



***A review of production statistics for the cut-flower and foliage sector 2015 (part of AHDB Horticulture funded project PO BOF 002a)***

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## **1.0 Introduction**

### **1.1 Background**

The bulk of UK cut-flower production consists of alstroemeria, chrysanthemum, column stock and lisianthus under glass, forced daffodil, lily and tulip bulbs, and field-grown daffodil and gladiolus. In addition a small area of non-bulb cut-flower crops has been grown in the open, comprised largely of natural-season chrysanthemum, pinks and sweet william, dried flowers and, more recently, sunflower and peony.

For many years, the UK had a low *per capita* purchase of cut-flowers compared with many other western European countries, providing little incentive for UK cut-flower growers to expand production or to hope to compete with well-established Dutch exporters and the emerging producer countries in Africa and South America. But between the late-1980s and early-2000s the UK's imports of cut-flowers rose from some £125m *per annum* to around £550m. But over the same period the farm-gate value of cut-flower production in England & Wales (E&W) remained static at around £50m to £60m *per annum*, including the non-bulb outdoor flower sector worth some £5m to £10m annually.<sup>1</sup> This inertia has been attributed to a lack of 'know-how' in non-traditional UK crops and a culture of buying-in 'from across the water'.

In addition to the upwards trend in cut-flower purchases, several factors might have been expected to have bolstered UK cut-flower production, in both quantitative and qualitative terms:

- The avowed environmental interest of supermarket chains in production in the UK, with its closeness to markets, fresher products and fewer air-miles;
- The perceived interest of supermarkets and consumers in a greater variety of products;
- The success of relatively cheap Spanish tunnels in enabling season extension and weather protection for strawberries and other crops and finding that they are also useful in cut-flower production.

Despite the (largely positive) influence of supermarkets on cut-flower buying habits, they also present UK growers with the disincentive of reaching high specifications on low margins.

In order to provide UK growers with more information on the cut-flower production of a wider range of species grown in Spanish tunnels and in the open, AHDB Horticulture (formerly HDC) is funding the National Cut Flower Centre (CFC) to carry

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<sup>1</sup> For a justification of these figures, see section 3.1, UK production areas and values.

out near-market R&D, information gathering and technology transfer. As one part of the CFC's information gathering and dissemination role, a review has been conducted to summarise the statistics of the cut-flower business, looking at production areas and values worldwide, the crops being grown, and imports and exports to and from the UK and the EU. It was hoped that the information may provide some insights to guide UK growers at a time of huge changes in the cut-flower business globally. Reading large statistical compilations can be heavy-going, so one aim of this work was to extract the most relevant statistics and make it more succinct and accessible.

## **1.2 Sources of statistical information**

Business statistics are maintained by governments for planning and accounting purposes and by trade organisations to inform and advise their members. Government statistics appear particularly prone to evolving over time: for example, the UK's official agricultural statistics may have started as a comprehensive, well-resourced planning tool (say, to assess the nation's food sustainability following WW2), but over time the exercise has been cut-back due to budgetary restraints, leading, for example, to the use of estimates rather than surveys, and restricting the data collected to that needed to fulfil internal and international requirements (say, providing customs and excise data and serving EU-wide statistical exercises). A specific example in the UK is the recent loss of regular production area statistics for the ornamentals sector, despite the maintenance of import and export data.

Although numerous agricultural statistics can be accessed over the Internet, this review has not attempted to be comprehensive, rather to concentrate on a few key sources. The main UK source consulted was Defra's *Basic Horticultural Statistics (BHS)* 2014, the latest run of compilations of the UK's area, production, value and external trade of horticulture crops. Unfortunately, since 2004 the coverage of *BHS* has been reduced to provide full statistics and a commentary on trends for fruit and vegetables only: for ornamental plants and flowers it contains only historic data (up to 2004) on production areas, etc., though ongoing import and export data have been maintained to date. In compiling *BHS* the authors state "Data on area, yield and production for England and Wales are [now] collected for Defra under contract by an external provider. These are combined with data for Scotland<sup>2</sup> and Northern Ireland<sup>3</sup> to produce UK figures [but] breakdowns to county or Government Office Region

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<sup>2</sup> <http://www.gov.scot/Publications/2014/06/3709>

<sup>3</sup> <http://www.dardni.gov.uk/index/statistics/statistical-reports/statistical-review-of-ni-agriculture.htm>

cannot be produced due to the method by which the statistics are collated.” The publication has therefore become less useful to those in the ornamentals industry than formerly. Recent editions of *BHS* and their datasets can be accessed on-line.<sup>4</sup>

The area of bulbs and flowers grown in the open are further broken down to genera and other broad categories in Defra’s (former) annual *Survey of Vegetables and Flowers (SVF)*, also available on-line.<sup>5</sup> These surveys were published annually until 2006 and then in 2008, probably for the last time due to budgetary restraints (Defra Crops Statistics, personal communication, 2015).

Longer runs of agricultural statistics that summarise data from Defra’s *June and December Surveys* can be found on-line<sup>6</sup> under the general title of ‘Structure of the agricultural industry’. For horticulture, however, the information is limited to the areas of horticultural farms, the combined area of horticultural crops, and the areas of hardy nursery stock (HNS), bulbs and flowers (including ‘bulbs and flowers in the open’) and ‘glasshouses (flowers, foliage and other plants)’. Note that in this context crops in Spanish tunnels are treated as ‘in the open’ rather than protected. Areas, values, volumes, price indices, imports and exports for a similar range of categories are given in Defra’s annual publication *Agriculture in the UK*.<sup>7</sup>

The main trade report consulted was the annual *International Statistics Flowers and Plants (ISPF)* published by the International Association of Horticultural Producers (AIPH) and Union Fleurs and currently in its 62nd volume (2014). It is compiled by Sabine Hübner, Leibniz University, Hanover, Germany.<sup>8</sup> Using a comprehensive range of national statistical sets, the compiler provides a mass of information on the producer countries and world trade. Its compilations of exports to and imports from the EU are particularly useful.

Sources of data are fully acknowledged in the text. This review was completed in August 2015.

### 1.3 Disclaimer

In this report all data have been interpreted in good faith, but the definitions of terms and the mode of data acquisition may vary from survey to survey, from time to time,

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<sup>4</sup> <https://www.gov.uk/government/collections/horticultural-statistics>

<sup>5</sup>

<http://webarchive.nationalarchives.gov.uk/20130123162956/http://www.defra.gov.uk/statistics/files/defra-stats-foodfarm-landuselivestock-vegflowers-latestrelease.pdf>

<sup>6</sup> <https://www.gov.uk/government/collections/Structure-of-the-agricultural-industry>

<sup>7</sup> <https://www.gov.uk/government/statistics/agriculture-in-the-united-kingdom-2013>

<sup>8</sup> <http://aiph.org/resources/statistical-yearbook/>

and from country to country, while the riders and footnotes attached to the original information are often numerous and not always unambiguous.

Please note that:

- In many data sets the most recent data are 'provisional' and subject to change (they are usually confirmed for the next edition);
- A recurrent problem of interpretation is the many changes made by compilers over time in definitions or in the classes of product included or excluded;
- Sometimes the data collected extends to individual species or genera, but these may be omitted from published surveys because they may be based on small samples and therefore may be imprecise or may compromise the anonymity of growers of speciality crops (Defra Crops Statistics, personal communication, 2015);
- In different surveys the data for foliage (cut-foliage), branches, etc., may or may not be included in the total 'cut-flower' figures;
- Very often 'totals' do not total, due to rounding or other errors;
- In some cases apparently erroneous data have been found and these have been omitted from the review (and these have been noted);
- Gaps in tables and figures can be difficult to interpret, and in this review '0' has been used for a true zero value, and '-' for a value that is missing for some reason (such as non-collection or non-availability);
- No attempts have been made to reconcile the figures in different surveys.

The following definitions have been used in this review:

- 'Cut-flowers' and 'foliage' always refer to the 'fresh' product, and where product has been 'treated' (e.g. dried, dyed or preserved), this is specified;
- The terms 'bulbous' plants or 'flower-bulbs' are used in the commercial sense to include true bulbs, corms, tubers, etc. (i.e., ornamental geophytes generally);
- Surveys often refer to the numbers of items produced as 'number of pieces', very often (but not always) meaning the number of stems.

## 2.0 Cut-flower sales and prices

### 2.1 Buying habits

The table below summarises consumption of flowers, plants and garden goods for some EU and other countries.<sup>9</sup> Amongst the EU countries, Norway's *per capita* spend is exceptionally high at €283 (although the population is small), while those of the Czech Republic and Spain are low (€41 and €28, respectively). *Per capita* consumption in the UK has risen from historically low levels, but at €86 is still relatively low for western European countries though similar to the larger economies of Japan and the USA.

Where both years' data are available, *per capita* consumption was static, or fell modestly, from 2011 to 2012 in most countries included. However, in Italy there was a marked reduction in spending while there was a significant increase in Sweden. On the whole, these figures do not appear to paint too pessimistic a picture for future sales of horticultural products.

	Spend per capita (€)		Total spend (€millions)		GNI <sup>1</sup> per capita (€1000s)	Population (millions) <sup>2</sup>
	2011	2012	2011	2012	2012	2012
Austria	158	153	1,132	1,102	33.5	7.2
Belgium	137	135	1,249	1,240	31.0	9.2
Czech Rep.	41	32	368	284	19.4	9.0
Denmark	189	184	862	846	33.6	4.6
France	129	127	6,802	6,732	28.6	53.2
Germany	139	139	9,851	9,900	33.4	71.0
Italy	113	75	5,871	3,835	26.5	51.1
Netherlands	125	126	1,724	1,738	33.5	13.8
Norway	283	- <sup>3</sup>	1,131	-	51.5	4.1
Spain	28	-	1,092	-	24.2	39.7
Sweden	150	170	1,174	1,342	33.5	7.9
UK	86	78	4,453	4,062	27.0	52.3
Japan	-	66	-	8,539	28.4	127.6
USA	-	85	-	26,700	41.0	313.9

<sup>1</sup> Gross National Income at Purchasing Power Parity.

<sup>2</sup> Population aged 15+ years except for Japan and USA where entire population used.

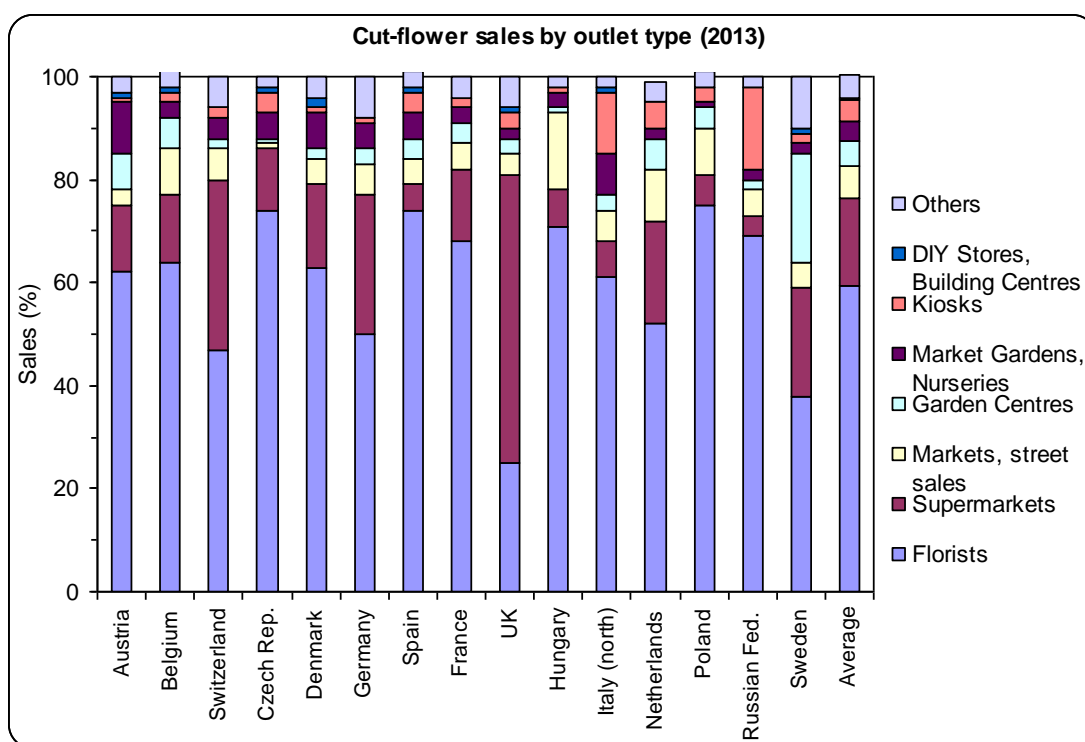
<sup>3</sup> – Indicates data not available.

The histogram below shows sales at different types of outlet for several European

<sup>9</sup> Source: *ISPF 2014*, from many national and other sources



countries.<sup>10</sup> The averages across these countries are also shown (right-hand column). Most sales - on average making up over three-quarters of the total - are made in florists and supermarkets. A major difference between countries is the ratio of florist to supermarket sales, and in this instance the UK is a clear exception, having the largest proportion of supermarket sales (56%) and the smallest of sales at florists (20%): in all other countries included the sales at florists top those at supermarkets, though Switzerland and Germany appear to have started on a similar trend to the UK. The smallest proportions of supermarket sales – 4 or 5% - occur in the Russian Federation and Spain. Sweden is unusual in its high proportion of garden centre sales (21%), while the Russian Federation and Italy have relatively high sales at kiosks (16 and 12%, respectively).



<sup>10</sup> Sales are expressed as 2013 expenditure on cut-flowers by consumers aged 18–65 years; Source: *ISPF 2014*, from *FloraHolland*, 2014.

## 2.2 Wholesale markets

The turnover of a number of wholesale markets for flowers and plants is shown in the next table.<sup>11</sup> Unfortunately it contains few continuous runs of data over the whole period.

Turnover of some wholesale markets for flowers and plants, 2007-2013								
Market	Country	Turnover (€million)						
		2007	2008	2009	2010	2011	2012	2013
Euroveiling Brussels	Belgium	- <sup>1</sup>	-	-	31	27	-	32
Veiling Holambra, São Paulo	Brazil	67	78	-	137	148	160	163
Ontario Flower Growers	Canada	-	-	-	14	15	-	15
UFG United Flower Growers, Burnaby	Canada	-	-	-	24	35	-	35
Douan Flower Market, Kunming	China	-	-	-	380	400	-	-
Kunming International Flower Auction	China	-	-	-	-	-	-	46
SICA Marché aux Fleurs, Hyeres	France	-	-	-	35	30	-	30
Landgard (including Veiling Rhein-Maas)	Germany	883	913	1078	1145	1337	1314	1216
Veiling Rhein-Maas	Germany	-	-	-	250	282	319	316
Il Contadino Marsala	Italy	-	-	-	5	5	-	5
UC Flor San Remo	Italy	-	-	-	16	7	5	7
FAJ Flower Auction	Japan	-	-	-	220	207	-	207
Naniwa Flower Auction, Osaka	Japan	-	-	-	-	-	130	130
OTA Floriculture Auction	Japan	180	174	201	226	246	-	300
Flora Max	New Zealand	-	-	-	11	11	-	6
United Flower Auction	New Zealand	-	-	-	10	10	-	15
Multiflora Johannesburg	South Africa	-	-	-	18	19	-	21
Taipei Flower Auctions	Taiwan China	37	34	-	40	42	-	42
FloraHolland	Netherlands	4064	4074	3861	4130	4160	4400	4350
Plantion	Netherlands	92	96	95	105	115	-	86
SS Flora Koop Istanbul	Turkey	-	-	29	30	42	-	42
New Covent Garden (Flower Market)	UK	76	67	-	41	41	37	-

<sup>1</sup> – Indicates data not available.

<sup>11</sup> Source: *ISPF 2014*, from FloraCulture International (May 2014), FloraHolland and Landgard; note that some markets deal with plants as well as cut-flowers.

In terms of size, FloraHolland and Landgard are dominant, with 2013 turnovers of €million 7,350 and 1,216, respectively. Between 2007 and 2013 FloraHolland's turnover increased by 7% and Landgard's by 38%. In comparison many of the other markets are modest in size, but the growth of two should be noted: Veiling Holambra (São Paulo, Brazil) and OTA Floriculture Auction (Japan) currently have turnovers of €million 163 and 300, respectively, showing increases of 143 and 67% over the same period 2007 to 2013. In comparison the turnover of New Covent Garden in the UK was €million 37 in 2012, a fall of 51% since 2007.

Figures on the top-selling cut-flowers are available from some auction houses and government statistics, and some of these data provide quantities sold and average prices on a time-series. The table below gives this information for the top-20 sales by turnover (clock sales) of FloraHolland, The Netherlands.<sup>12</sup>

The top-20: quantity sold and average price for cut-flowers at FloraHolland 2009-2012										
	Quantity sold (million pieces) and % change over period					Average price (€/piece) and % change over period				
	2009	2010	2011	2012	Change	2009	2010	2011	2012	Change
Rose	2,701	2,655	2,561	2,336	-16	0.22	0.24	0.24	0.25	14
Tulip	1,143	1,211	1,215	1,168	2	0.13	0.14	0.12	0.13	0
Chrysanthemum (spray)	1,026	987	933	874	-17	0.18	0.21	0.22	0.25	39
Gerbera	610	592	584	570	-7	0.12	0.14	0.13	0.14	17
Lily	255	219	204	205	-20	0.41	0.50	0.50	0.46	12
Freesia	241	226	221	181	-25	0.14	0.16	0.15	0.18	29
Chrysanthemum (bloom)	160	157	161	155	-3	0.31	0.37	0.37	0.40	29
Alstroemeria	190	168	161	148	-22	0.15	0.17	0.17	0.18	20
Carnation	143	138	151	145	1	0.13	0.15	0.14	0.14	8
Hypericum	154	135	128	116	-25	0.15	0.17	0.17	0.19	27
Lisianthus	106	120	118	115	8	0.30	0.30	0.32	0.35	17
Gypsophila	154	114	105	91	-41	0.19	0.20	0.20	0.22	16
Limonium	52	49	62	67	29	0.18	0.22	0.20	0.19	6
Zantedeschia	85	77	63	63	-26	0.36	0.41	0.46	0.43	19
Anthurium	73	68	62	55	-25	0.40	0.43	0.45	0.46	15
Peony	55	64	61	55	0	0.39	0.37	0.39	0.49	26
Helianthus	48	41	40	39	-19	0.26	0.28	0.27	0.26	0
Hippeastrum	41	39	39	36	-12	0.77	0.75	0.79	0.84	9
Hydrangea	23	27	30	32	39	0.99	1.03	1.03	1.02	3
Cymbidium	20	18	16	15	-25	2.03	2.40	2.45	2.64	30
Total of sales	9,002	8,670	8,478	7,945						
Average prices						0.20	0.22	0.22	0.22	

<sup>12</sup> Source: *ISPF* 2014, from FloraHolland, 2013

Rose, tulip and spray chrysanthemums easily maintained their dominance in terms of numbers sold over this period. The figures show an overall fall in number of pieces (stems) sold of 13% between 2009 and 2012, as a result of large decreases in the numbers of many cut-flowers sold, but particularly of gypsophila (41% fall over the period) and anthurium, cymbidium, freesia, hypericum and zantedeschia which saw drops of sales of ca 25% over the same time. Despite this, as compensation the overall average price increased by 9%, with many subjects (alstroemeria, bloom chrysanthemum, spray chrysanthemum, cymbidium, freesia, hypericum, and peony) showing increases of 20% or more. However, the prices of one of the top subjects, tulip, remained static - a cause for concern.

The table below gives equivalent information for Plantion, The Netherlands.<sup>13</sup> This is a market that operates on a smaller scale than FloraHolland, but it shows similar trends. Over the period 2011 to 2013 there was a decreasing sales volume but increasing prices.

Plantion's sales are dominated by roses, though decreasing from 201 million pieces in 2011 to 48 million in 2013, a drop of 76%, with prices increasing by 54% over the same time. Next in importance are tulips, with sales decreasing by 29% and prices increasing by 12% over the period, and gerbera, with both sales and prices decreasing (by 19 and 15%, respectively). Other flowers were traded at much lower volumes, so it would be unwise to draw any substantial conclusions from the figures.

The top-20: quantity sold and average price for cut-flowers at Plantion 2011-2013								
	Quantity sold (million pieces) and % change over period				Average price (€/piece) and % change over period			
	2011	2012	2013	change	2011	2012	2013	change
Rose	201	92	48	-76	0.13	0.16	0.20	54
Tulip	31	29	22	-29	0.17	0.18	0.19	12
Gerbera	21	16	17	-19	0.13	0.14	0.11	-15
Alstroemeria	7	6	6	-14	0.15	0.17	0.17	13
Carnation	9	9	6	-33	0.11	0.13	0.15	36
Chrysanthemum (spray)	7	6	6	-14	0.20	0.24	0.22	10
Chrysanthemum (bloom)	4	5	6	50	0.29	0.30	0.19	-34
Hypericum	4	4	4	0	0.14	0.15	0.14	0
Peony	4	3	4	0	0.31	0.41	0.34	10
Lily	4	4	3	-25	0.35	0.36	0.34	-3
Lisianthus	4	4	3	-25	0.25	0.32	0.25	0
Veronica	0	0	3	- <sup>1</sup>	-	-	0.14	-
Anthurium	2	2	2	0	0.33	0.35	0.32	-3
Eucalyptus	2	2	2	0	-	0.24	0.24	-
Hippeastrum	2	1	1	-50	0.79	0.81	0.75	-5
'Huis' <sup>2</sup>	0	1	1	-	-	0.58	0.59	-
Hydrangea	1	0	1	0	0.75	-	0.81	8
Fatsia	5	6	0	-100	0.14	0.13	-	-100
Helianthus	3	2	0	-100	0.25	0.23	-	-100
Ranunculus	0	3	0	0	-	0.18	-	-
Total of all sales	2322	2207	2148					
Average price					0.27	0.28	0.30	

<sup>1</sup> – Indicates data not available or not applicable, except that the missing values in the eucalyptus row appeared doubtful and was excluded.

<sup>2</sup> The meaning of 'huis' is unclear.

<sup>13</sup> Source: ISPF 2014, from Plantion, 2012, 2013, 2014; note that the rows for 'other' and 'mixed' cut-flowers have been omitted, and that spray and bloom chrysanthemums were not clearly distinguished.

Sales volumes and average prices for the main cut-flower lines of Veiling Rhein-Maas, Germany, are shown in the next table – but note that, due to procedural changes, the figures for each year are not strictly comparable.<sup>14</sup> Major products from this house are mini-gerberas, large-flowered roses and single-flowered tulips. No clear trends on quantities or prices can be seen, but the high values of cut-foilage and hippeastrum may be noted.

High-selling cut-flowers for Veiling Rhein-Maas, 2011 and 2012				
	Quantity sold (million pieces)		Average price (€/piece)	
	2011	2012	2011	2012
Alstroemeria	8	- <sup>1</sup>	0.16	-
Anthurium	3	1	0.44	0.54
Aralia	11	-	0.14	-
Carnation, standard	7	11	0.12	0.09
Chrysanthemum, bloom	-	2	-	0.32
Chrysanthemum, multiflora	12	16	0.21	0.22
Chrysanthemum, multiflora Santini	11	6	0.17	0.24
Foliage (bunch)	-	3	-	1.04
Gerbera, large-flowered	11	31	0.24	0.26
Gerbera, mini	48	37	0.14	0.13
Gypsophila	10	5	0.19	0.20
Helianthus	-	5	-	0.16
Hippeastrum	-	3	-	0.81
Hypericum	7	3	0.18	0.20
Peony	-	4	-	0.37
Ranunculus	-	8	-	0.19
Rose	-	43	-	0.20
Rose, large-flowered	172	148	0.22	0.23
Rose, small-flowered	15	9	0.12	0.13
Solidago	7	-	0.13	-
Tulip, double flowers	-	17	-	0.15
Tulip, single flowers	-	57	-	0.13

<sup>1</sup> – Indicates data not available.

<sup>14</sup> Source: *ISPF* 2014, from Veiling Rhein-Maas, Straelen-Herongen

Cut-flower sales volumes and average prices are shown for the USA in the following table.<sup>15</sup>

Quantity sold and average price for wholesale cut-flowers in the USA, 2012-2013										
	Quantity sold (million pieces) and % change over period					Average price (€/piece) and % change over period				
	2010	2011	2012	2013	change	2010	2011	2012	2013	change
Tulip	156	169	162	157	1	0.28	0.25	0.28	0.28	0
Gerbera	108	114	108	99	-8	0.23	0.20	0.23	0.23	0
Lily	93	141	100	90	-3	0.49	0.41	0.50	0.52	6
Iris	58	62	55	55	-5	0.19	0.19	0.18	0.18	-5
Gladiolus	90	60	61	52	-42	0.19	0.19	0.19	0.23	21
Leather-leaf fern (bunch)	28	26	32	32	14	0.78	0.70	0.77	0.75	-4
Snapdragon	31	35	35	32	3	0.20	0.18	0.22	0.22	10
Rose	39	37	33	31	-21	0.32	0.35	0.37	0.41	28
Delphinium	27	20	19	18	-33	0.20	0.22	0.28	0.30	50
Alstroemeria	10	9	11	11	10	0.13	0.14	0.16	0.16	23
Lisianthus	8	7	10	9	13	0.29	0.30	0.32	0.34	17
Chrysanthemum (pompon) (spray)	8	8	9	8	0	1.06	1.01	1.01	1.01	-5
Orchids (bloom)	8	7	6	5	-38	0.75	0.60	0.68	0.48	-36
Total of sales	664	695	641	599						
Average price						0.39	0.36	0.40	0.39	
Orchids (bloom)	8	7	6	5	-38	0.75	0.60	0.68	0.48	-36
Total of sales	664	695	641	599						
Average price						0.39	0.36	0.40	0.39	

These statistics for the period 2010 to 2013 show a somewhat different pattern to those of the Dutch houses described above: the downward trend in volumes is less consistent, and average prices have remained more or less static. Numerically, sales were dominated by five subjects, tulip, gerbera, lily and iris – of which sales volumes and average prices changed relatively little over the period, and gladiolus – which showed a 42% drop in sales, partly compensated by a 21% rise in prices.

Trends for the flowers in a secondary group showed mixed fortunes. Interestingly, a foliage subject – leather-leaf fern – showed sales increased by 14%, though prices fell a little (4%). Sales of snapdragon, rose and delphinium changed by +3, -21 and -33%, respectively, with corresponding effects on prices: increases of 10, 28 and

<sup>15</sup> Source: AIPH 2014, from Floriculture Crops 2013 Summary (June 2014), USDA, National Agricultural Statistics Service, 15-States-Program, Operations with \$100,000+ Sales. Non-equivalent figures for carnations excluded; figures quoted are per stem or spike, except where specified.

50%. Other flowers were traded at much lower volumes, so it is inadvisable to make any definite conclusions – although it is difficult to ignore the substantial reduction in both volumes and prices of orchids.

Flower auction sales and prices are also available for the Taiwan China auctions – see table below.<sup>16</sup> Lilies are the predominant crop, with a following group of chrysanthemums, rose and gerbera. Only lilies and chrysanthemums showed a marked increase in sales volume in 2013 compared with the previous year, while prices fell or were little changed over the same period, except for standard chrysanthemums and gerberas which showed modest increases.

Total sales volumes and average prices for 'top-10' cut-flowers at the Taiwan China auctions, 2012-2013, listed in descending order of turnover in 2013 Note that anthurium is sold per single stem					
	Stems per bunch	Quantity (million bunches)		Average price (€/bunch)	
		2012	2013	2012	2013
Lily, 'Casablanca'-type	5	8.43	8.82	3.73	3.51
Chrysanthemum, spray	12	6.42	6.84	1.48	1.25
Rose	20	3.52	3.38	2.49	2.31
Chrysanthemum, standard	12	3.02	3.26	1.61	1.70
Gerbera	10	5.71	5.04	0.95	1.07
Lily, 'Acapulco'-type	5	1.49	1.48	3.55	3.15
Lisianthus	10	1.49	1.62	2.33	2.14
Gladiolus	20	1.43	1.42	2.73	2.39
Anthurium	1	12.76	12.70	0.26	0.25
Carnation	10	- <sup>1</sup>	1.56	-	1.30
Dendrobium	10	0.99	-	3.28	-

<sup>1</sup> – Indicates not in 'top-10' this year.

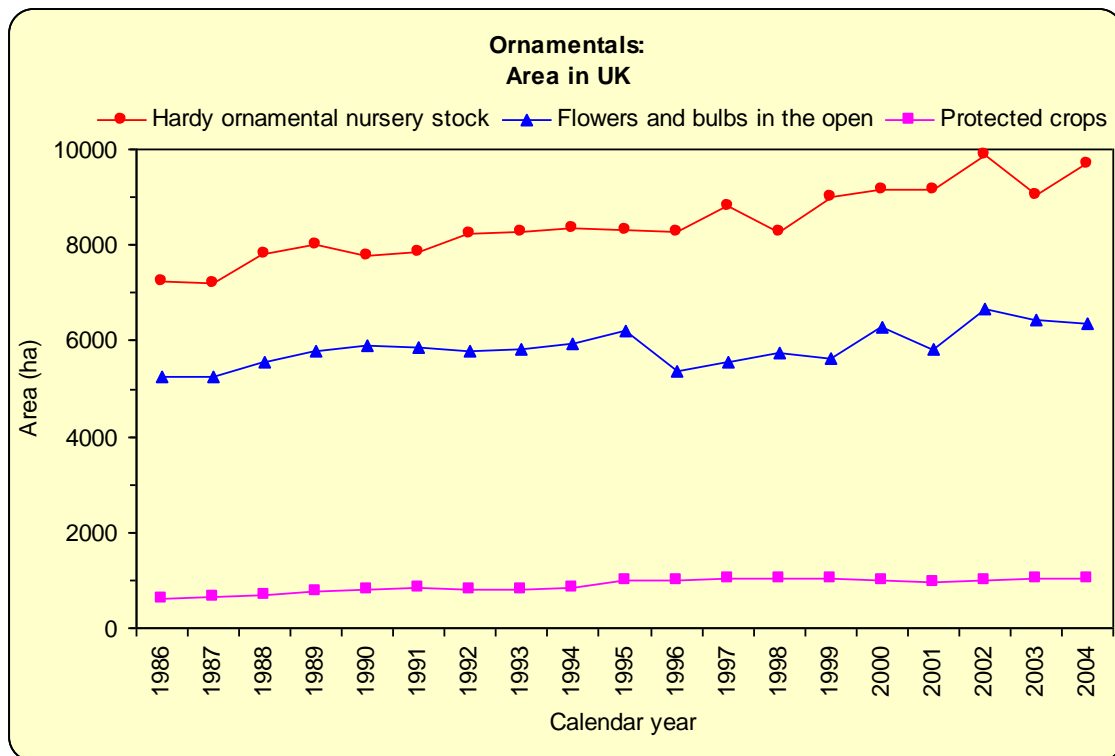
<sup>16</sup> Totals across the Taipei, Taichun, Kaohsiung, Changhua and Tainan auctions. Source: *ISPF 2014*, from Taiwan Floriculture Exporters Association (TFDA), Taiwan China.



### 3.0 Basic Horticultural Statistics UK<sup>17</sup>

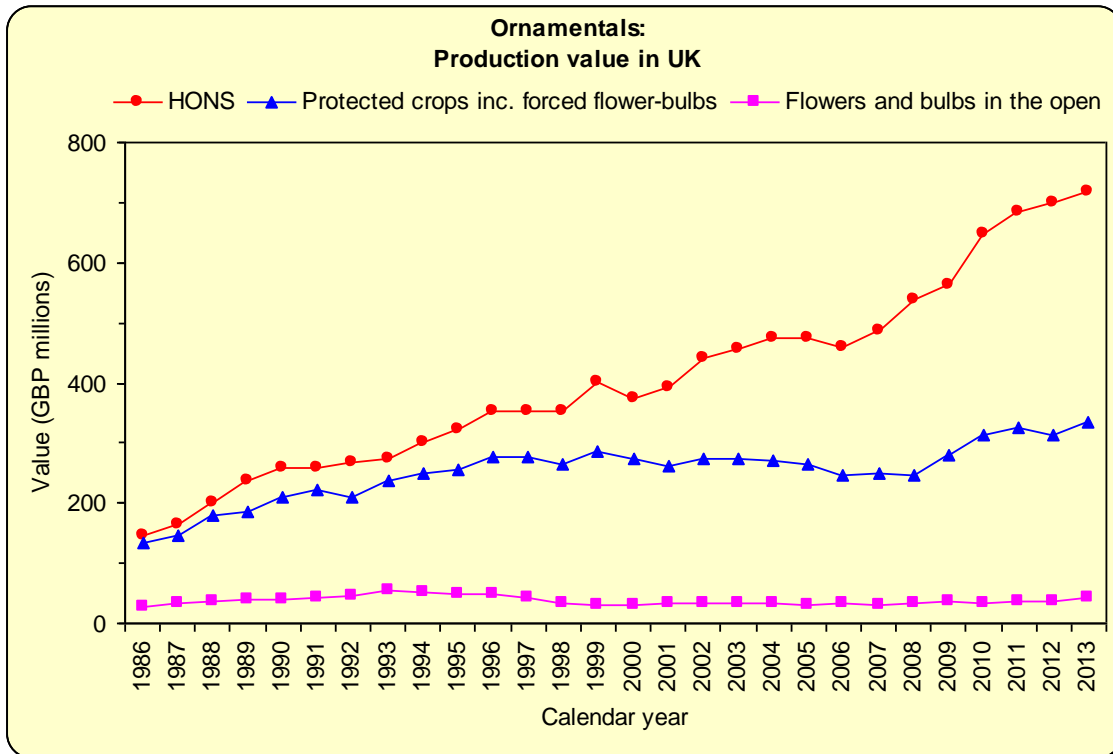
#### 3.1 UK production areas and values

Despite a setback in the late 1990's, the UK area of bulbs and outdoor flowers (BOF) increased by 22% over the 18 years to 2004, the last year for which this statistic is available, to stand at 6,376ha (see figure below). Over the same time the hardy ornamental nursery stock (HONS) area rose steadily by 34% to 9,685ha, while protected ornamentals increased from a very small base by 70% to 1,029ha, probably due to the widespread adoption of Spanish tunnels.

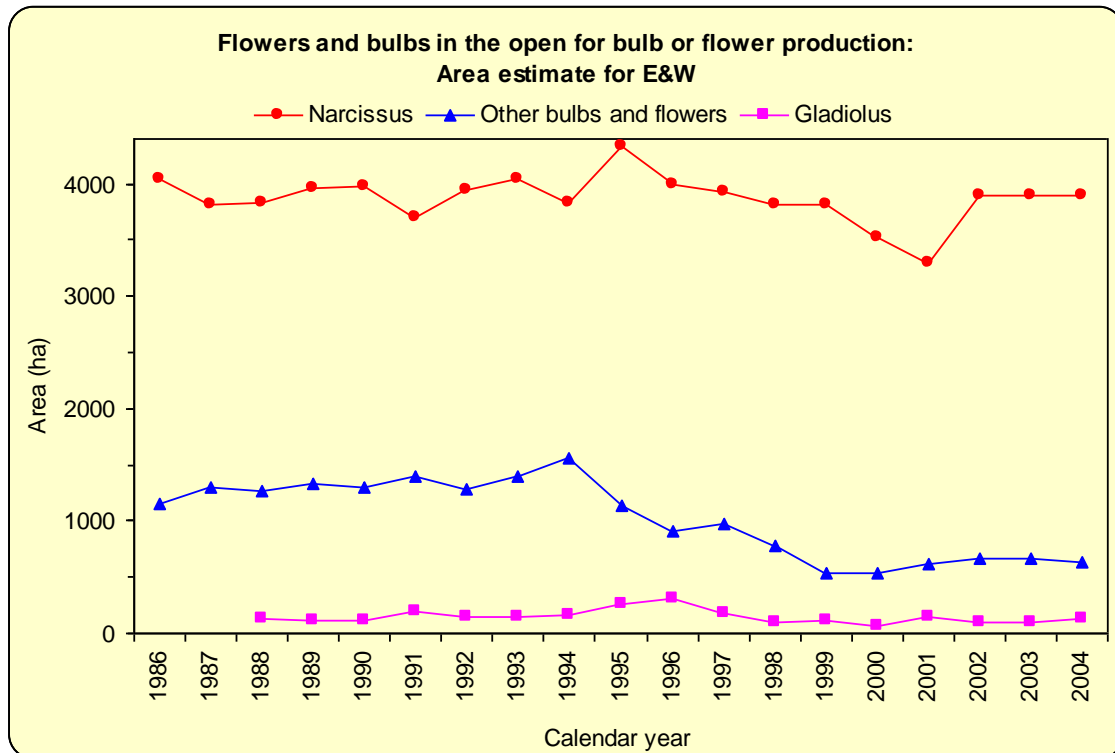


<sup>17</sup> From BHS 2014.

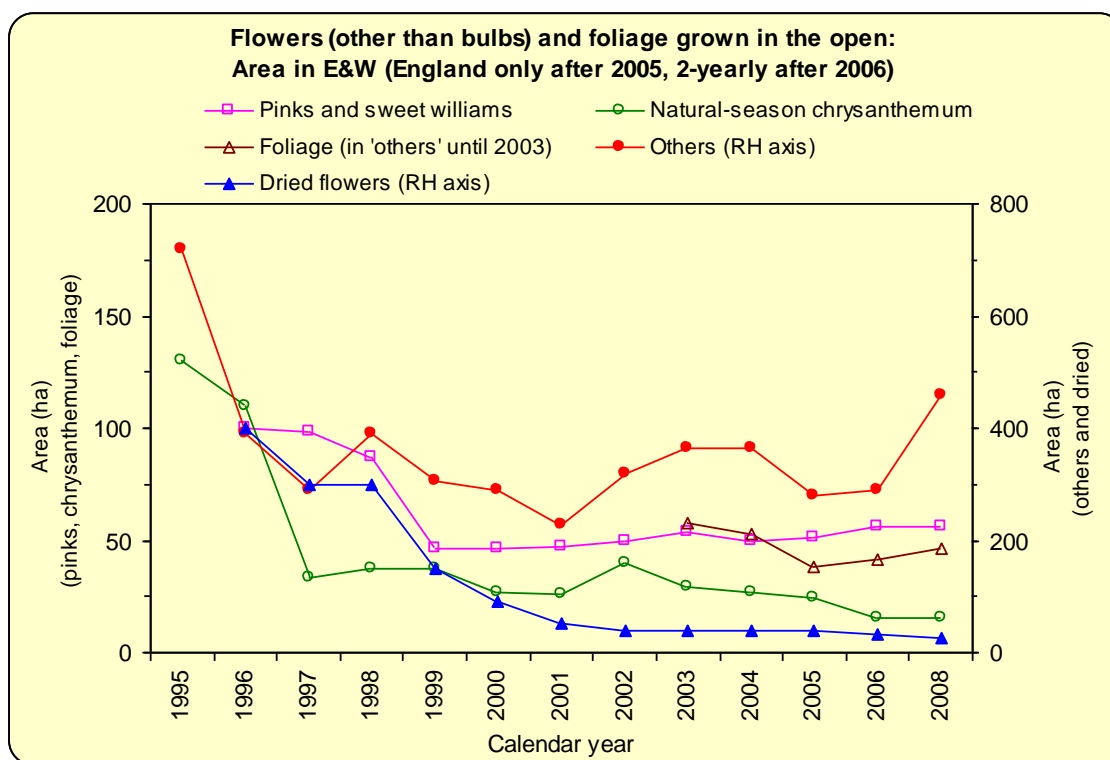
With HONS again included for comparison, the next figure shows that the value of protected ornamentals (including forced bulbs) increased steadily, from a production value of £135m in 1986 to £335m in 2013. Over the same period the production value of flowers and bulbs in the open remained steady at around £38m (£44m in 2013).



The figure below shows that the area of flowers and bulbs in the open is dominated by daffodils - 80% of the total - most crops of which are now picked (rather than being reserved for only the production of 'dry' bulbs). With minor fluctuations, the area remained at ca 4,000ha from 1986 to 2004. Other bulbs and flowers accounted for ca 1,300ha until 1994, fell sharply until 1999, and then remained steady at ca 600ha, until at least 2004. The gladiolus crop was recorded separately from 1998 and has remained steady at ca 100ha.

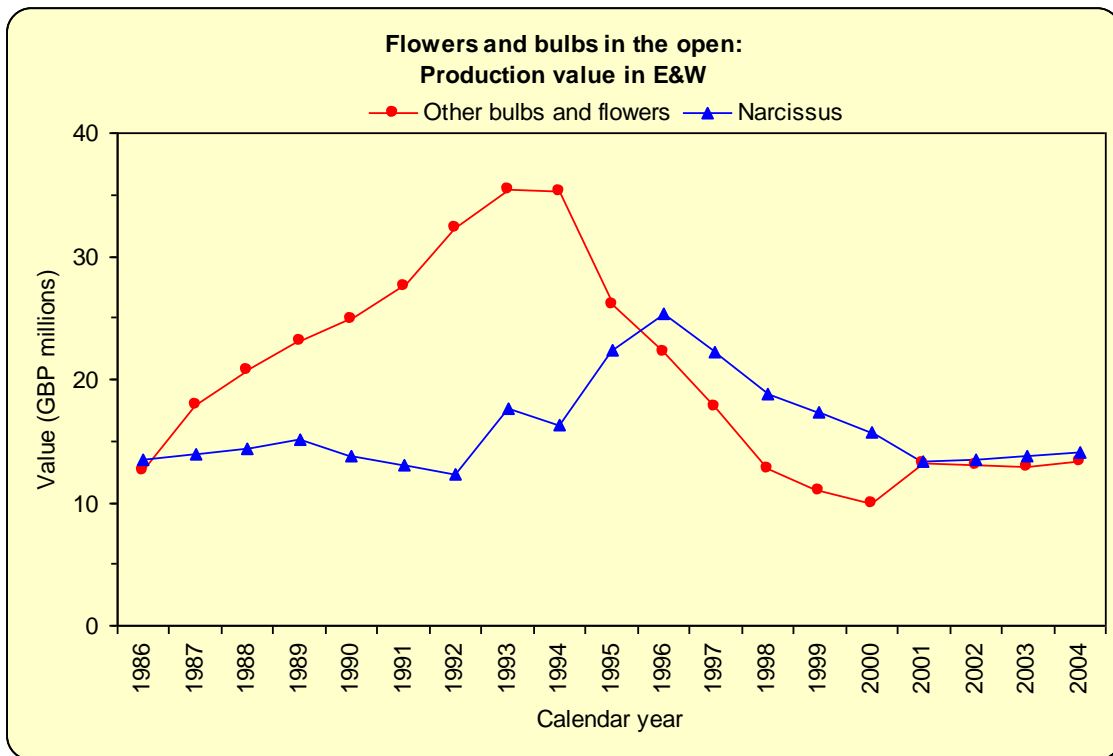


The figure below splits the non-bulb flowers grown in the open into the main categories.<sup>18</sup> Separate figures are collected only for natural-season chrysanthemum and pinks/sweet william. The latter were recorded on about 100ha in 1996, and were about halved by 2008, the end of the dataset, while natural-season chrysanthemum fared even less well, falling from 130ha in 1995 to only 16ha in 2008. As seen in many other datasets in this report, of the types recorded, the 'other' category has been most widely grown, although the figure for 1995 (720ha) was distorted as both dried flowers and pink/sweet william were included in 'other' up to that year. After settling around 300ha for most of the period shown, the 'other' cut-flowers have enjoyed a rise in popularity since 2005, rising to over 400ha in 2008. Dried flowers were recorded on 400ha in 1996, since when they have declined steadily to stand at 25ha in 2008. Foliage, recorded separately only since 2003, has since remained steady at around 40 to 60ha.



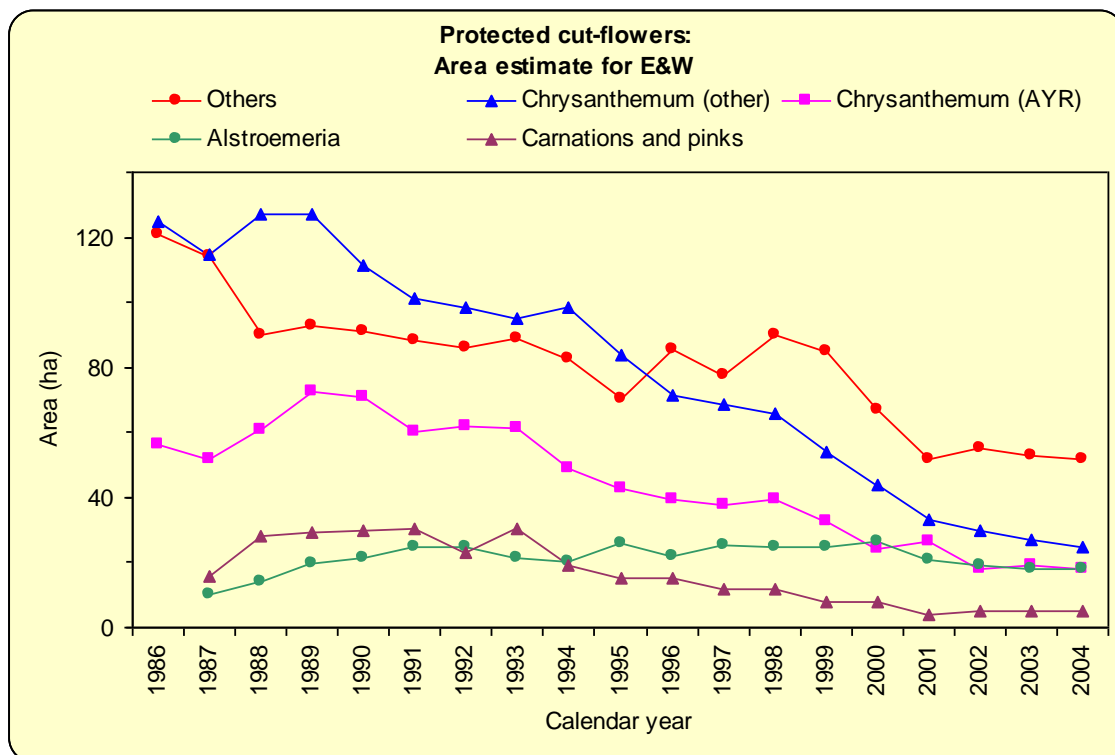
<sup>18</sup> These figures are not available in *BHS* but appear in *SVF* which ran until 2008; a more detailed split to species is known to be collected but is unfortunately not published.

The production values for flowers and bulbs in the open are shown below, split to daffodils and others, in the following figure. It shows that, despite some considerable fluctuations along the way, the values were virtually the same in 2004 as in 1986 - £13m to £14m for each sub-sector. Other flowers and bulbs in the open climbed rapidly from 1986 to peak at £35m in 1993-1994, before falling back. Daffodils increased later, from 1986 to peak at £25m in 1996, before falling back.

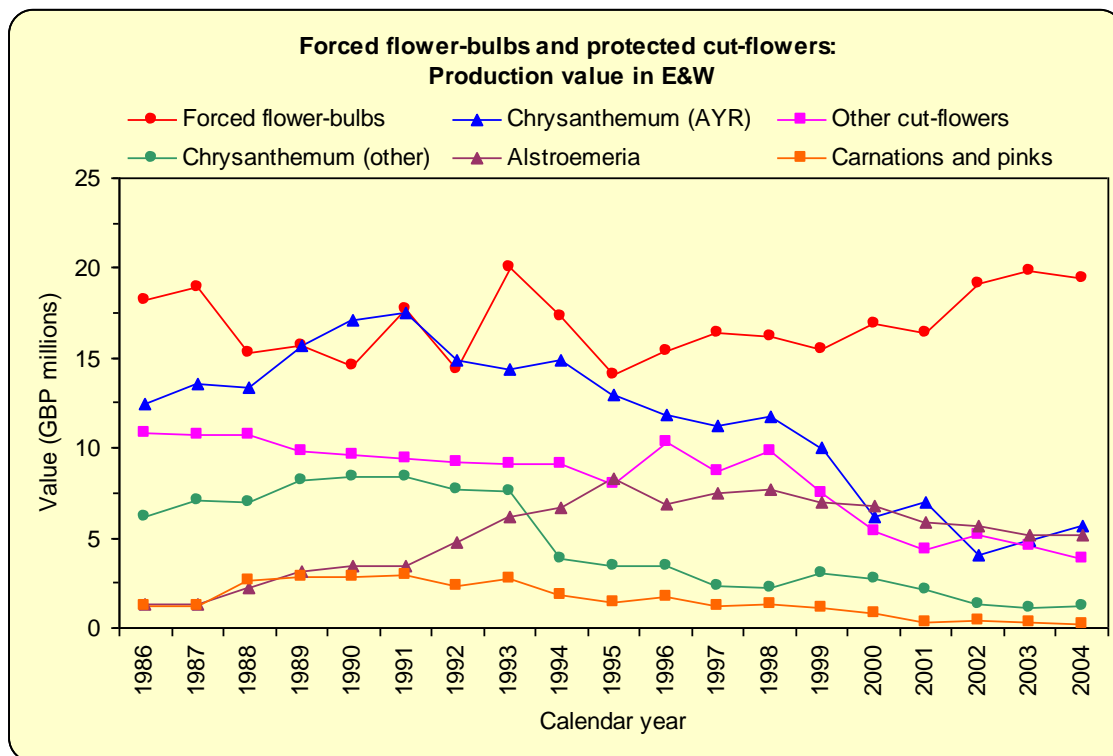


Moving to protected cut-flowers, the figure below shows a striking change that occurred between the late-1980s and 2004: the area of chrysanthemum (both all-year-round (AYR) and others) experienced a substantial fall of about 75%, to 25 and 18ha for AYR and others, respectively. The smaller areas of alstroemeria (average 21ha) and carnation/pinks (16ha) have been maintained over the period 1987 to 2004.

Although the 'other' species also suffered a large drop in area over this period – partly due to recording alstroemeria and carnation/pinks separately starting in 1987 - they have held their own since 2001 and now dominate the sector with some 52ha grown in 2004.

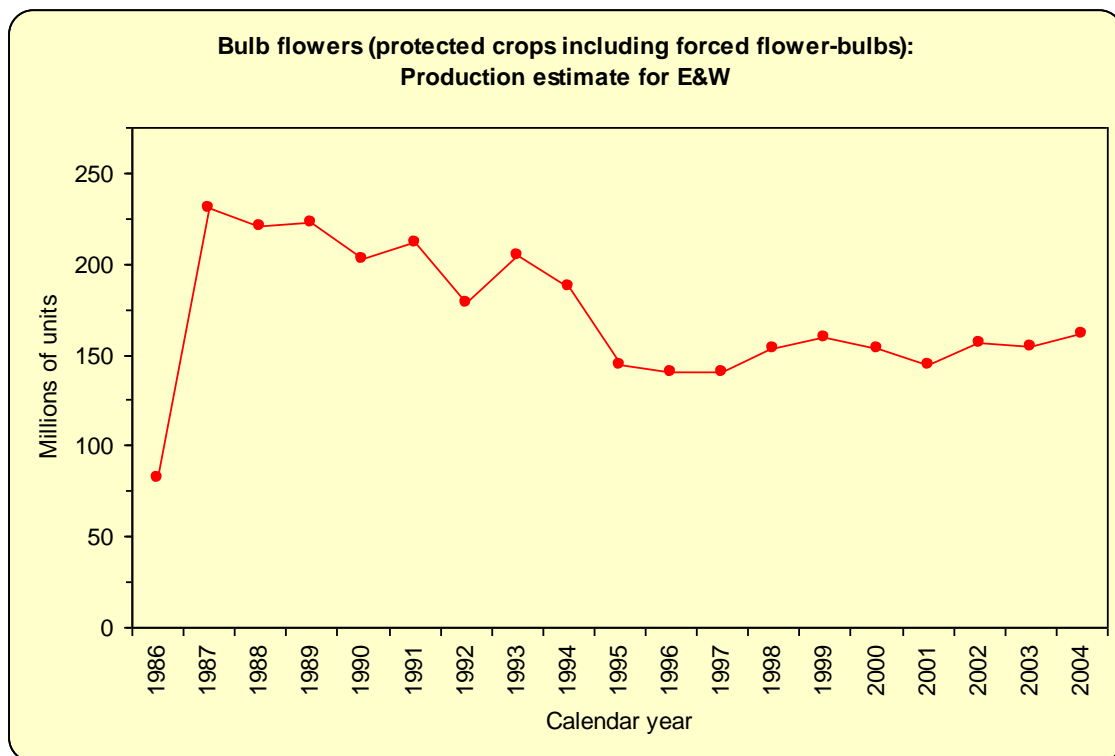


The next figure for production value adds forced bulbs to the crops in the previous figure. After something of a production trough in the intervening years, the 2004 values for forced bulbs were back to 1986 levels of about £19m. Over the same period the value of alstroemeria climbed from £1m to £5m, but the values of AYR chrysanthemum fell from £12m to £6m, other chrysanthemum from £6m to £1m, and 'other' flowers from £11m to £4m. The carnation/pinks crop dwindled below £1m.



It is difficult to compute the total value of cut-flower production in E&W or UK from these figures, due to the categories of data collected. This sector should include forced flower-bulbs (about £19m for E&W in 2004), protected cut-flowers (AYR and other chrysanthemum, alstroemeria, carnations/pinks and other cut-flowers, £16m in all), narcissus cut-flowers (about half of the output of field-grown narcissus which are grown for bulbs and cut-flowers, say £7m for cut-flowers), and other flowers and bulbs in the open (£13m), a total of say £50m to £60m *per annum*.

In Basic Horticultural Statistics UK (*BHS*) production estimates are available only for protected bulb-flowers (including forced crops), shown below. Ignoring the unexplained and outlying value for 1986, the area fell from a peak of 231ha (1987) to 145ha in 1995; thereafter it remained steady, with 161ha in 2004. This sector will formerly have included large quantities of forced daffodil, while more recently lily and tulip will have predominated.



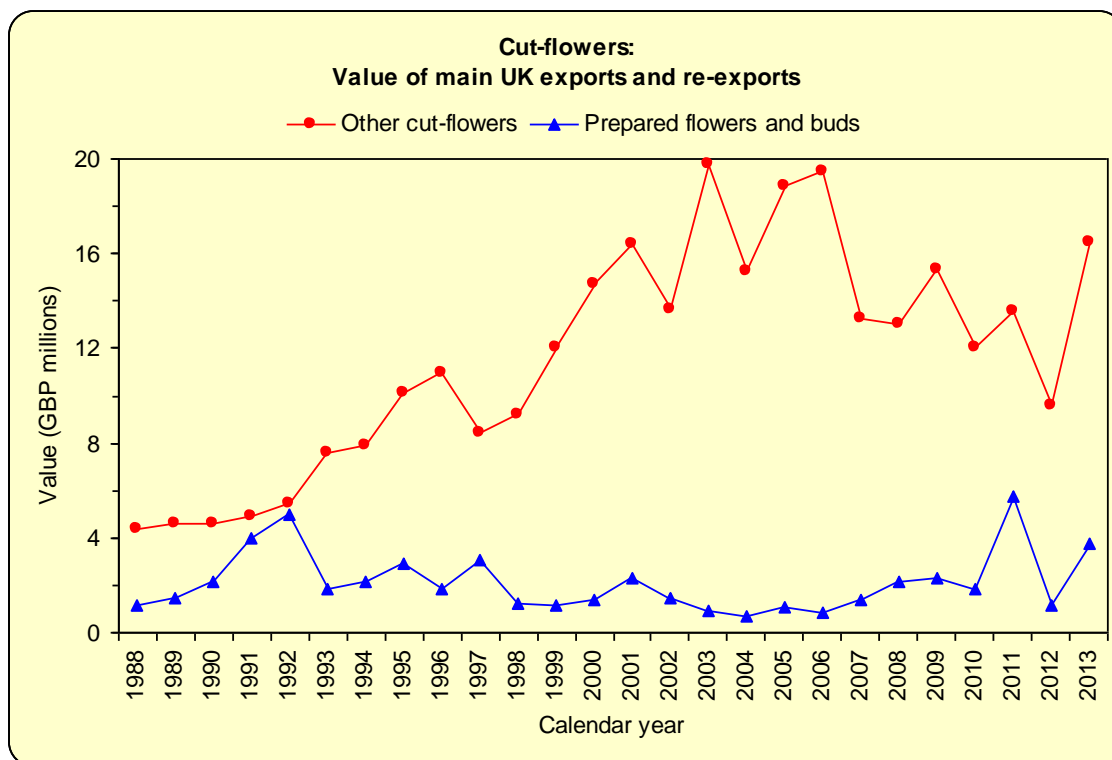


### 3.2 UK exports and imports

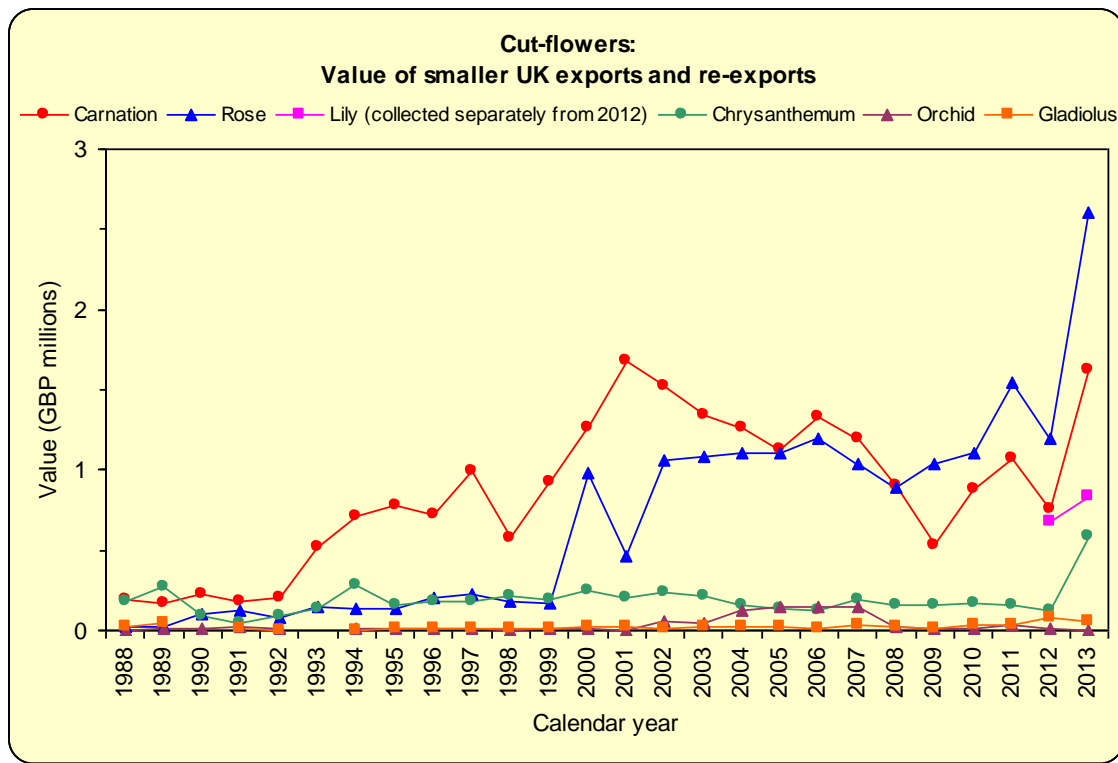
For exports and imports, *BHS* uses Customs & Excise figures (which continue to be available to the present time) rather than industry-based figures (which do not). Note that Customs & Excise data cover the UK rather than E&W.

Regarding exports and imports, the following graphs should be interpreted with care because of the gross (10-fold or more) differences in scale between UK imports and UK exports. 'Exports' include re-exports, so not all product exported was necessarily grown in the UK, some will have been imported then exported. Data on lilies were collected separately only from 2012.

Shown in the next figure, the main cut-flower export categories were 'other' cut-flowers, up to £16m in 2013 from £4m in 1988, and 'prepared flowers and buds', up to £4m from £1m.

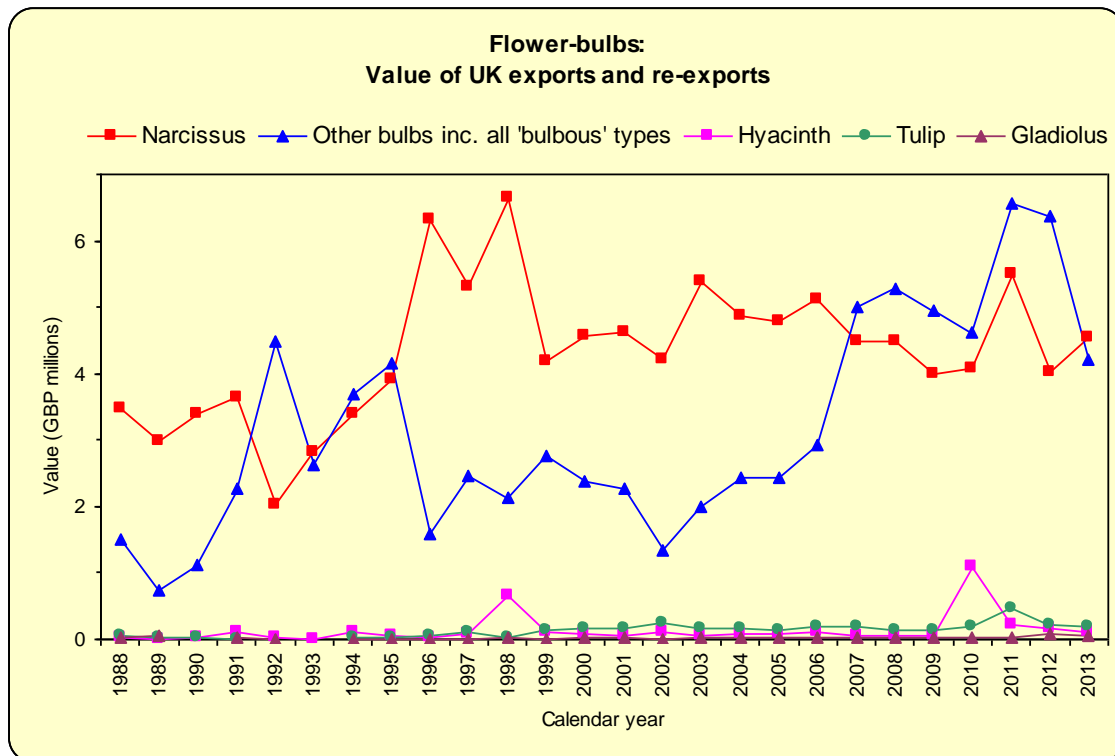


Smaller export categories comprise rose (£3m in 2013), carnation (£2m), lily and chrysanthemum (ca £1m each), the export of which had been negligible in the late-1980s (see figure below).



Bulb exports and imports are also recorded, and exports are shown in the next figure. Despite some fluctuations in the intervening years, exports of daffodil bulbs at the start and end of the period (1988-2013) remained about £4m.

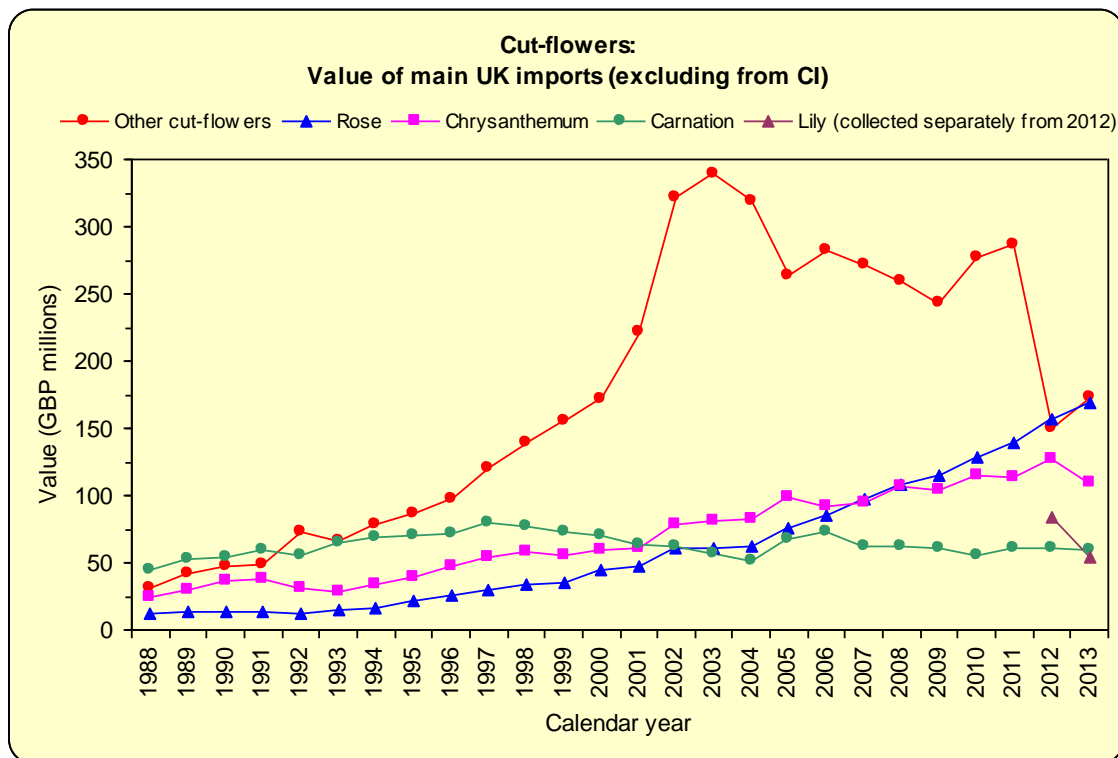
Exports of other bulbs rose erratically from £1.5m to £4m over the same period. Exports of hyacinth, tulip and gladiolus bulbs each remained at <£1m annually, apart from occasional blips.



Turning to UK imports, trade in cut-flowers grew substantially between 1988 and 2013. The principal categories are shown in the next figure. The 'other' category was most notable, going from £31m to £173m over the period, with a striking broad peak reaching £339m between 2000 and 2012. Part of this post-2011 decrease may have been due to the separate collection of data for lily after that time.

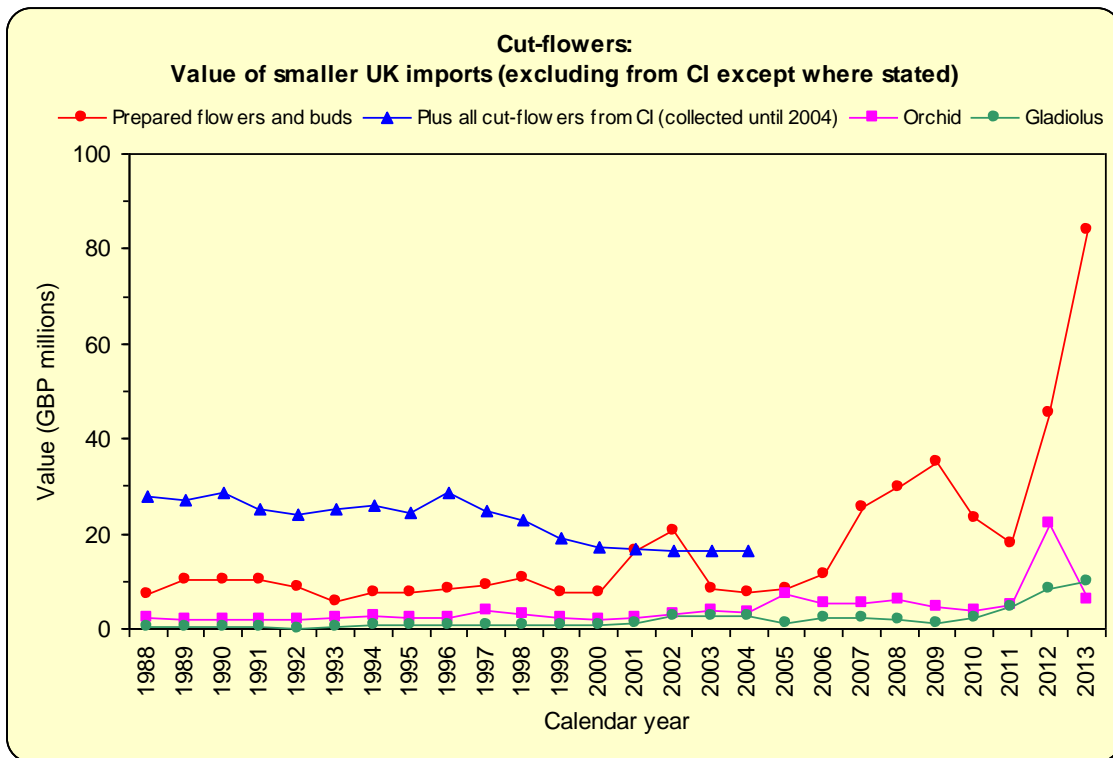
Over the same period the imports of rose climbed from £12m to £168m, of chrysanthemum from £24m to £109m, and of carnation from £44m to £60m. In 2012 and 2013 imports of lily were £53m to £83m.

Smaller categories are shown in the subsequent figure.

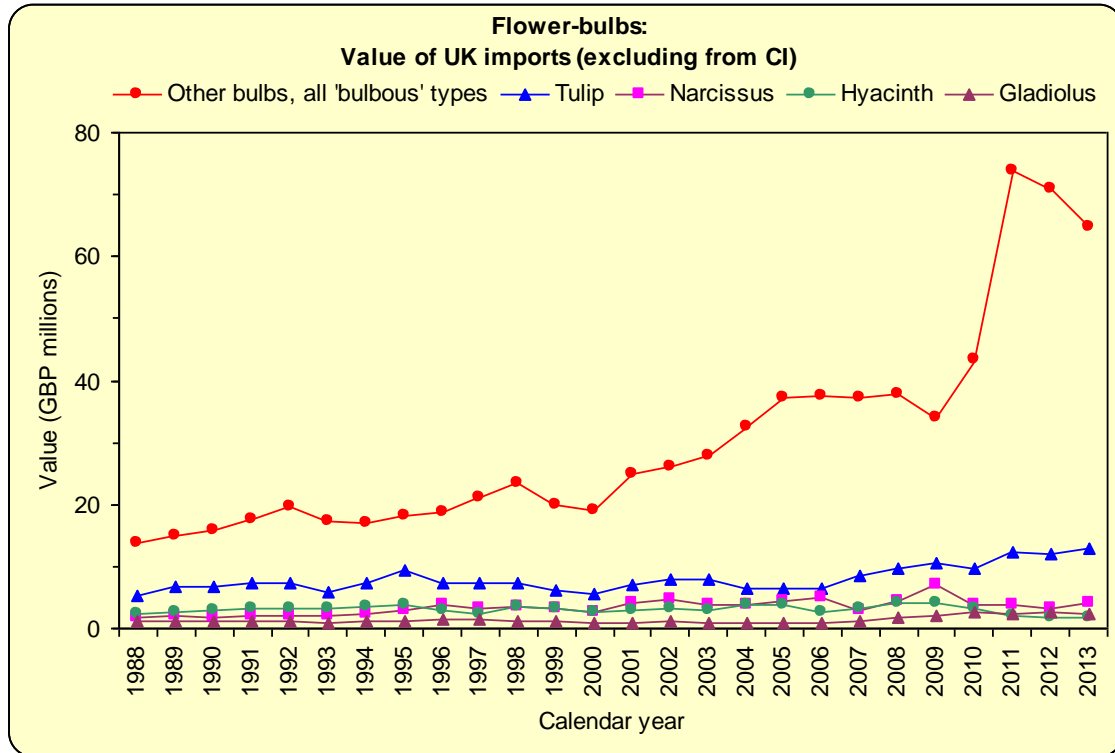


The smaller categories of imports comprised 'prepared flowers and buds', only £7m in 1988 but reaching £84m in 2013, with a massive increase between 2006 and 2013. Gladiolus increased from <£1m to £10m over the same period, and orchids from £2m to £6m.

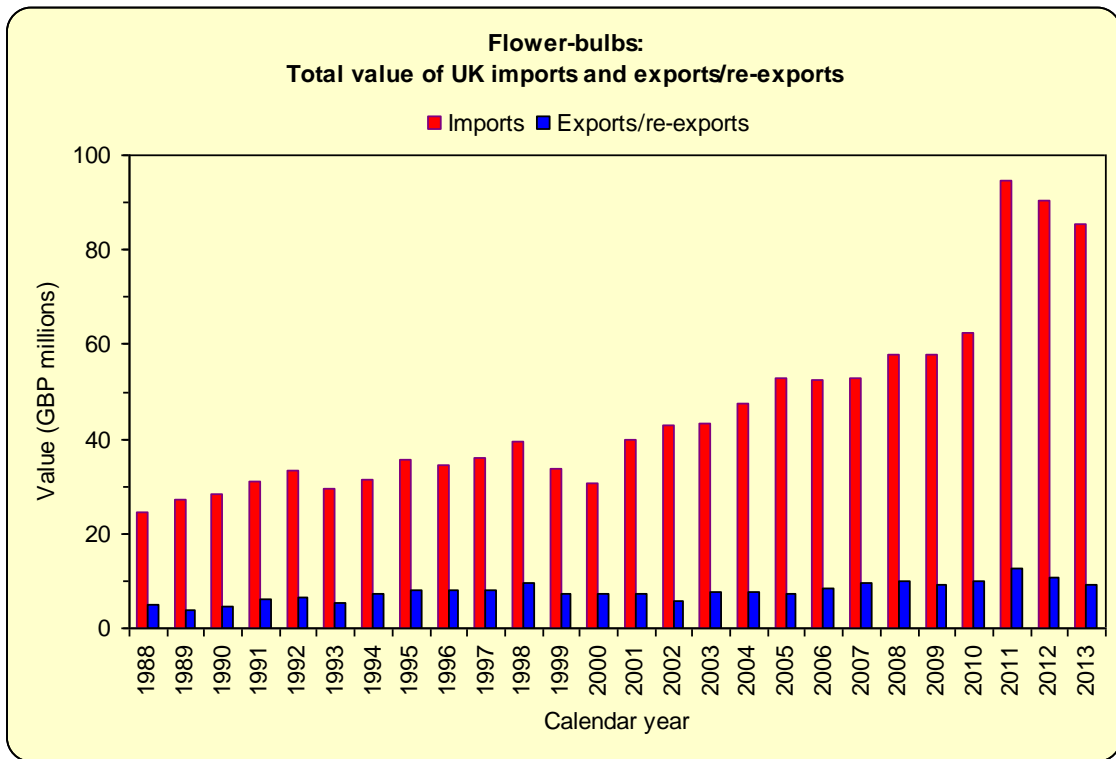
Imports of all cut-flowers from the Channel Islands (CI) were recorded separately until 2004; they had been running at £16m to £28m *per annum*.



As the next figure shows, tulip bulb imports rose from £5m to £13m over this period. Imports of daffodil, hyacinth and gladiolus bulbs remained at up to £5m each over the whole period. In contrast, imports of other bulbs rose steadily from £14m in 1988 to £65m by 2013, increasing massively between 2009 and 2011.



The imbalance between UK exports and imports are summed up in the next two figures, for cut-flowers and bulbs respectively.



## **4.0 UK exports and imports country by country**

International Statistics Flowers and Plants (*ISFP*) 2014 provides a matrix of imports and exports – who exports what and to whom – for the main cut-flower and foliage sub-sectors.<sup>19</sup> The information on UK exports and imports – far more detailed than as given in *BHS* – is summarised in this section.

### **4.1 Cut-flowers**

The next figure sets the style for the following graphs. In descending order of size, it shows in blue the 2013 imports of all cut-flowers from all countries supplying more than €10,000 of cut-flowers. Shown in red are the destination countries for UK exports of cut-flowers.

As expected, the UK's imports of cut-flowers are utterly dominated by the Netherlands, with massive imports worth nearly €550m annually. Dutch exports are followed by those of Kenya (€60m), Columbia (€35m), Spain (€11m) and South Africa (€8m), with a further ten countries each sending over €1m worth of product.

The UK's exports are primarily to the Netherlands (€11m), 'other EU countries' (€11m)<sup>20</sup> and Denmark (€2m), with smaller amounts going to a variety of other countries.

*ISFP* 2014 provides a further breakdown of the trade in cut-flowers to six main types – rose, chrysanthemum, lily, gladiolus, carnation and orchids - plus 'other' cut-flowers and 'treated' cut-flowers, described below.<sup>21</sup>

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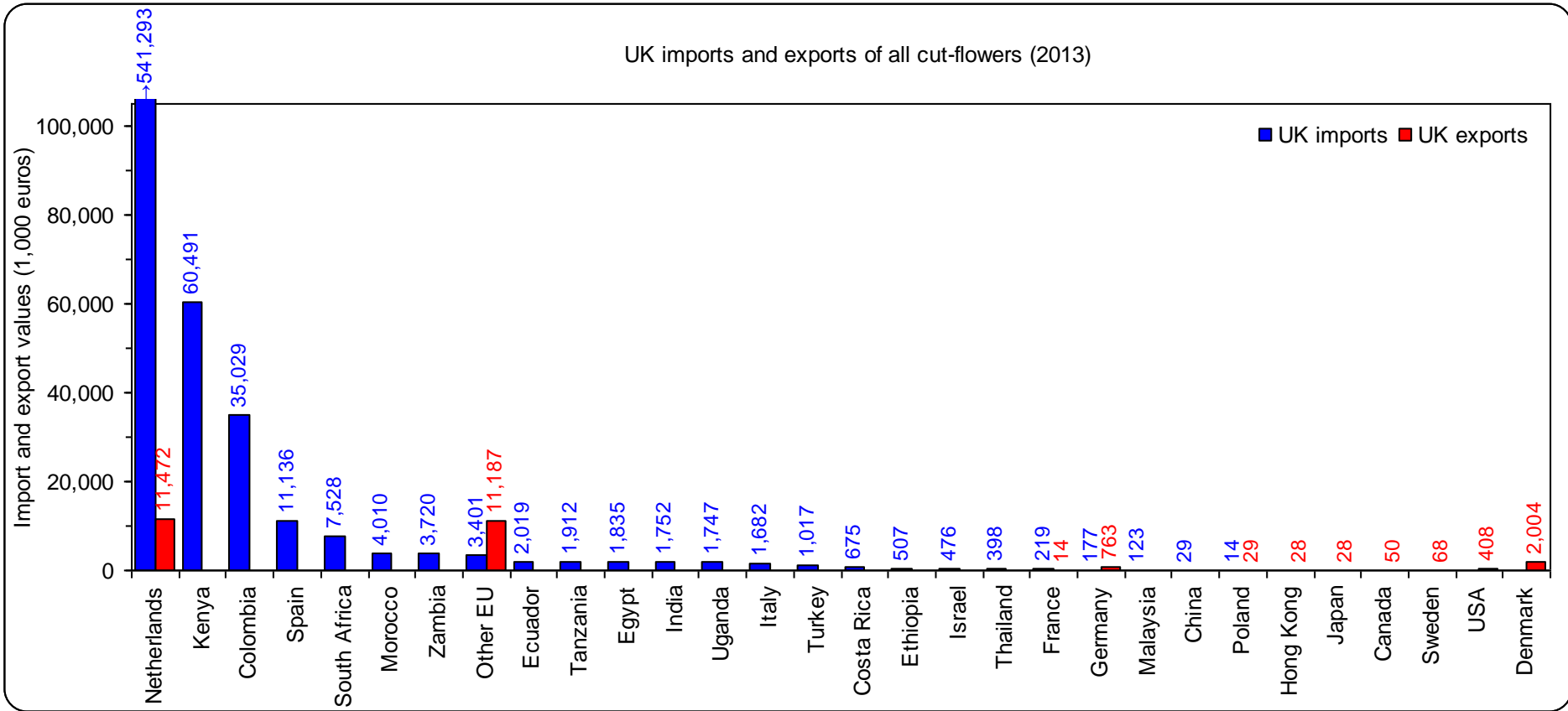
<sup>19</sup> Data for 'Christmas trees and cut conifer branches' has not been included in this review.

<sup>20</sup> In the context of *ISFP* 2014 'other EU countries' means those not listed individually in the matrices of importing and exporting countries, i.e. Bulgaria, Croatia, Cyprus, Estonia, Greece, Ireland, Latvia, Lithuania, Malta, Portugal, Romania, Slovakia and Slovenia.

<sup>21</sup> *ISFP* 2014 contains errors in the tables for lily and gladiolus so these are excluded from this report.



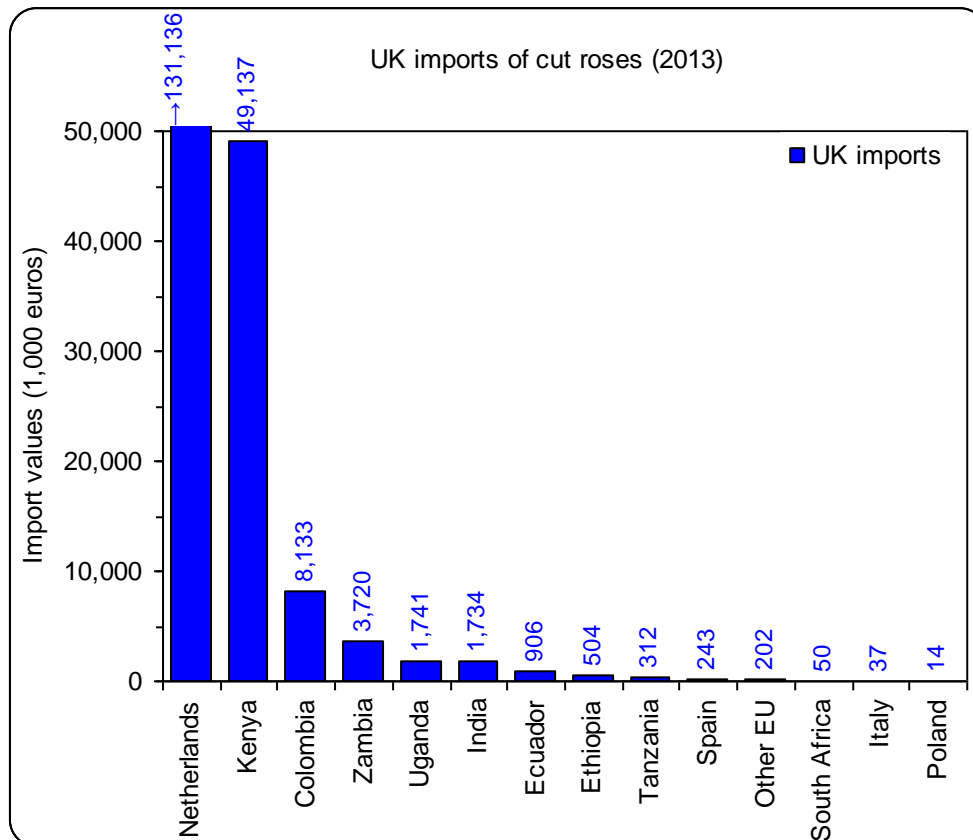
UK imports and exports of all cut-flowers (2013)



## 4.2 Rose

As shown in the following figure, the Netherlands dominates rose imports to the UK, worth €131m annually. This is followed by imports from Kenya (€49m), Columbia (€8m), Zambia (€4m), Uganda (€2m) and India (€2m), with smaller imports from a number of other countries.

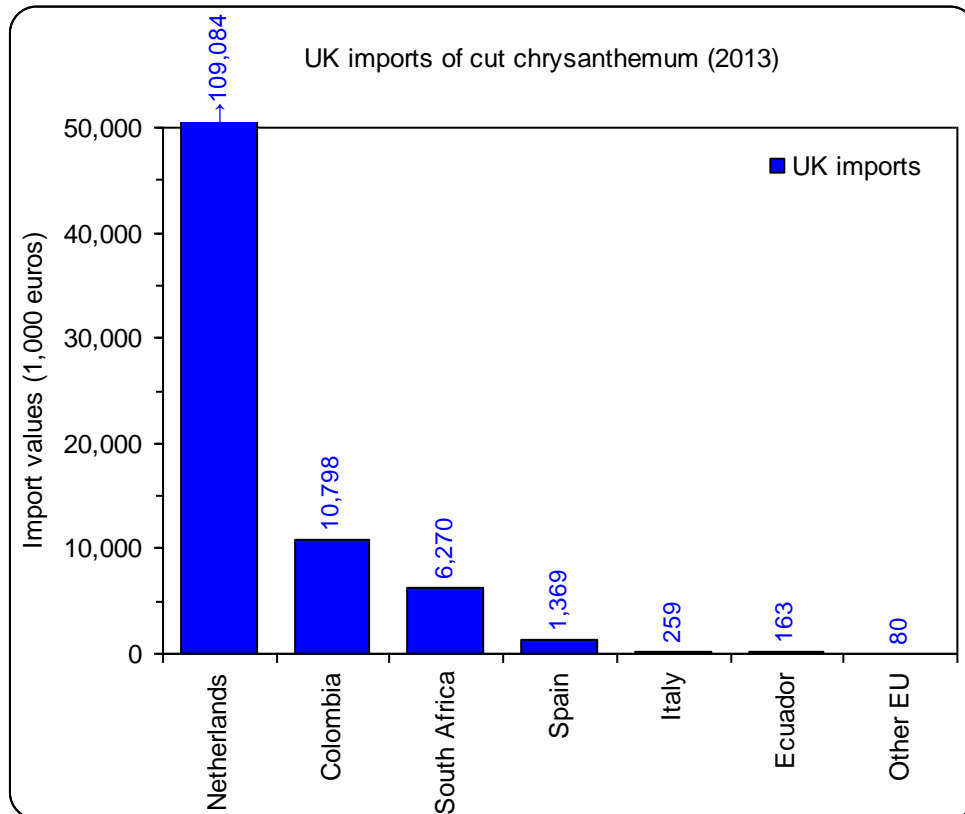
No UK exports of roses are listed.



### 4.3 Chrysanthemum

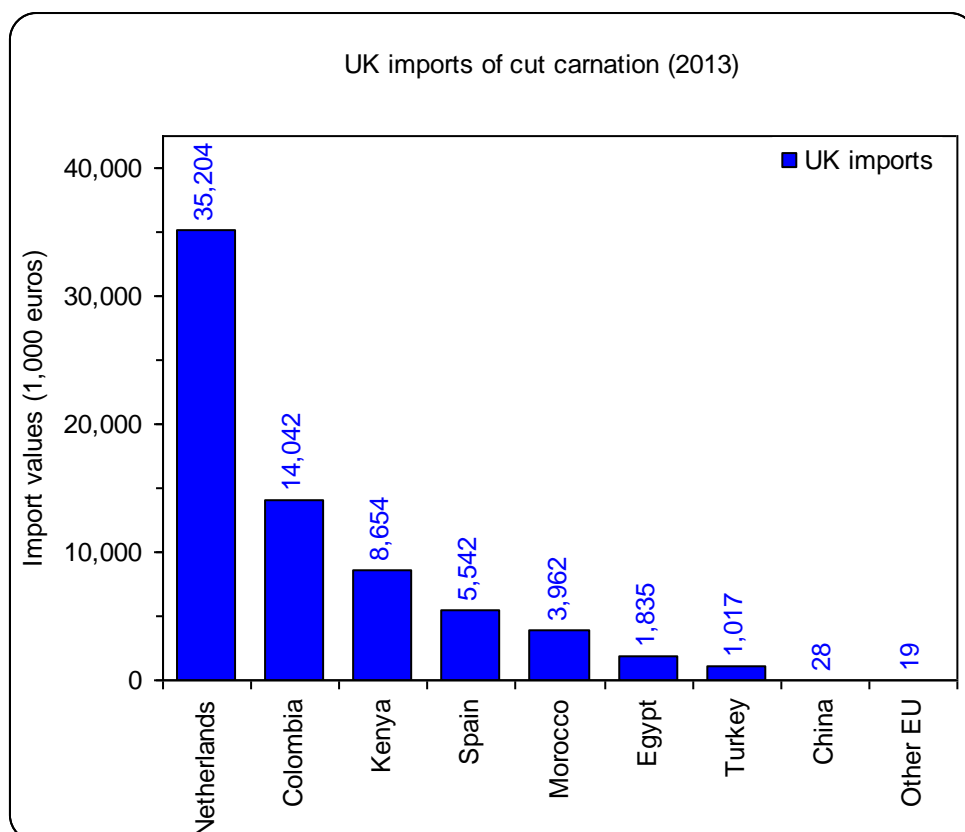
The figure below shows that the Netherlands also dominates UK imports of chrysanthemum, worth €109m annually. Other significant imports are from Columbia (€11m), South Africa (€6m) and Spain (€1m).

No UK exports of chrysanthemum are listed.



#### 4.4 Carnation

Again, the Netherlands (€35m), Columbia (€14m), Kenya (€9m) and Spain (€6m) lead imports to the UK, followed by Morocco (€4m), with smaller amounts from other countries. No UK exports of carnation are listed.

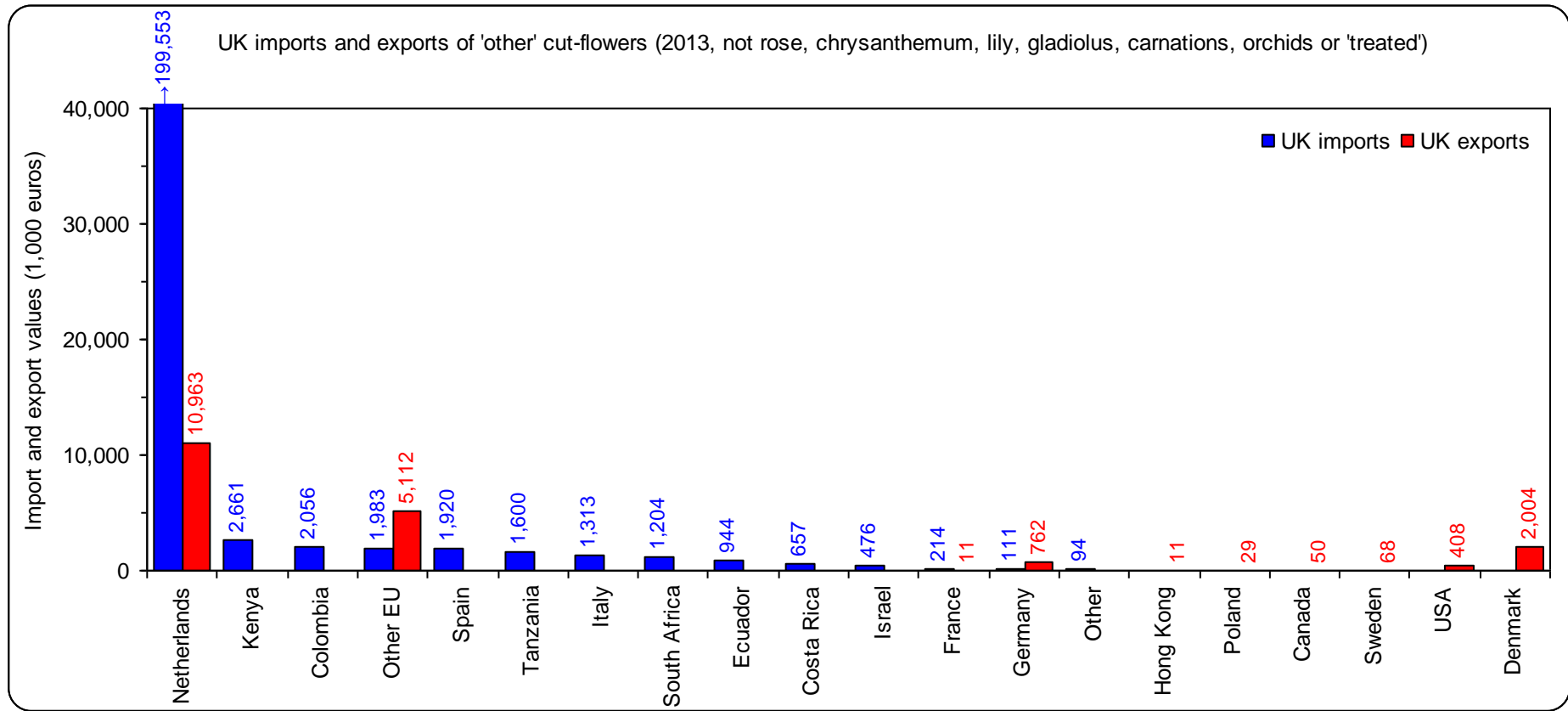


#### 4.5 Orchids

The bulk of the cut orchids that are imported to the UK come from the Netherlands, valued at €7m. Other substantial sources are Thailand (€0.4m) and Malaysia (€0.1m), with a small amount from 'other EU countries' (€0.01m). No UK exports of orchids are listed.

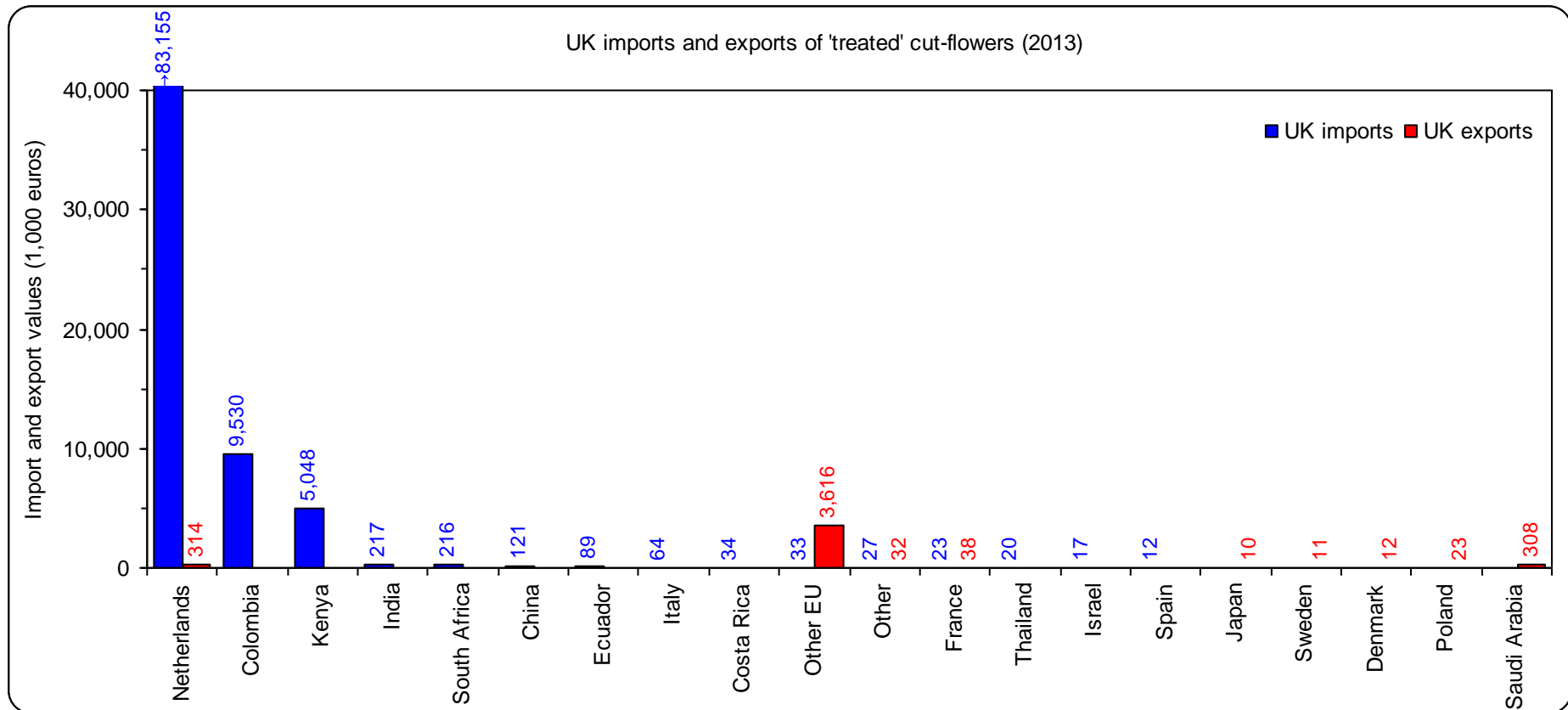
#### 4.6 'Other' cut-flowers

The next figure shows UK imports and exports of cut-flowers once the main types (rose, chrysanthemum, carnation and orchids) and any 'treated cut-flowers' have been removed. Imports to the UK are massively dominated by the Netherlands, with a value of nearly €200m, and no other country comes close to this in their own right: Kenya, Columbia, 'other EU countries', Spain, Tanzania, Italy, South Africa and Ecuador each send exports worth only €1m to €3m to the UK. The UK exports some product in this category: primarily to the Netherlands (€0.1m) and the 'other EU countries' (€0.1m), Denmark, Germany and the USA.



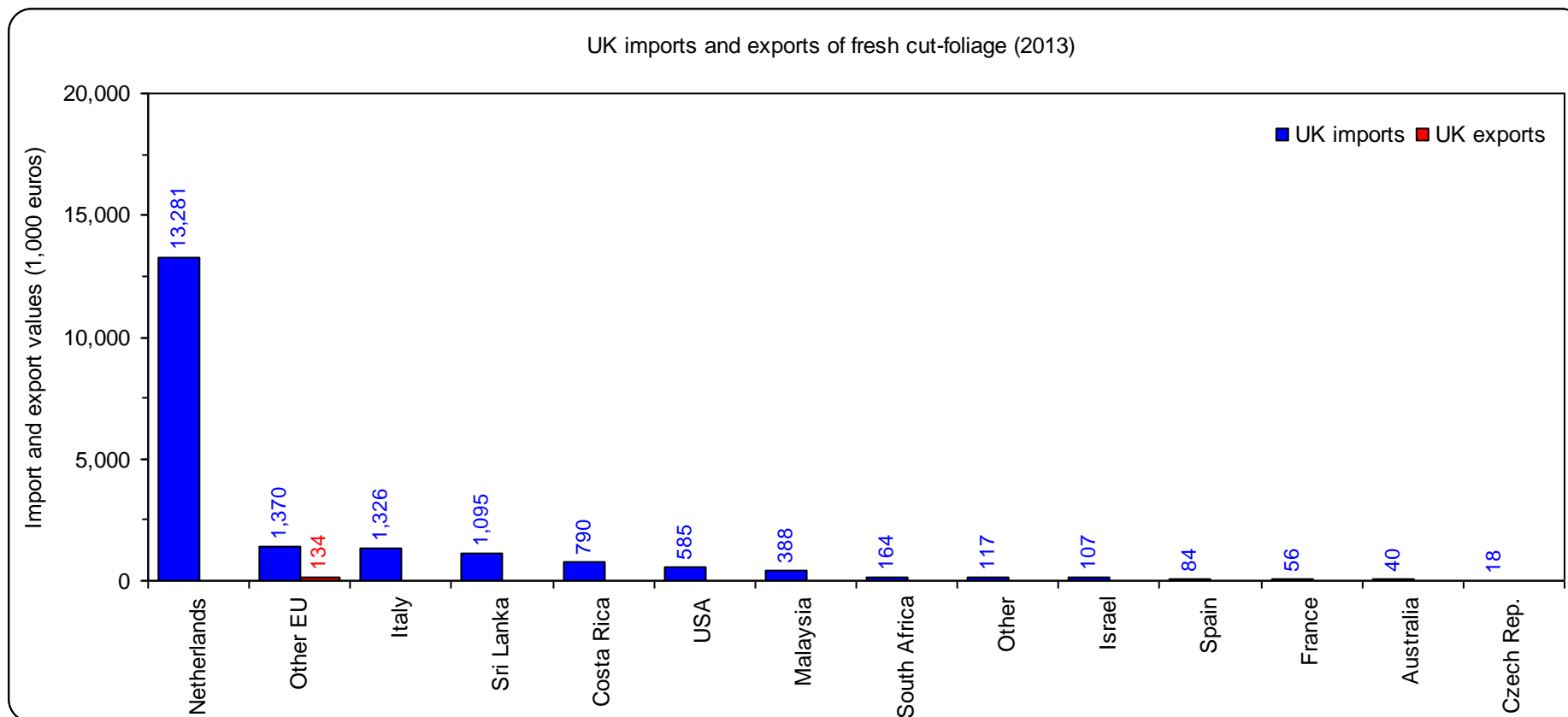
#### 4.7 Treated cut-flowers

Following the trends in the data for 'all' and 'other' (fresh) cut-flowers, the UK's imports of 'treated' cut-flowers are dominated by the Netherlands (€83m), with smaller amounts from Columbia (€9m) and Kenya (€5m), while the only substantial UK exports are to the 'other EU countries' (€4m).



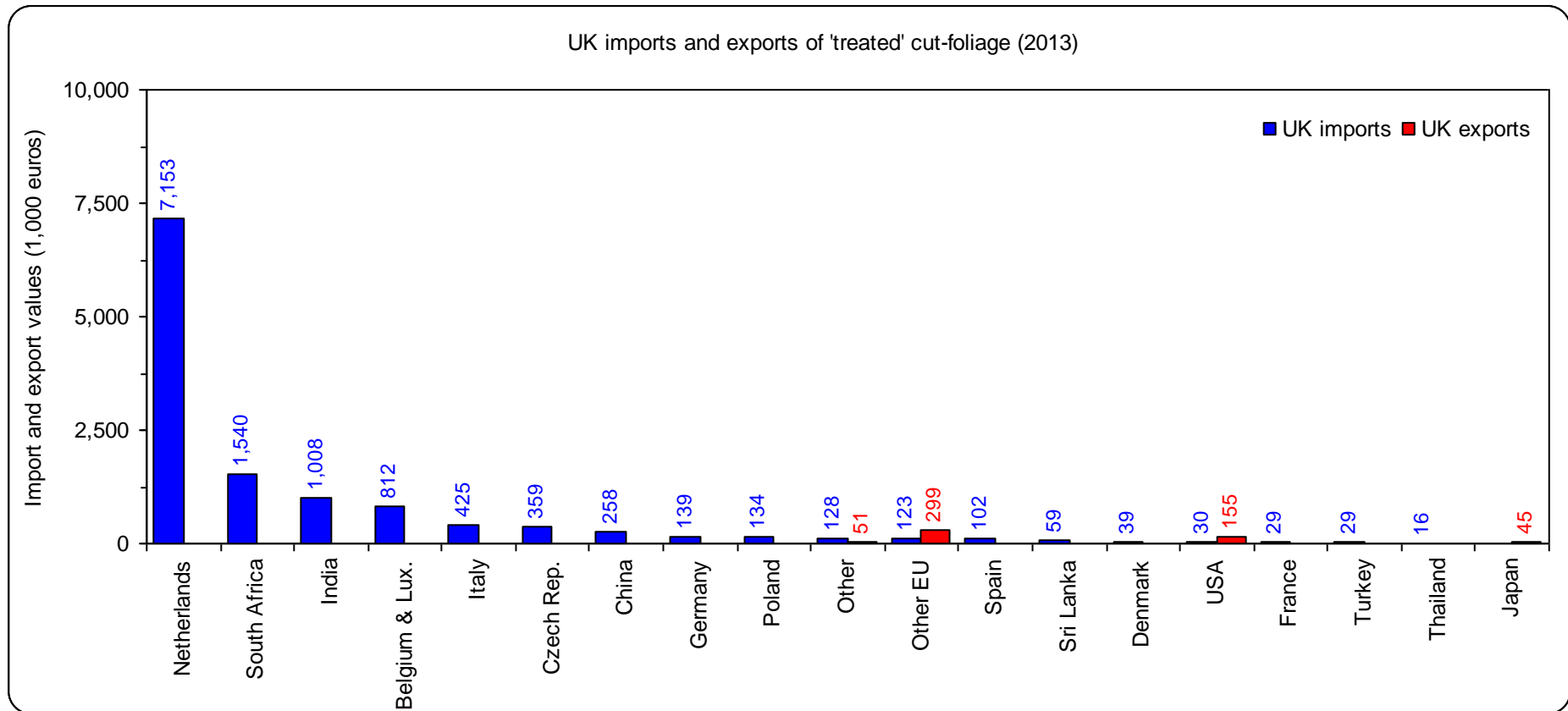
## 4.8 Fresh cut-foilage

Moving to foliage, the next figure shows the UK's imports and exports of fresh-cut foliage. For fresh-cut foliage, imports come mostly from the Netherlands (€13m), besides which only the 'other EU countries', Italy and Sri Lanka send more than €1m of exports each. For this commodity, the UK's exports are negligible.



## 4.9 Treated cut-foilage

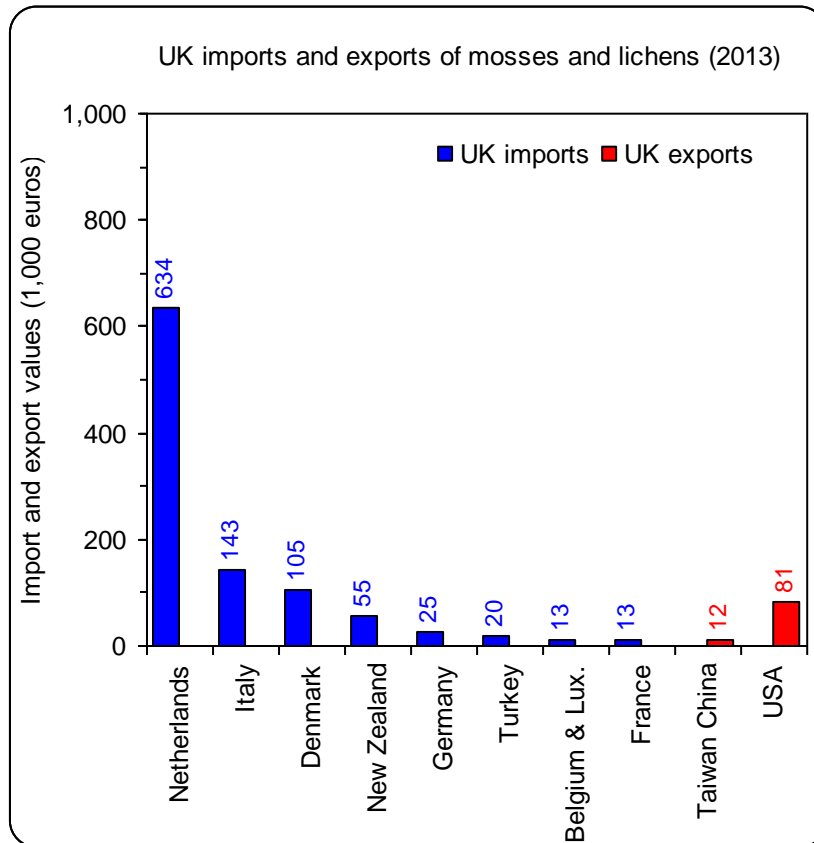
The UK's imports of 'treated' foliage also derive largely from the Netherlands (€7m), with only South Africa and India supplying more than €1m each. UK exports are, again, negligible.





#### 4.10 Mosses and lichens

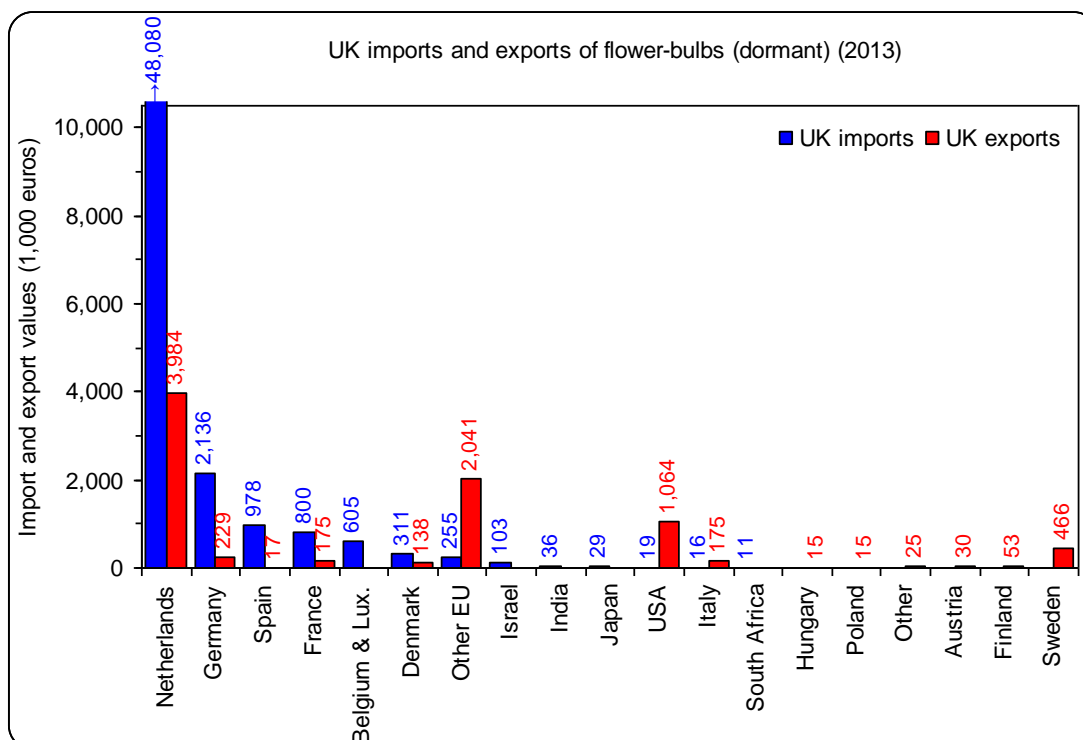
Data for mosses and lichens are also collected in *ISPF 2014* and UK imports and exports are shown in the next figure. The UK's imports come primarily from the Netherlands (€0.6m) with over €0.1m each from Italy and Denmark. The UK exported small quantities to the USA and Taiwan China.



#### 4.11 Flower-bulbs (dormant)

The UK also imports large quantities of bulbs, corms and tubers from the Netherlands, worth €48m in 2013. Another sizeable import came from Germany (€2m), with nearly €1m from Spain.

The UK is an active exporter of flower-bulbs, mainly daffodil, sending €4m to the Netherlands, €2m to 'other EU countries' and €1m to the USA.



## 5.0 The production of ornamentals worldwide

Figures on the production of cut-flowers and pot-plants worldwide are tabulated in *ISPF 2014*, though there is no compilation for cut-flowers alone. Nevertheless, the information reveals much about the current state of ornamentals production. The statistics are shown in the table below.<sup>22</sup>

Recent production areas, production values and numbers of holdings for flowers and pot-plants <sup>1</sup>					
	Area (ha)			Production value (€millions)	Number of holdings
	Protected	Open	Total		
Europe					
Austria	211	197	408	195	1,320
Belgium	426	912	1,338	227	841
Czech Rep.	- <sup>2</sup>	-	612	129	1,000
Denmark	265	-	265	453	415
Finland	128	26	154	101	697
France	-	-	9,159	954	7,234
Germany	1,848	4,893	6,741	1,319	4,449
Greece	363	732	1,094	66	-
Hungary	280	680	960	42	850
Ireland	-	-	415	17	133
Italy	5,443	7,282	12,724	1,330	14,093
Netherlands	4,396	2,905	7,301	4,130	4,127
Norway	113	-	113	32	402
Poland	1,616	3,840	5,456	180	4,800
Portugal	610	1,090	1,700	258	1,415
Spain	1,911	4,611	6,522	880	3,969
Sweden	135	-	135	154	501
Switzerland	195	-	195	294	402
UK	545	5,163	5,708	430	304
Middle-East					
Israel	1,748	1,000	2,748	129	1,100
Turkey	-	-	1,192	57	-
Africa					
Ethiopia	700	1,300	2,000	470	300
Kenya	-	-	4,039	595	140
Morocco	113	52	165	10	-
South Africa	-	-	11,461	49	900
Tanzania	-	-	120	21	15
Uganda	-	-	205	42	20
Zambia	-	-	195	25	30

Continued...

<sup>22</sup> Source: *ISPF 2014*, from a variety of worldwide sources (see original publication for details); naturally the information collated will be subject to many different collection protocols in the original countries, so it should be treated as a general guide.

...Continued

Asia/Pacific					
Australia	349	3,840	4,189	175	877
China	-	-	169,081	5,095	83,338
Hong Kong	-	-	153	5	-
India	-	-	242,000	-	-
Japan	10,190	9,869	16,840	2,512	77,980
Korea Rep.	3,132	-	3,132	598	10,383
Malaysia	-	-	2,000	102	600
Philippines	-	-	670	3	42,189
Singapore	-	-	312	27	<149
Taiwan China	-	-	4,929	199	-
Thailand	-	-	9,280	60	25,000
North America					
Canada	814	-	814	786	1,885
USA	21,294	8,113	29,407	4,434	26,884
Central/South America					
Brazil	-	-	13,800	1,747	8,000
Columbia	6,783	-	6,783	1,012	541
Costa Rica	-	-	850	116	-
Ecuador	5,377	1,292	6,669	630	-
Mexico	1,158	13,963	15,121	281	7,857
Regional totals					
Europe			61,000	11,191	>46,952
Middle East			3,940	186	>1,100
Africa			18,185	1,212	>1,405
Asia/Pacific			452,586	>8,776	>240,367
North America			30,221	5,220	28,769
Central/South America			43,223	3,786	>16,398

<sup>1</sup> Based on the most recent year or estimate available, mostly 2011 to 2013 but data often around 10 years' old has been used for many of the numbers of holdings.

<sup>2</sup> - Indicates data not available.

The striking feature of these data is the enormous production area - though not necessarily value - and numbers of holdings in China and India. This is apparently mainly for national use - little is destined for western markets, as later export/import figures will show. Japan and the Philippines also have huge numbers of holdings, though they are also lacking in production areas and values.

In Europe, the largest areas of production and number of holdings are found in Italy, France, Germany, Spain and Poland, though, as expected, it is the UK that concentrates its production on relatively few, larger holdings, and the Netherlands which excels in production value. In Africa, South Africa has by far the largest production area, dwarfing that of new producer countries (Kenya and Ethiopia). In the

Americas, the USA has a large production area and number of holdings. Substantial areas of production in Brazil and Mexico are also linked to large numbers of holdings, whereas in Columbia the substantial area of production is associated with relatively few.

*ISFP* 2014 includes a similar dataset for bulb production, shown in the table below.<sup>23</sup> The UK is not included in these figures, perhaps because statistics comparable with those of the countries shown were unavailable.

Recent production areas, production values and numbers of holdings for bulbs <sup>1</sup>			
	Area (ha)	Production value (€millions)	Number of holdings
Belgium	171	- <sup>2</sup>	46
France	1,115	-	-
Germany	270	-	161
Netherlands	18,528	570	1,551
Turkey	55	-	-
China	4,174	82	-
Japan	478	-	1,660
USA	2,521	55	193

<sup>1</sup> Based on the most recent year available, mostly 2012 or 2013.

<sup>2</sup> - Indicates data not available.

As expected, the Netherlands leads bulb growing, but China, the UK, the USA and France also have substantial production areas. It is interesting to note that in the Netherlands and Japan similar numbers of holdings are involved despite a 40-fold difference in production areas.

<sup>23</sup> Source: *ISPF* 2014, from a variety of worldwide sources (see original publication for details).

## **6.0 Cut-flower and foliage production in key countries**

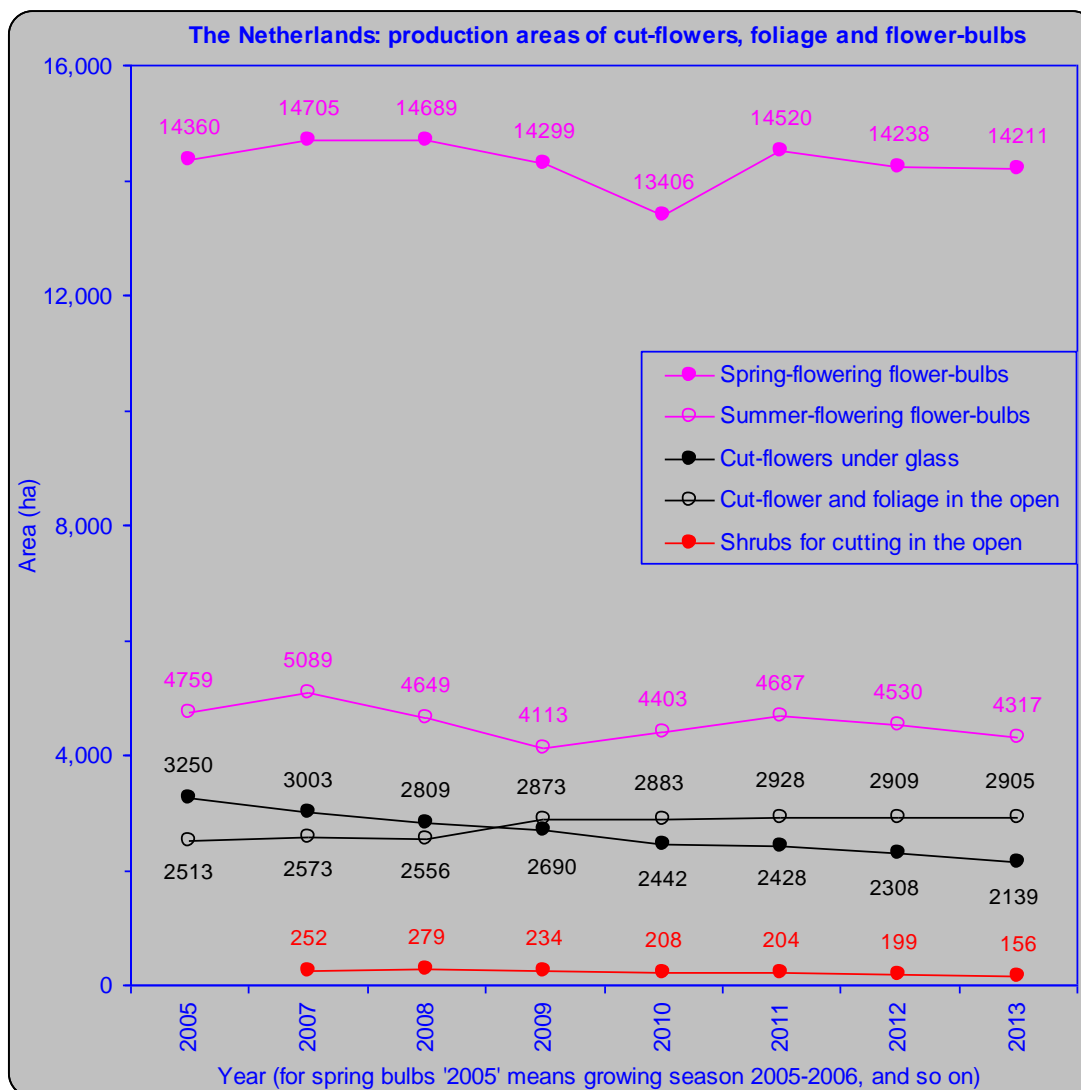
Some knowledge of changing production patterns for the various cut-flowers could be useful in informing future UK cropping plans. *ISPF 2014* provides tables of production areas and values for numerous countries, though, as might be expected, the level of reporting varies widely from country to country. Information for the Netherlands is comprehensive and is summarised first. Data for some other countries follows in alphabetical order, though country statistics are included only when they include at least some breakdown to individual crops.

### **6.1 Netherlands<sup>24</sup>**

The striking feature of the Dutch production area statistics (see next figure) is the overall steady decline in the production of cut-flowers under glass, down by one-third over the 2005–2013 period, while over the same period the area of cut-flowers (and foliage) grown in the open has increased, albeit not fully compensating for the lost area under glass. In addition, the same statistics include an entry for ‘shrubs for cutting in the open’, down from 252ha in 2007 to 156ha in 2013. The much larger spring-flowering flower-bulb area remained relatively stable, with summer flower-bulbs suffering a small decline over the same period; both dipped in area in 2009–2012.

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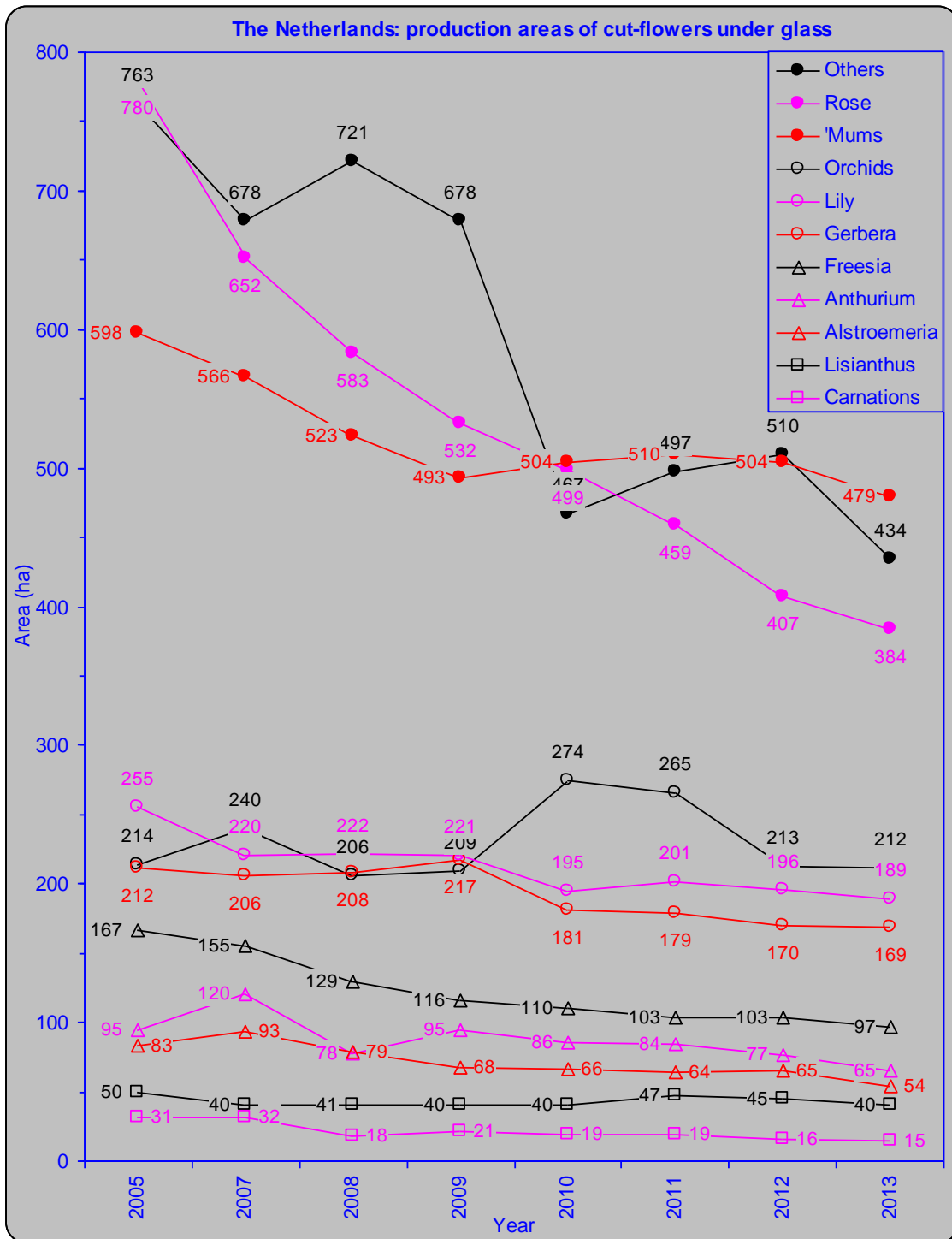
<sup>24</sup> Source: *ISPF 2014*, from Centraal Bureau voor de Statistiek (CBS) and Bloembollenkeuringsdienst (BKD).



The area of cut-flowers under glass can be broken down to the main species (see figure below), but unfortunately these statistics do not provide a breakdown of the flower and foliage crops grown in the open.

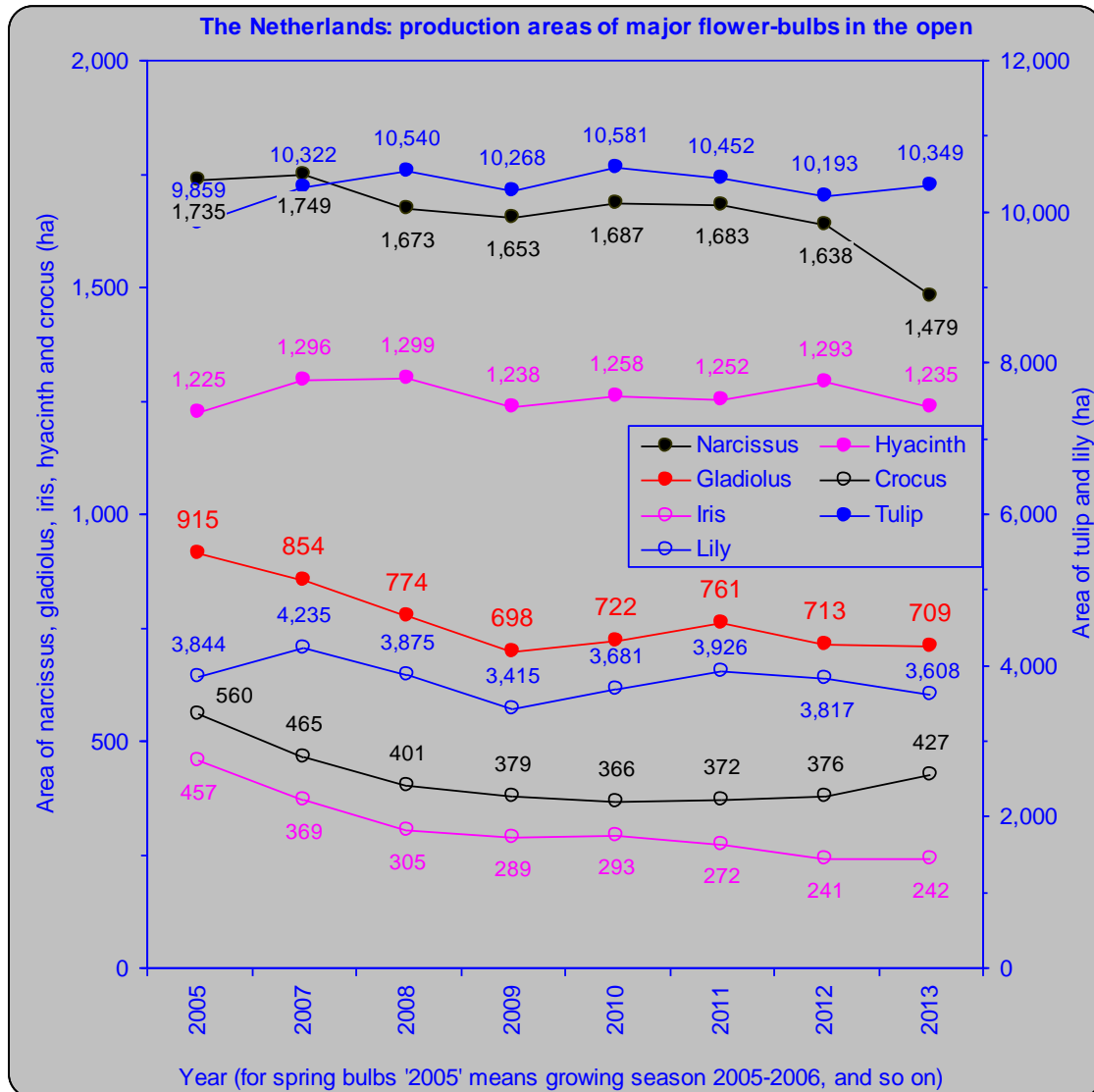
Over the 2005–2013 period the decline in area of cut-flowers under glass was shared by virtually all crops – only the area of orchids remained stable. Rose was overtaken by chrysanthemum for first place in 2010. The major losses were in rose and carnation (each falling by about 50%), freesia and ‘other’ cut-flowers (>40% falls) and alstroemeria and anthurium (>30% falls). Chrysanthemum, lily, gerbera and lisianthus suffered smaller – though still substantial – falls of 20 to 26%. These figures reflect, no doubt, the production, of rose particularly, in the new producer countries of Africa and South America.

Alstroemeria, lisianthus and ‘other’ crops’ might provide opportunities for UK growers - promising results have already been achieved in the HDC-funded trials at CFC.





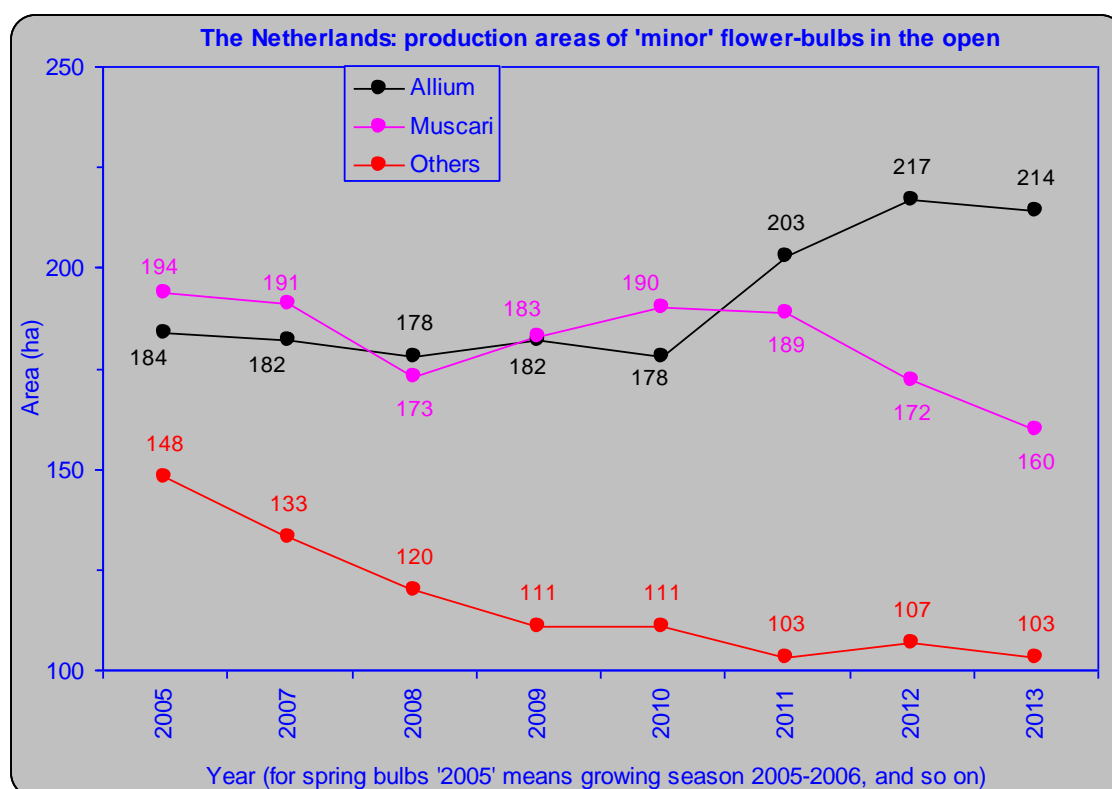
Data for the flower-bulb sector are shown in the next two figures, first the major bulbs and then the so-called 'minor' bulbs. This sector is difficult to interpret in terms of cut-flower production because different crops will be grown for flowers, for dry bulbs, or for both. Many flower-bulb species, of course, are grown only for bulb sales, though for completeness they are all included.



While the overall area of Dutch bulbs has remained more or less stable in recent years – down just 3% between 2005 and 2013 – there have been some important changes for individual genera. Tulip and ornamental allium growing have increased during this period (by 5 and 16%, respectively), the hyacinth area has remained stable, and the production of most other species has declined to some extent – iris by

almost half and the 'minor' bulbs<sup>25</sup> by almost a third.

The Dutch tulip sector is notable for its continued flow of superior new cultivars that add to the tulip's enduring appeal as a cut-flower, garden plant and container plant. Growers of ornamental alliums have benefitted from the promotion of the crop as a trendy and architectural alternative to traditional flowers. The reason for the decline in many spring-flowering 'minor' flower-bulb genera, after considerable interest a few years ago, is unclear – perhaps difficulties in reliable production, which could indicate a niche opportunity for specialist growers.



<sup>25</sup> Here including *Anemone*, *Chionodoxa*, *Hyacinthoides*, *Nectaroscordum*, *Pushkinia* and *Scilla*,

## 6.2 Canada<sup>26</sup>

The table below indicates the total number of stems produced in Canada in 2013 was a 16% increase over the 2009 figures. Notable increases over this period were recorded for chrysanthemum (74%), tulip (40%, though the time-course of the increase was irregular), gerbera (29%) and antirrhinum (17%). However, production of alstroemeria, rose, lily and daffodil fell over this period (as did the number of 'other' crops, which may be partly due to changes over time in the genera that have been recorded).

Cut-flower production in Canada, 2009-2013					
Category	Production (thousands of stems)				
	2009	2010	2011	2012	2013
All cut-flowers <sup>1</sup>	285,037	310,656	302,624	321,099	331,900
of which:					
Tulip	91,685	96,670	80,473	- <sup>2</sup>	128,743
Gerbera	60,939	69,029	66,046	75,086	78,560
Alstroemeria	19,504	15,617	15,924	-	13,180
Chrysanthemum	20,108	27,531	23,105	-	34,949
Antirrhinum	16,481	-	-	-	19,272
Rose	11,483	12,047	10,456	8,435	8,306
Lily	16,049	19,778	15,197	14,465	13,307
Daffodil	12,827	-	-	3,724	4,098
Lisianthus	-	-	2,344	-	-
Iris	-	-	-	2,723	2,408
'Other'	48,788	69,984	66,303	-	21,141

<sup>1</sup> These figures do not appear to sum the values below.

<sup>2</sup> – Indicates data not available.

The Canadian data also records the area of flowers and pot-plants grown in glasshouses or other structures (polyfilm, rigid plastic and all other types of enclosed protection) over 2008-2013 (see table below). While the overall area fell slightly over this time, an increase in glasshouse area was compensated by a fall in the area of rigid plastic structures, which may reflect the types of ornamentals now being grown.

Production area of flowers and pot-plants in different greenhouse types in Canada, 2008-2013						
Structure type	Area (ha)					
	2008	2009	2010	2011	2012	2013
Glass greenhouses	217	198	215	218	218	257
Fibreglass and other rigid greenhouses	92	65	62	41	54	42
Film plastic	523	565	561	556	544	515
Total	833	828	838	816	817	814

<sup>26</sup> Source: *ISPF* 2014, from Statistics Canada, CANSIM database.

### 6.3 China<sup>27</sup>

China's production of ornamental plants rose hugely over the period 2005-2013, with the production area for all cut-flowers and foliage increasing by 68% over this period. All the recorded crops showed an increase – particularly gerbera (185%), carnation (125%) and lily (104%). The small dried flower sector also showed a large increase, 121%. However, the area of bulbs cultivated fell slightly (by 9%).

Production area of cut-flowers and foliage, bulbs and dry flowers under protection and in the open in China, 2005-2013									
	Production area (ha)								
	2005	2006	2007	2008	2009	2010	2011	2012	2013
Cut-flowers and foliage	38,853	41,603	44,325	44,079	44,603	50,859	57,935	59,382	65,128
of which:									
Rose	7,676	7,424	8,140	7,388	9,021	9,946	12,530	13,870	14,316
Lily	- <sup>1</sup>	4,908	4,717	5,373	5,827	7,485	8,831	9,105	9,989
Chrysanth.	7,486	4,279	4,722	4,500	4,122	4,927	5,719	7,185	8,475
Gerbera	-	2,180	2,531	2,764	4,563	5,156	5,444	5,378	6,204
Carnation	2,362	2,068	2,674	2,658	2,396	2,826	3,582	3,380	5,312
Gladiolus	2,523	2,140	2,365	2,386	2,447	2,891	3,414	3,327	4,896
Cut-foliage	4,926	4,720	5,835	5,362	6,037	5,609	6,805	7,409	8,592
Cut-branches	-	3,701	3,713	3,798	5,190	4,960	5,404	4,170	5,187
Bulbs	4,606	3,404	3,897	4,680	4,132	4,794	4,514	4,471	4,174
Dried flowers	-	-	-	24	32	23	44	62	53

<sup>1</sup> - Indicates data not available.

<sup>27</sup> Source: *ISPF* 2014, from China Flower Association, Statistics of China Floricultural Industry 2013, released by Ministry of Agriculture, PRC, July, 2014.

## 6.4 Columbia<sup>28</sup>

For Columbia the production area data for 2012 are shown in the table below. Production is dominated by rose, occupying 36% of the total area, with carnation, hydrangea and pompon chrysanthemum making up another one-third of the total. The crops grown include 'exotics' (such as leucadendron and heliconia), foliage (ruscus, ferns, eucalyptus) and what (given the area involved) must be a substantial assembly of 'others'.

Production area (ha) of cut-flowers and cut-foliage in Columbia, 2012	
	2012
Total	6,782
of which:	
Rose	2,465
Carnation	780
Hydrangea	639
Chrysanthemum, pompon	577
Carnation, mini	366
Alstroemeria	306
Chrysanthemum, standard	139
Ruscus	127
Carnation, spray	123
Leucadendron	71
Heliconia	68
Calla	62
Gypsophila	58
Aster	55
Ferns	54
Eucalyptus	53
Gerbera	48
'Other'	791

<sup>28</sup> Source *ISPF 2014*, from DANE.

## 6.5 Ecuador<sup>29</sup>

With a similar total production area to Columbia, the data set available for Ecuador is comprehensive, covering several years and split to protected crops and crops in the open. While the total area of cut-flowers changed little between 2006 and 2012 – an increase of 4% - the area under protection has increased by 31% over the same period, while the area in the open has fallen by 43%.

Production area of cut-flowers under protection and in the open in Ecuador, 2006-2012							
	Area (ha)						
	2006	2007	2008	2009	2010	2011	2012
Overall total	6,395	5,391	5,889	5,893	5,961	6,629	6,682
Under protection	4,119	3,489	3,913	4,287	3,950	5,066	5,390
of which:							
Rose	3,273	2,704	3,500	3,648	3,746	4,253	4,071
Carnation	35	51	107	85	64	99	628
Gypsophila	407	423	51	66	16	- <sup>1</sup>	521
Sunflower	-	-	-	-	-	-	24
Larkspur	-	13	8	29	-	12	15
Delphinium	-	3	1	231	-	-	5
Limonium	49	22	23	16	10	10	2
Chrysanthemum	11	11	8	-	-	-	1
Hypericum	-	1	3	19	-	-	-
Other annuals	248	172	7	24	89	654	90
Other perennials	68	88	183	169	25	31	13
In the open	2,276	1,902	1,976	1,606	2,011	1,563	1,292
of which:							
Gypsophila	902	951	917	962	1,100	954	890
Hypericum	241	172	98	71	54	110	83
Sunflower	2	2	30	83	21	27	15
Delphinium	307	261	132	18	-	-	9
Ginger	85	45	41	33	6	20	8
Liatris	47	9	5	22	39	62	4
Chrysanthemum	48	-	-	9	-	-	2
Heliconia	71	158	147	98	11	33	2
Rose	294	40	350	54	517	21	2
Aster	63	28	-	37	-	-	-
Other annuals	116	94	127	154	29	36	168
Other perennials	94	141	128	65	222	269	109

<sup>29</sup> Source ISPF 2014, from *Instituto Nacional de Estadística y Censos (INEC) ESPAC – 2012 Bases de Datos*.

The paramount crop is rose, now grown virtually totally under protection and making up 75% of the protected cut-flower area and 61% of the total cut-flower area. Gypsophila is the second-ranking crop, grown equally under protection and in the open, though under protection the area dropped considerably after 2008 before recovering later. Carnation under protection makes up the third main crop. Sunflower remains a small-scale crop, but has expanded both outdoors and in between 2006 and 2012. The areas of other annuals and perennials under protection fell, but both have increased in the open. Most other crops have fallen in area during this time, including once popular lines such as aster, chrysanthemum, delphinium, ginger, heliconia, hypericum, liatris and limonium. Maybe these changes indicate a single-mindedness to concentrate on only the most profitable products.

## 6.6 Finland<sup>30</sup>

Finland has a small cut-flower industry, but the statistics (shown in the table below) are interesting. Between 2005 and 2013 the area of cut-flowers fell from nearly 40ha to under 10ha, largely because of the great reduction in cut-rose production (from 28ha to <5ha) – presumably the result of cheaper imports.

Over the same period the production of bulb-flowers increased as a result of expanding tulip growing from 44 to 59 million pieces. Hyacinths and amaryllis production remained more or less steady, but the production of daffodil, lily and other bulb flowers fell.

Production of cut-flowers, cut-foliage and bulb-flowers in Finland, 2005-2013							
	Area (ha)						
	2005	2008	2009	2010	2011	2012	2013
Cut-flowers	37.9	26.3	20.9	16.6	12.9	8.6	6.9
of which:							
Rose	28.3	18.4	13.7	10.2	8.0	4.5	- <sup>1</sup>
'Other'	5.5	5.0	4.6	4.2	3.2	2.4	-
Gypsophila	1.4	1.0	1.0	1.0	0.9	0.9	-
Gerbera	1.5	1.3	1.3	0.8	0.5	0.5	-
Chrysanthemum	1.3	0.6	0.3	0.4	0.3	0.2	-
Cut-foliage	0.3	0.3	0.4	0.3	0.5	0.3	-
Production (1,000 pieces)							
	2005	2008	2009	2010	2011	2012	2013
Bulb flowers	57,685	73,749	79,842	70,461	76,420	66,707	64,186
of which:							
Tulip	44,320	56,582	59,964	59,975	65,290	59,104	59,219
Hyacinth (pots)	2,570	2,751	2,937	2,676	2,478	2,572	2,394
Amaryllis	866	1,246	1,055	1,237	1,238	1,108	919
'Other'	1,829	2,172	2,275	1,709	2,117	-	893
Daffodil	1,622	2,455	2,791	1,041	1,291	847	669
Lily	831	909	841	788	770	503	92

<sup>1</sup> - Indicates data not given.

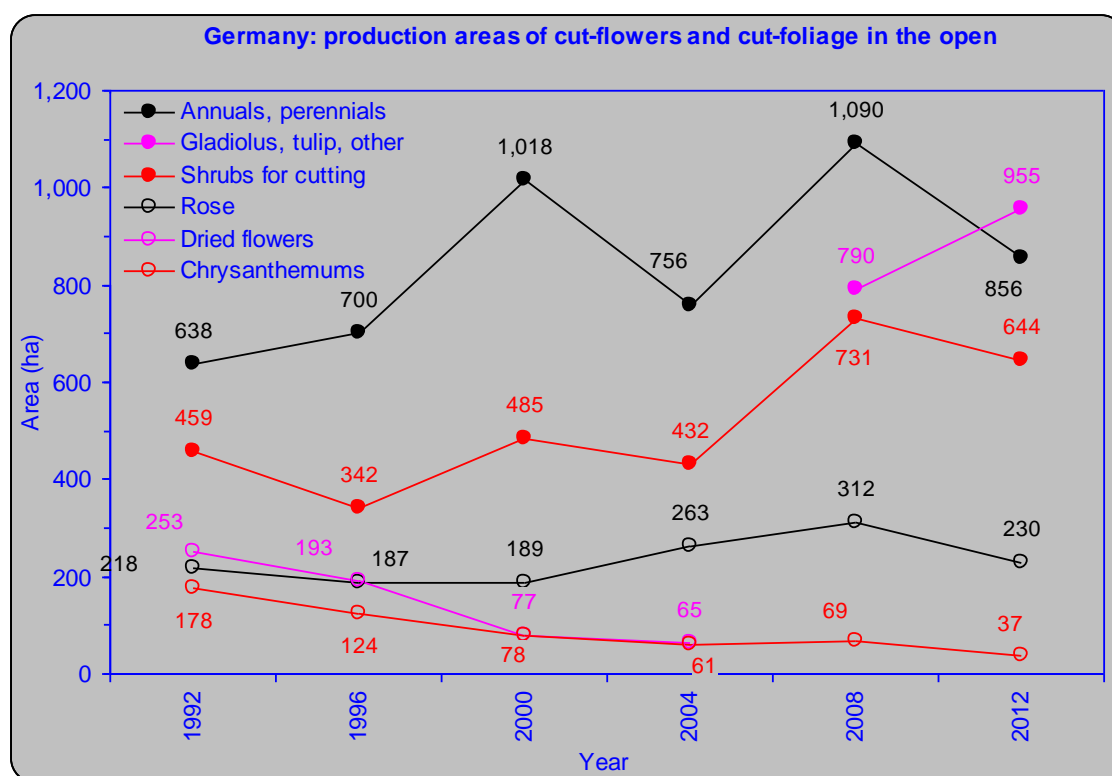
<sup>30</sup> Source: *ISPF 2014*, from Tike, Horticultural Statistics, 2014.



## 6.7 Germany<sup>31</sup>

Four-yearly cut-flower production figures are available for Germany, though the actual data collected appear to have varied from time to time, rendering them less useful than they may have been.

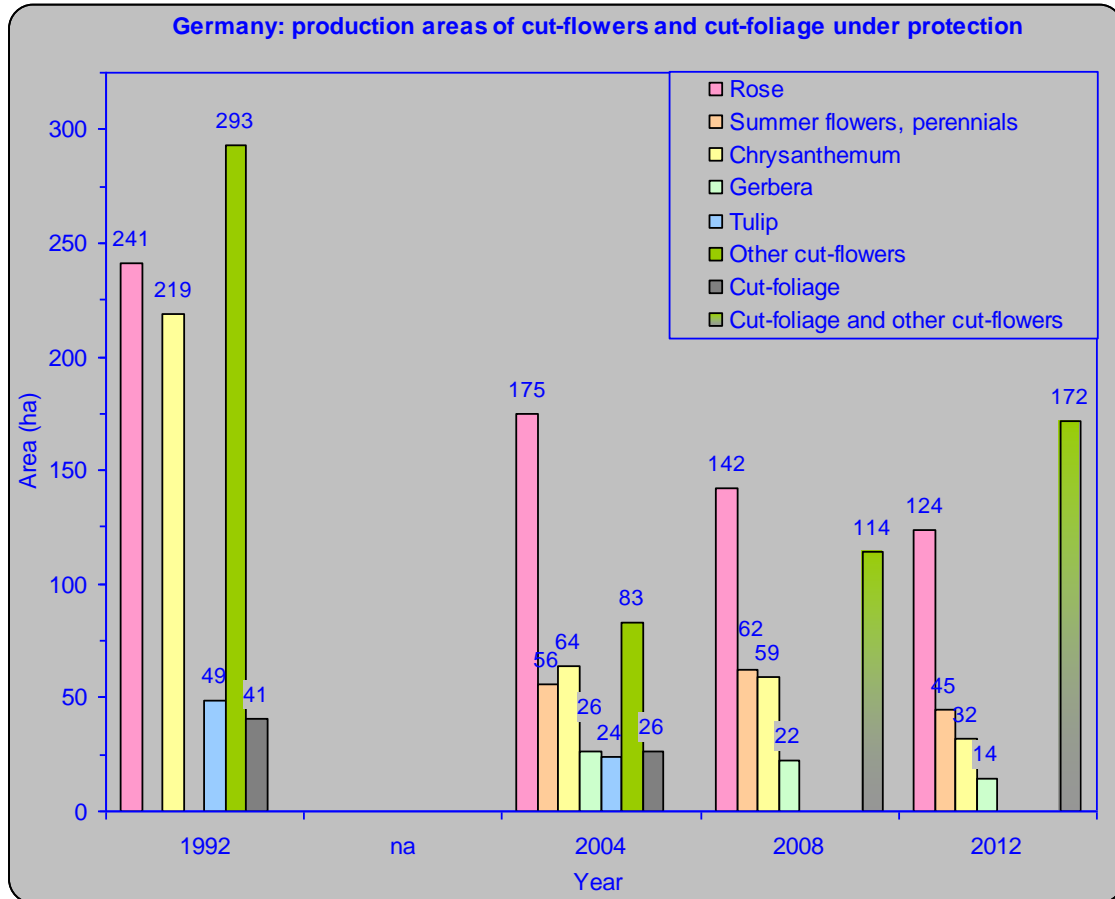
The figure below shows the area of cut-flowers and foliage grown in the open between 1992 and 2012. Over this period the area of chrysanthemum and of dried flowers each fell by nearly 80%. In contrast the areas of annual and perennial flowers, although fluctuating widely, finished the period 34% up, and shrubs for cutting increased by 40%. The rose area remained relatively stable. Only the data for 2008 and 2012 include an entry for 'other' cut-flowers (including gladiolus and tulip), approaching 1,000ha by 2012: it is not clear how these were recorded previously, but the net effect is to increase the overall area of cut-flowers in the open considerably.



In contrast to open-ground growing, the production of cut-flowers and foliage under protection has declined dramatically over the same period, though data are difficult to interpret because of changes in the categories collected and missing data for some years. However, the figure below shows that the area of most subjects has fallen, drastically so in the case of chrysanthemum (85%) and rose (48%). The growing of 'other cut-flowers and foliage' also fell dramatically at the start of this period, though

<sup>31</sup> Source: *ISPF 2014*, from Statistische Bundesamt, Zierpflanzenerhebung 2004, 2008, 2012.

seems to have revived more recently (it reached 172ha by 2012). Overall, the figures may reflect the higher energy costs for glasshouse production, competition from new producer countries, and perhaps a fashion shift towards 'more natural looking' products.



## 6.8 Greece<sup>32</sup>

Only relatively dated statistics are available, and the table below shows that between 1990 and 1995 the overall production area was quite stable at around 400ha. The areas of the main crops – carnation, rose, chrysanthemum and gladiolus – were equally stable.

Production of cut-flowers and cut-foliage under glass and in the open in Greece, 1990-1995				
	Area (ha)			
	1990	1993	1994	1995
Total	402	421	380	420
of which:				
Carnation	173	190	170	190
Rose	74	90	90	90
Gladiolus	95	80	56	80
Chrysanthemum	52	55	53	54
Tulip	3	1	6	3
Foliage	5	5	5	3

<sup>32</sup> Source: *ISPF 2014*, from *Ministere del Agriculture*, 2004; Office of Agricultural Affairs, Athens.

## 6.9 Hungary<sup>33</sup>

Only very limited information is available on Hungarian cut-flower production. In the table below the totals do not tally correctly, so data on some types of cut-flower may be missing. With some intervening fluctuations, the area of cut-flowers and cut-foliage remained stable between 1997 and 2009. Under cover, the main crops were carnation, rose, gerbera and asparagus, though carnation growing reduced sharply in the late 1990s. In the open, the main crops in 2006 were dried flowers and gladiolus.

Production of cut-flowers and cut-foliage under glass and in the open in Hungary, 1997-2009				
	Area (ha)			
	1997	1998	2006	2009
Under cover	180	220	174	180
of which:				
Carnation	72	60	20	- <sup>1</sup>
Rose	16	30	25	-
Gerbera	-	-	20	-
Asparagus	-	-	20	-
Gypsophila	-	-	15	-
Chrysanthemum	-	-	15	-
Lily	-	-	6	-
Calla	-	-	6	-
In the open	-	-	145	-
of which:				
Dried flowers	-	-	80	-
Gladiolus	-	-	75	-
Gypsophila	-	-	20	-
Tulip	-	-	10	-

<sup>1</sup> - Indicates data not given.

<sup>33</sup> Source: *ISPF* 2014, from Hungarian Ornamental Plant Association and Commodity Board.

## 6.10 India<sup>34</sup>

Some recent statistics for cut-flower production in India are tabulated below. They will look unfamiliar to European growers with the importance of marigold and the sale of cut-flowers 'loose', both connected to the floral decorations that play a large part in Hindu festivals such as Diwali.

Marigold and jasmine production currently occupy about 40ha each, and are sold 'loose'. Rose, chrysanthemum, gladiolus and tuberose are also important, with about 70ha in all and generally on the increase, and only chrysanthemum being sold loose in any quantity. Anthurium, carnation, gerbera and tulip are grown in small quantities and are sold conventionally. The production of 'other' cut-flowers is extensive and makes up some 40% of the total area, being sold both conventionally and 'loose', mostly the former.

No trends can be described based on only two years' data, but there is a suggestion of a slightly expanding production area with somewhat lower yields.

Production areas and quantities of cut and 'loose' flowers in India, 2011/12-2012/13						
	Total area (1,000ha)		Cut-flowers (millions)		Loose flowers (1,000t)	
	2011/12	2012/13	2011/12	2012/13	2011/12	2012/13
Total	234	254	7,673	7,507	1,729	1,651
of which:						
Marigold	43	44	0	0	360	382
Jasmine	10	42	0	0	51	207
Rose	28	28	1,990	2,740	76	66
Chrysanthemum	18	19	3	148	176	195
Gladiolus	9	12	707	1,061	12	11
Tuberose	8	12	156	1,401	28	39
Anthurium	0	0	32	12	0	0
Carnation	0	0	15	37	0	0
Gerbera	0	0	25	32	0	0
Tulip	0	0	5	4	0	0
'Other'	116	97	4,741	2,072	1,027	751

<sup>34</sup> Source: *ISPF* 2014, from National Horticulture Board, India, Indian Horticulture Database.

## 6.11 Ireland<sup>35</sup>

Ireland's horticultural industry is noted for its development of the cut-foilage crop, and the table below is useful in giving a breakdown of the types of foliage grown, mainly ozothamnus, pittosporum, laurel and eucalyptus.

Production area (ha) of ornamental plants in the open and under protection in Ireland, 2011	
Total bulbs, cut-flowers and cut-foilage	357
of which:	
Daffodil bulbs	59
Daffodils for cutting	103
Ozothamnus	56
Pittosporum	53
Laurel	34
Eucalyptus	32
Other foliage	18
Cut-flowers under protection	2

## 6.12 Israel<sup>36</sup>

Cut-flower and foliage production in Israel is shown in production areas and millions of pieces produced in the next two tables (though unfortunately the data available do not cover the same periods). Over the period 1995 to 2004 the production area increased, but production in number of pieces appeared to decline and to continue to do so in the additional years' data to 2008.

Production area (ha) of cut-flowers and foliage under protection and in the open in Israel, 1995/96 - 2004				
	1995/96	1998/99	2000	2004
Total	1,950	2,245	2,700	2,748
of which:				
Wax flower	300	282	300	256
Rose	215	227	210	214
Gypsophila	165	229	220	207
Solidago	67	149	170	198
Gerbera	49	60	60	58
Carnation, spray	32	10	2	- <sup>1</sup>
Carnation, standard	130	141	-	-
'Other' cut-flowers	810	724	788	-
Foliage	225	423	430	-

<sup>1</sup> – Indicates data not given

<sup>35</sup> Source: *ISPF 2014*, from National Amenity Census 2011, Department of Agriculture, Food and the Marine, *Bord Bia* and Irish Food Board.

<sup>36</sup> Source: *ISPF 2014*, from National Flower Board, Israel; Central Bureau of Statistics, Israel.

Production amounts (million flowers) of cut-flowers and foliage in Israel, 1995/96 - 2008					
	1995/96	1998/99	2000	2006	2008
Total	1,350	1,670	1,282	1,078	962
of which:					
Gypsophila	105	165	146	104	86
Wax flower	78	77	56	67	33
Gerbera	42	46	49	43	31
Limonium	- <sup>1</sup>	-	-	22	13
Rose	340	500	395	59	10
Carnation, spray	38	13	-	-	-
Carnation, standard	110	103	-	-	-
'Other' cut-flowers	501	376	349	454	445
Ruscus	-	-	286	333	344

<sup>1</sup> – Indicates data not given

Gypsophila, solidago, rose and wax flower occupied around 200ha each in 2004, followed by smaller areas of carnation, gerbera and limonium. 'Other' cut-flowers occupied a substantial area, nearly 800ha in 2004, while cut-foliage, probably largely ruscus, occupied over 400ha.

However, the table of production amounts shows that total production and the production of gerbera, gypsophila, rose and wax flower fell over the period to 2008; in the case of rose the fall was dramatic, from 340 million pieces in 1995/96 to 10 million in 2008, presumably reflections the impact of the new producer countries. In contrast, the production of ruscus increased between 2000 and 2008, while the substantial production of 'other' cut-flowers seems to have reversed the decline since 2000 and is now increasing. The figures available do not allow conclusions to be drawn for the other crops mentioned (carnation, limonium and solidago). Israel seems to be an example of rapid change in profile of crops grown, accompanied by a search for novel, replacement products.

These data do not cover the flower-bulb sector, which is a dynamic aspect of Israeli horticultural production.

## 6.13 Italy<sup>37</sup>

The first table below shows the overall importance of cut-foliage and branches grown outside and under protection in Italy's horticultural produce. The second shows that while traditional cut-flower crops, like carnation, chrysanthemum and rose remain important, so are newer crops such as gerbera and ranunculus, and there is also much production of 'other' cut-flowers - suggesting a quest for innovation. Cut-foliage production includes the expected asparagus, eucalyptus, pittosporium and ruscus, but also aspidistra, while flowering branches include genista, mimosa and viburnum.

Overall Italian production areas for cut-flowers and foliage in 2007				
Category	Cultivated area in 2007 (ha)			
	Total	In the open	In glasshouses	Under other covering
Total	5,834	3,337	2,037	459
of which:				
Cut-flowers	2,752	740	1,830	182
Cut-foliage & branches	3,082	2,597	208	278

Italian crop type, species and 2007 (production in million pieces)			
Cut-flowers	2,422	Cut-foliage	548
of which:		of which:	
Rose, large-blooms	331	Eucalyptus	197
Chrysanthemum, multiflora	319	Ruscus	145
Rose, medium and small blooms	258	Aralia	58
Gerbera	218	Asparagus	38
Ranunculus	132	Pittosporum	32
Carnation, standard	118	Aspidistra	25
Chrysanthemum, bloom	118	Other	53
Carnation, spray	90		
Lily, Oriental hybrids	70		
Lily, Asiatic hybrids	64		
Anemone	58		
Lisianthus	51	Flowering branches	182
Gladiolus	33	of which:	
Wallflower	32	Genista	77
Calla	20	Mimosa	60
Orchids	20	Gypsophila	19
Iris	19	Viburnum	6
Alstroemeria	18	Other	19
Lilium	14		
Anthurium	10		
Gerbera, mini	2		
Antirrhinum	1		
Other	425	Fruit-bearing branches	2

<sup>37</sup> Source: ISPF 2014, from *Indagine Florovivaismo 2007*, Ministero delle politiche agricole alimentari e forestali.



## 6.14 Japan<sup>38</sup>

Japanese production areas are shown in the next table. They illustrate the importance of the traditional chrysanthemum crop that occupies almost one-third of the overall area – over 5,000ha of the about 17,000ha total. The production areas of alstroemeria, carnation, gerbera, gypsophila, lily, limonium, lisianthus, orchids and rose are small in comparison – but would be considered very substantial in other situations. The area of ‘other’ cut-flowers – over 8,000ha or nearly half of the total cut-flower area – suggests a very broad spectrum of species and probably a search for innovative products; unfortunately figures for ‘others’ are not available after 2008. Additional areas include >700ha for cut-foliage, >3,000ha for cut-tree branches, and nearly 500ha of flower-bulbs.

Production area of cut-flowers, cut-foliage and bulbous plants in Japan, 2006-2012							
	Area (ha)						
	2006	2007	2008	2009	2010	2011	2012
Cut-flowers	17,450	17,230	16,840	- <sup>1</sup>	-	-	-
of which:							
Chrysanthemum	5,700	5,650	5,530	5,420	5,331	5,233	5,230
Lily	880	860	860	869	855	833	805
Lisianthus	449	465	466	462	454	439	435
Rose	490	484	474	457	432	419	409
Carnation	430	410	410	405	390	378	367
Gypsophila	290	270	270	260	255	253	251
Limonium	250	210	210	212	204	214	212
Tropical orchids	189	185	178	172	167	161	157
Alstroemeria	102	97	95	92	89	91	93
Gerbera	103	98	99	98	94	93	92
Other cuts	8,547	8,500	8,243	-	-	-	-
Cut-foliage	672	681	744	768	763	742	713
Cut tree branches	4,024	4,100	3,996	3,739	3,813	3,707	3,703
Bulbous plants	575	564	567	538	505	478	472

<sup>1</sup> – Indicates data not given.

Apart from cut-foliage, all these crops and sub-sectors saw decreases in production areas between 2006 and 2012, though these were relatively modest compared with those in some European countries. These area reductions are reflected in the table of production amounts on the next page.

<sup>38</sup> Source: *ISPF 2014*, from Statistics Department, Ministry of Agriculture, Forestry and Fisheries, Statistical Yearbook, Number 88, 2012/13

Production amount of selected cut-flowers in Japan, 2000-2008				
	Number (million pieces)			
	2000	2006	2007	2008
Cut-flowers	5,593	4,934	4,829	4,734
of which:				
Chrysanthemum	2,028	1,857	1,814	1,792
Lily	204	174	170	171
Rose	459	371	355	347
Carnation	495	412	387	388
Gypsophila	87	69	60	61
Limonium	138	127	118	120
Other cuts	2,182	1,924	1,925	1,855

## 6.15 Kenya<sup>39</sup>

The Kenyan cut-flower production area is summarised in the next table. Between 2010 and 2011 the total area fell, but it more than recovered in the following year, to >4,000ha. Rose is the predominant crop, making up >2,000ha in 2012, but this had fallen from the 2011 figure. The areas of Easter lily and eryngium showed major rises in 2012, the former from 24ha in 2011 to >1,000ha, and eryngium from 56ha to 176ha. Asclepias, carnation and 'other' cut-flowers showed smaller increases over the same period, while in contrast the area of 'arabicum' (ornithogalum?) was halved and that of alstroemeria was down by one-third. Kenya looks like another emerging producer seeking its best options.

Production area of cut-flowers in Kenya, 2010-2012			
	Area (ha)		
	2010	2011	2012
Total	3,419	3,213	4,039
of which:			
Rose	2,674	2,597	2,164
Carnation	160	157	252
Hypericum	- <sup>1</sup>	78	80
Arabicum	286	92	140
Easter lily	152	24	1,073
Asclepias	25	52	55
Alstroemeria	55	55	38
Eryngium	20	56	176
Anthurium	-	7	3
'Other'	-	26	155

<sup>1</sup> – Indicates data not given.

<sup>39</sup> Source: *ISPF 2014*, from Horticultural Crops Development Authority (HCDA), Kenya.

## 6.16 Mexico<sup>40</sup>

Detailed statistics on the wide range of cut-flowers grown in Mexico are given in the table below.

Production area of cut-flowers and cut-foliage under protection and in the open in Mexico, 2007-2012						
	Area (ha)					
	2007	2008	2009	2010	2011	2012
Cut-flowers (glass)	874	930	973	1,758	1,967	2,081
of which:						
Chrysanthemum	10	10	10	110	170	1,025
Rose	663	688	696	1,375	1,488	712
Lily	108	124	112	157	163	145
Gerbera	77	81	86	87	88	87
Carnation	10	17	27	15	17	18
Solidago	5	10	12	10	11	61
'Other'	1	- <sup>1</sup>	30	4	30	33
Cut-flowers (open)	12,357	12,031	11,721	10,930	13,221	11,839
of which:						
Gladiolus	3,854	3,461	3,667	3,611	3,715	3,806
Chrysanthemum	2,359	2,630	2,435	2,319	2,310	2,365
Tagetes	1,162	981	855	791	1,187	1,735
Gypsophila	739	685	768	417	780	586
Rose	590	735	718	676	788	709
Carnation	557	515	452	452	442	447
Matthiola	509	351	405	399	535	-
Sunflower	233	257	269	243	562	211
Tuberose	338	287	225	266	255	276
Heliconia	200	198	203	212	206	208
Limonium	110	83	180	132	222	123
Aster	98	112	121	122	117	110
Antirrhinum	-	107	106	108	205	101
Alstroemeria	52	62	71	71	67	67
Lunaria (honesty)	69	69	67	67	62	62
Agapanthus	77	69	62	52	55	57
'Other'	1,410	1,429	1,117	992	1,713	976
Cut-foliage						
of which:						
Chamaedorea	1,068	1,118	1,523	1,533	1,547	1,583
Ferns	-	52	62	62	63	85

<sup>1</sup> – Indicates data not given.

<sup>40</sup> Source: ISPF 2014, from *Servizio de información Agroalimentaria y Pesquera*, Mexico.

The area of cut-flowers grown under protection more than doubled in the period 2007 to 2012, mainly because of a large increase in rose production in 2010, while the corresponding area in the open fell slightly. The area of cut-foliage increased by about 50% over the same period.

Under protection, only a small area (10ha) of chrysanthemum was grown before 2010, and by 2012 it had risen to >1,000ha; over the same time, the rose area started at nearly 700ha, doubled in 2010 and 2011, and then fell back to the earlier level by 2012. The other glasshouse crops – carnation, gerbera, lily, solidago and ‘others’ – all increased modestly over the period.

Amongst crops grown in the open, the dynamics of chrysanthemum and rose growing remained steady from 2007 to 2012, despite the changes under protection: around 2,250ha for chrysanthemum and 700ha for rose. The primary outdoor crop, however, was gladiolus, with approaching 4,000ha grown consistently over the period, while there were around 1,000ha of tagetes. Among the other, but still substantial crops, carnation and tuberose increased modestly, while gypsophila decreased slightly and the ‘other’ crops remained more or less stable in extent. In 2011 only there was a doubling of the sunflower area, indicating great flexibility in cropping plans. Unlike the situation under protection, in the open a large area of ‘other’ cut-flowers – around 1,000ha - was grown.

Chamaedorea formed the bulk of the cut-foliage area, increasing from >1,000ha in 2007 to about 1,500ha in 2012.

## 6.17 Morocco<sup>41</sup>

Some limited statistics for Morocco are shown in the table below, covering the period 2007 to 2008 in which production appeared remarkably stable. Some two-thirds of the total production area, 113ha out of 165ha, was under protection and dominated by the rose and carnation crops respectively, with small areas of 'other' cut-flowers. In outdoor growing there was a small amount of rose production but most was down to strelitzia and 'other' crop production.

Production area and number of cut-flowers grown under protection and in the open in Morocco, 2006/07 - 2007/08				
	Area (ha)		Number (million stems)	
	2006/07	2007/08	2006/07	2007/08
Protected crops	113	113	74	79
of which:				
Rose	72	73	43	47
Carnation	28	30	27	29
'Other'	14	11	4	4
In the open	52	52	6	5
of which:				
Rose	10	9	3	1
Strelitzia	23	23	1	1
'Other'	20	20	2	3
<b>Total</b>	<b>165</b>	<b>165</b>	<b>79</b>	<b>84</b>

<sup>41</sup> Source: ISPF 2014, from *Royaume du Maroc, Ministère de l'Agriculture, du Développement Rural et des Pêches Maritimes*, Morocco.

## 6.18 Norway<sup>42</sup>

Some patchy statistics for Norway's cut-flower production are given below. Production had been stable or growing slightly between 1995 and 2006, but between 2006 and 2010 production was greatly reduced by nearly 50 million pieces. All crops were affected, but particularly rose and also chrysanthemum and 'other' cut-flowers. Lily and tulip saw relatively smaller reductions. This is another example of a European country affected by the new producer countries.

Production (thousand pieces) of cut-flowers (under protection) in Norway, 1995-2010						
	1995	1998	2001	2004	2006	2010
Total	104,646	109,137	109,580	110,048	117,471	69,303
of which:						
Tulip	- <sup>1</sup>	-	-	-	78,873	53,879
Rose	-	-	-	-	25,713	10,596
Lily	-	-	-	-	4,717	3,075
Chrysanthemum	-	-	-	-	2,432	1,208
'Other'	-	-	-	-	5,736	493

<sup>1</sup> – Indicates data not given.

<sup>42</sup> Source: *ISPF 2014*, from Statistics Norway, Census of Agriculture 2010.

## 6.19 Poland<sup>43</sup>

Although the amount of data available on Polish cut-flower production is limited, it does show an interesting pattern (see table below). Between 2002 and 2013 the total areas of cut-flowers grown under cover, and in the open (including flower-bulbs), increased continuously and steadily, with apparently none of the knock-on effects seen in the data of several other European countries. There is a large area (around 600ha) of 'other' cut-flowers, and smaller areas of rose and chrysanthemum grown, both of which increased modestly over this period.

Flower and bulb production areas (ha) in Poland, 2002-2013											
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2013
Cut-flowers											
under cover	1,417	1,433	1,445	1,477	1,518	1,554	1,589	1,602	1,608	1,616	1,616
of which:											
Rose	110	- <sup>1</sup>	-	-	-	-	-	-	194	-	194
Chrysanthemum	50	-	-	-	-	-	-	-	65	-	65
'Other'	657	-	-	-	-	-	-	-	573	-	573
In the open, including bulbs	3,176	3,246	3,311	3,364	3,455	3,507	3,609	3,698	3,799	3,833	3,840

<sup>1</sup> – Indicates data not given.

<sup>43</sup> Source: *ISPF* 2014, from Agricultural Census 2002, 2010, Central Statistical Office, Poland; A. Marosz, Institute of Horticulture, Skierniewice, Poland.



## 6.20 Spain<sup>44</sup>

The table below shows that cut-flower production in Spain fell steadily between 2008 and 2012. For most crops – mainly carnation and rose, production areas fell by about half over this period. The large area of ‘other’ cut-flowers lost only about 20% of its area.

Production area and numbers of cut-flowers produced under protection and in the open in Spain, 2008-2012

	Area (ha)					Production (million pieces)			
	2008	2009	2010	2011	2012	2009	2010	2011	2012
Total	2,236	1,667	1,724	1,458	1,383	- <sup>1</sup>	2,042	1,838	1,778
of which:									
Carnation	923	592	592	469	429	1,324	1,082	859	788
Carnation, other	706	405	441	351	310	992	799	679	612
Rose	308	194	195	174	164	216	184	166	156
Rose, other	290	182	184	164	121	206	175	157	115
American type	190	163	133	117	109	295	251	180	164
Rose, Baccara/Meilland	18	12	11	11	11	10	9	9	9
Anita type	27	23	18	<1	-	38	32	1	-
‘Other’ cut-flowers	1,005	881	937	815	790	-	777	813	834

<sup>1</sup> – Indicates data not given.

<sup>44</sup> Source: ISPF 2014, from Eurostat; *Ministerio de Agricultura, Alimentacion y Medio Ambiente, Avance de Anuario de Estadística*, 2013, Spain.

## 6.21 Sweden<sup>45</sup>

Some rather incomplete statistics for Sweden are given in the next table. Over the period 2002 to 2011 the production area for cut-flowers appears to have fallen considerably, involving in terms of relative area, chrysanthemum, rose and alstroemeria; the area of 'other' flowers has increased recently. For flower-bulbs, the total number has increased steadily from 2002 to 2011, made up of a considerable increase in the numbers of tulips produced, accompanied by large falls in the numbers of daffodil and 'other' bulbs.

Production of cut-flowers and flower-bulbs for cut-flowers in Sweden, 2002-2011				
	Number (thousand pieces)			
	2002	2005	2008	2011
Cut-flowers	11,383 <sup>1</sup>	3,805 <sup>1</sup>	3,636	2,568
of which:				
Chrysanthemum	43,211 <sup>1</sup>	3,185	204	50
Rose	10,032	3,070	3,216	- <sup>2</sup>
Alstroemeria	477	178	-	-
'Other'	433	240	199	647
Flower-bulbs for cut-flowers	115,628	115,784	126,685	152,776
of which:				
Tulip	112,025	114,363	132,500	152,400
Daffodil	1,023	787	456	336
'Other'	2,580	634	501	11

<sup>1</sup> Some anomalous figures in the original are being checked.

<sup>2</sup> – Indicates data not given.

<sup>45</sup> Source: *ISPF 2014*, from Swedish Board of Agriculture, The Horticultural Census 2011A, Horticultural Survey 2011.

## 6.22 Taiwan China<sup>46</sup>

In marked contrast to the figures for China, the total area of cut-flowers grown in Taiwan fell by 24% between 2004 and 2012. The most serious reductions were for dahlia (90%), gladiolus (21%), tuberose (45%), heliconia (38%), chrysanthemum (32%) and rose (26%). The area of bulbs also fell sharply, though this was in any case a very small sector in Taiwan. On the other hand, the production areas of anthurium, lisianthus and gerbera all increased, by 48, 46 and 22%, respectively.

Production area of cut-flowers in Taiwan China, 2004-2012								
	Production area (ha)							
	2004	2006	2007	2008	2009	2010	2011	2012
Total cut-flowers	4,498	4,265	4,170	3,912	3,862	3,707	3,748	3,401
of which:								
Chrysanthemum	1,074	959	945	799	772	827	825	728
Gladiolus	529	416	354	276	236	246	207	208
Lily	339	271	345	331	337	287	370	307
Tuberose	121	174	140	96	91	72	70	67
Rose	324	321	320	332	273	287	262	239
Anthurium	130	150	160	189	196	209	215	193
Carnation	80	86	79	129	115	98	75	67
Gerbera	63	63	81	82	78	77	81	77
Lisianthus	89	65	59	58	54	76	101	130
Dahlia	99	84	39	43	29	9	9	10
Heliconia	56	48	47	43	39	36	40	35
'Other'	1,596	1,629	1,601	1,534	1,641	1,483	1,495	1,337
Bulbs	22	10	11	7	4	5	- <sup>1</sup>	2

<sup>1</sup> – Indicates data not given.

<sup>46</sup> Source: *ISPF 2014*, from Chinese Taipei Floriculture Development Association, Yearly Report of Chinese Taipei Agriculture 2010, 2011, 2012.

## 6.23 Turkey<sup>47</sup>

The data available for Turkish cut-flower production, shown below, unfortunately do not give full runs of both area and numbers produced over the same period. The area data appear to show more or less steady production between the available years, 2004 to 2013. The majority of crops are increasingly grown under plastic. The production of carnation, gillyflower, hyacinth and rose have seen small falls in production during this period, while the area of daffodil has greatly decreased. Other subjects have seen stable production levels or small increases.

Production area and number produced for cut-flowers grown under protection and in the open in Turkey, 2004-2013

	Area (ha)					Production (million pieces)		
	2004	2008/09	2011	2012	2013	2011	2012	2013
Total	1,199	1,212	1,142	1,178	1,082	- <sup>1</sup>	-	-
of which (a):								
Under glass	64	47	57	55	-	-	-	-
Under plastic	771	890	914	938	-	-	-	-
Open field	364	274	-	-	-	-	-	-
and of which (b):								
Carnation	-	-	504	504	489	588	623	594
Rose	-	-	186	109	161	105	112	83
Gerbera	-	-	114	116	113	136	125	123
Chrysanthemum	-	-	47	43	57	38	36	42
Lily	-	-	57	73	52	13	14	10
'Others'	-	-	20	33	43	15	22	28
Tulip	-	-	26	22	34	24	24	56
Gladiolus	-	-	29	44	33	14	17	10
Gypsophila	-	-	25	25	26	18	18	17
Freesia	-	-	17	18	16	26	30	17
Lisianthus	-	-	16	22	14	13	19	9
Solidago	-	-	12	13	12	20	18	16
Gillyflower	-	-	18	17	11	6	6	3
Anemone	-	-	1	1	8	2	2	1
Hyacinth	-	-	15	6	5	10	2	2
Iris	-	-	3	2	3	1	1	1
Statice	-	-	1	1	3	-	-	-
Daffodil	-	-	48	43	1	14	9	11
Orchids	-	-	2	2	1	-	-	-

<sup>1</sup> – Indicates data not given.

<sup>47</sup> Source: *ISPF* 2014, from Turkish Statistical Institute Database; Ministry of Food, Agriculture and Livestock.

## 6.24 USA<sup>48</sup>

According to US Department of Agriculture (USDA) statistics quoted below, the last ten years or so have seen a major change in the production of cut-flowers and ‘florist greens’ (cut-foliage), presumably as a result of cheaper imports from Central and South America and elsewhere.

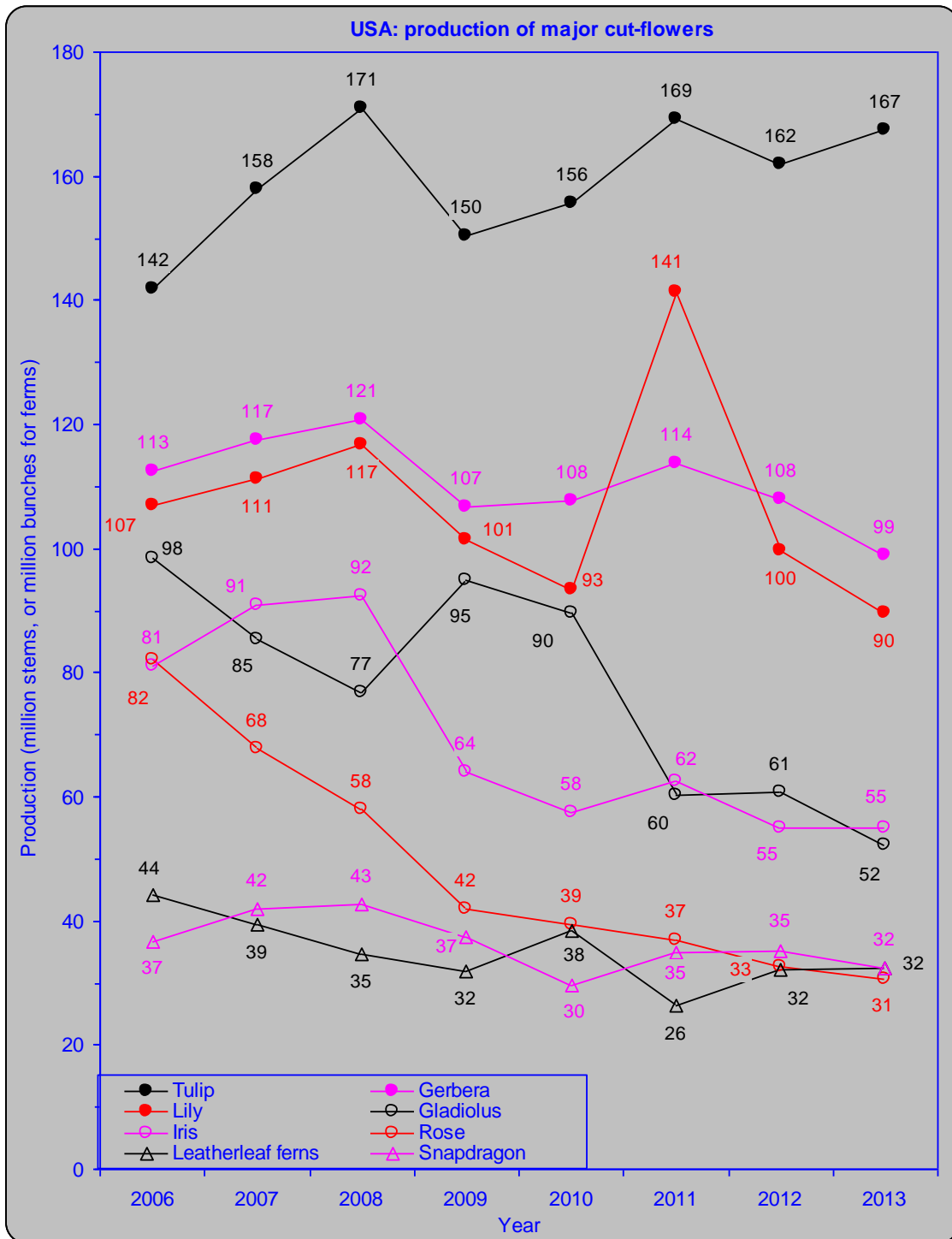
The overall figures for the period 2002 to 2012 (see table below) showed a drop of almost one-third in production in the open, without any compensating increase in production under protection. Between 2007 and 2012, the only figures readily available, production in the bulb sector remained steady, presumably as bulbs are less amenable to growing in the new producer countries.

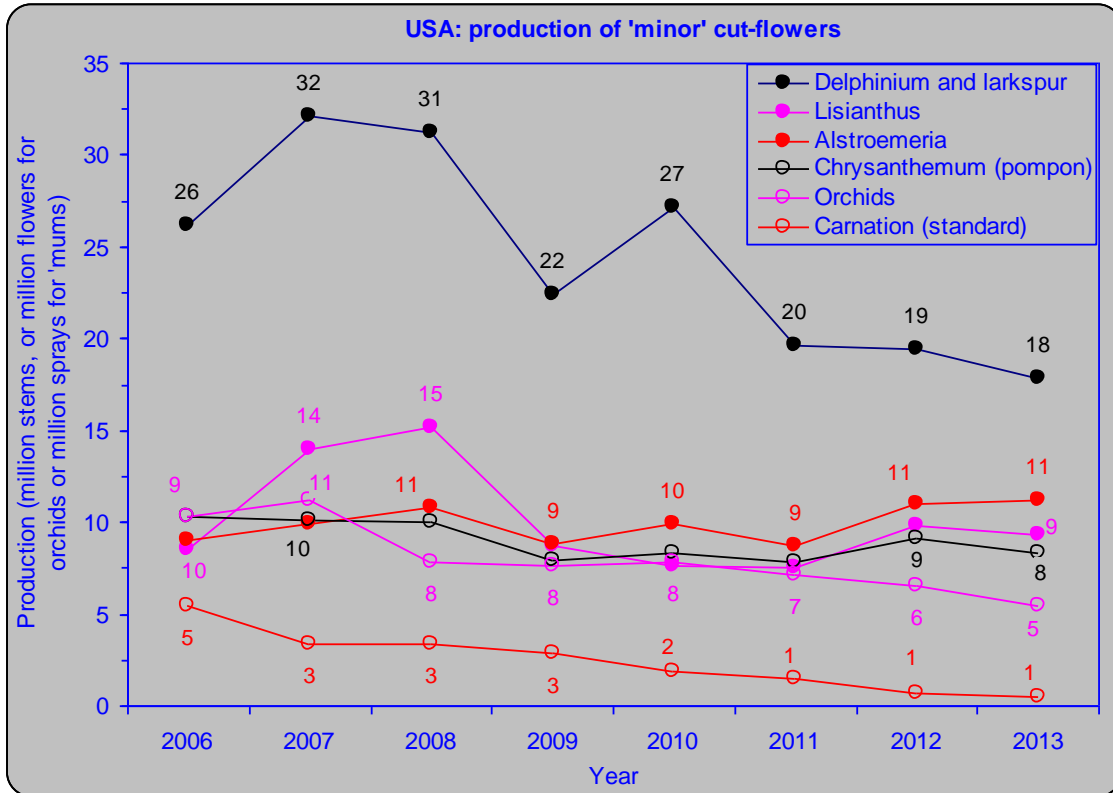
Overall USA production areas for cut-flowers, florist greens and flower-bulbs, 2002 to 2012			
Category	Cultivated area (ha)		
	2002	2007	2012
Cut-flowers and florist greens, of which:			
In the open	13,387	10,400	9,217
Under glass or other protection	2,140	1,620	2,185
Flower bulbs, etc (dry), of which:			
In the open	- <sup>1</sup>	2,452	2,509
Under glass or other protection	-	20	12

<sup>1</sup> - Indicates data not available.

The statistics for individual crops are shown in the two figures below. Examination reveals some very crop-specific effects, for example, despite the overall fall in production of cut-flower crops from 2006 to 2013 of 21%, in the same period the production of tulips – already the most numerous product by far, increased by 18%, with alstroemeria and lisianthus also increasing, by 31 and 9%, respectively. This confirms the enduring popularity of tulips and, perhaps, of an increased appreciation of alstroemeria and lisianthus as cool-grown crops - also noted in CFC trials. Production of the other listed crops fell over the same period, most dramatically in the case of carnation (by 90%), rose (63%) and orchids and gladiolus (each by 47%).

<sup>48</sup> Source: *ISPF* 2014, from 2012 Census of Agriculture, USDA, National Agricultural Statistics Service, and USDA, Floricultural Crops 2013, Summary, Data for Operations with \$100,000+ Sales, 15 States Program.



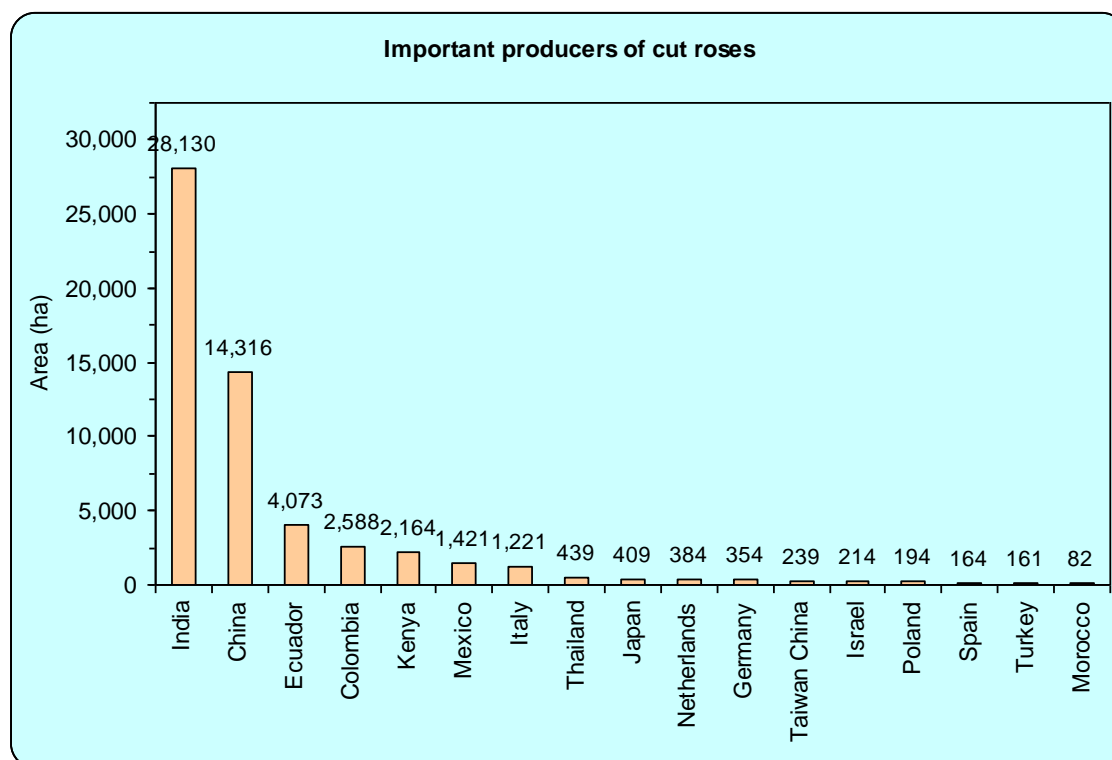


## 7.0 The major cut-flowers: production, exports to the EU, EU imports

Despite the diversity of cut-flower species that make up commercial production worldwide, the bulk of the industry is concentrated on a very few genera mainly – rose, carnation, chrysanthemum, lily and orchids. The sheer dominance of these important cut-flowers may partly explain the slow pace at which alternative or novel cut-flowers catch the imagination of the industry as being worthy of exploitation.

*ISFP 2014* provides useful information on the main producing countries of these major cut-flowers, and their export to and import by the countries of the EU.<sup>49</sup> Data are also provided under the generic heading of cut-foliage.

### 7.1 Rose



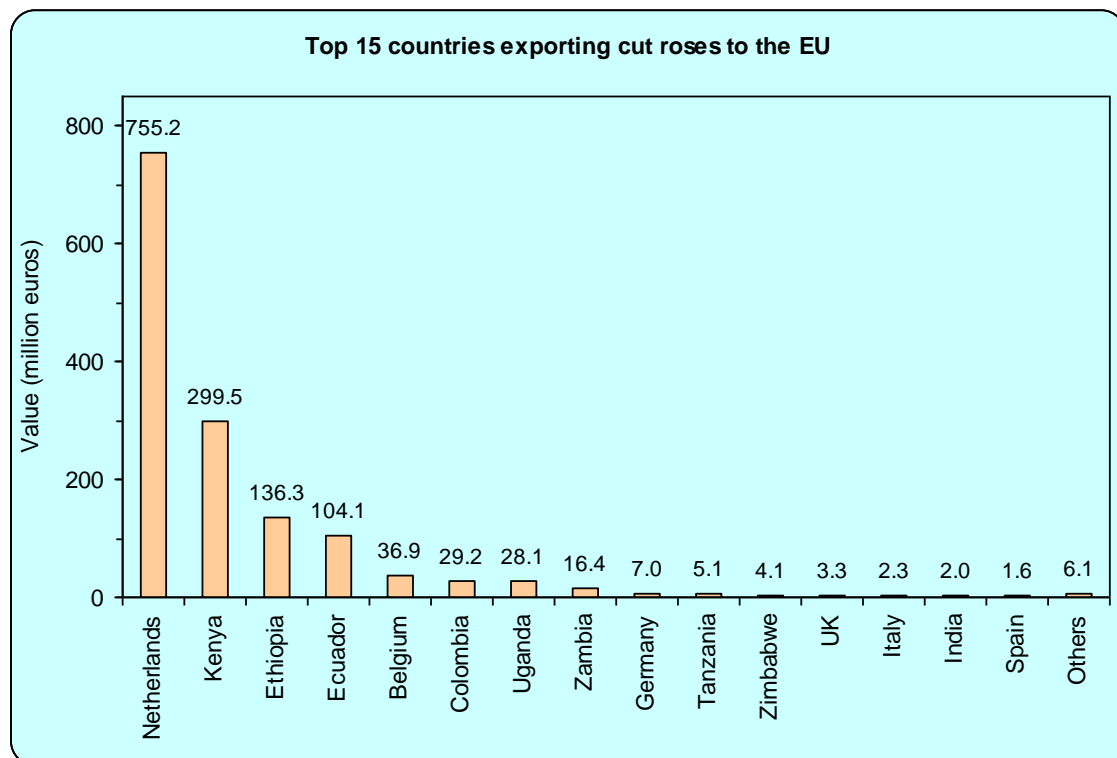
The above figure establishes something of a pattern – that one or two countries often dominate the production area to an overwhelming extent. In this case India has >28,000ha of crops, China >14,000ha, and the next largest producer, Ecuador, ca 4,000ha. Other emerging South American and African countries follow, ahead of the largest European grower, Italy (1,221ha). Of course, area grown does not equate to

<sup>49</sup> In these statistics information on the producing countries is based on the latest year available (often 2012 or 2013), and exports and imports on 2013 figures. Not all important producer countries are included in the production areas – statistics for Ethiopia and Kenya, in particular, are often lacking. Source: *ISFP 2014*, from Eurostat.



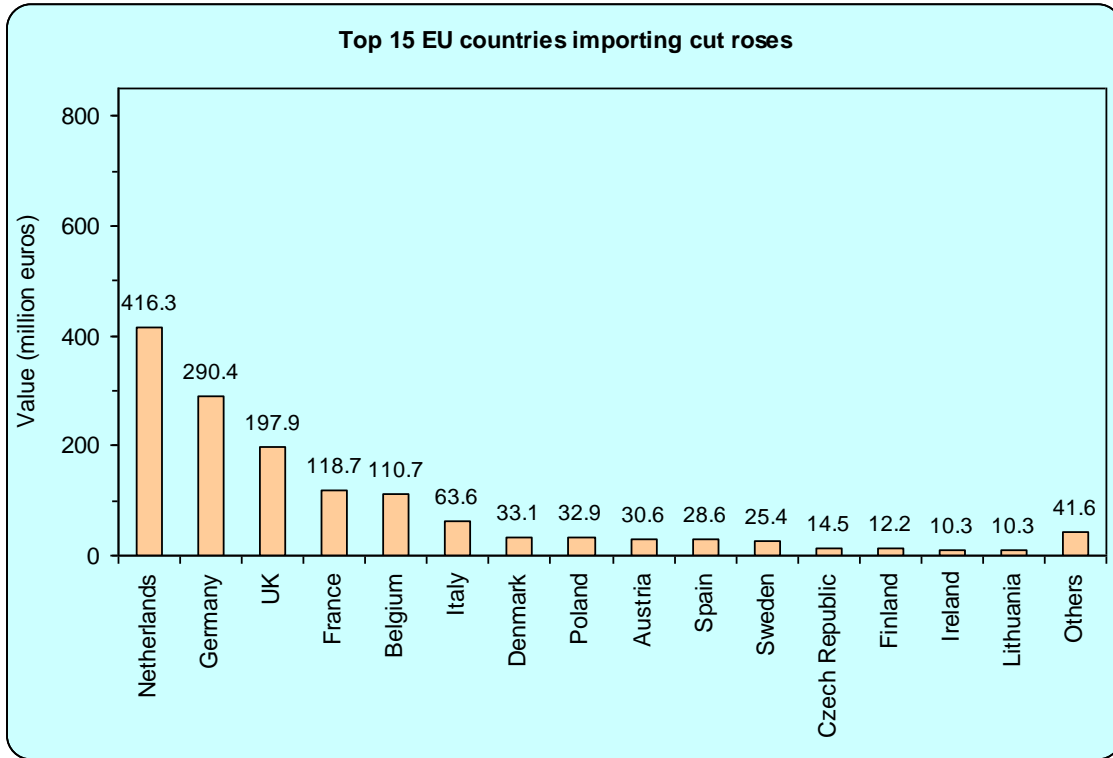
the amount of marketable product or market value, but those figures, which might allow the amount or value of product per hectare to be estimated, are often unavailable.

The next two figures show the top 15 countries exporting cut-roses to EU countries, or to other EU countries, in the case of intra-EU trade, and the top 15 EU countries importing cut-roses. Although it leaves some empty space in the figures, the graphs for exports and imports have been drawn to the same vertical scale to make visual comparisons easier.



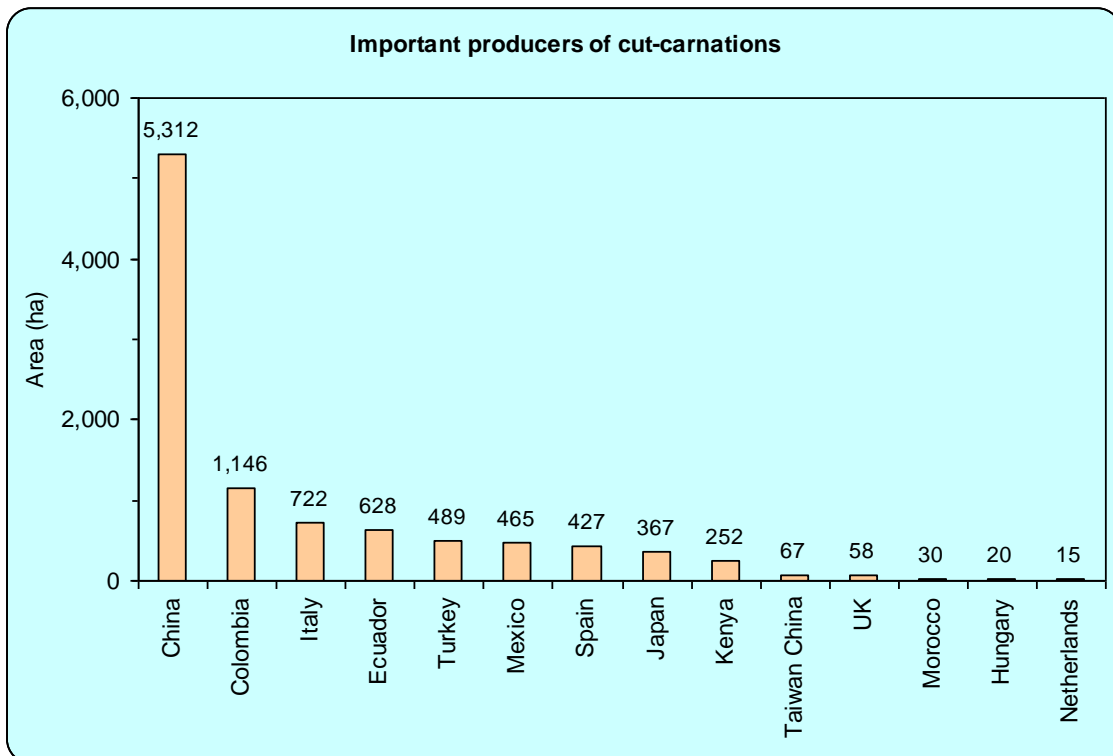
Two striking features – again common to this series of statistics – are (a) the predominance of the Netherlands in the import-export trade and as an intra-EU exporter, and (b) the non-appearance of new, major Asian producer countries in the list of exporters to the EU. Aside from the Netherlands, Kenya, Ethiopia and Ecuador are the EU's main source of imports.

The major EU importing countries are (in descending order) the Netherlands, Germany, the UK, France, Belgium and Italy, while most other EU countries import some cut-roses.

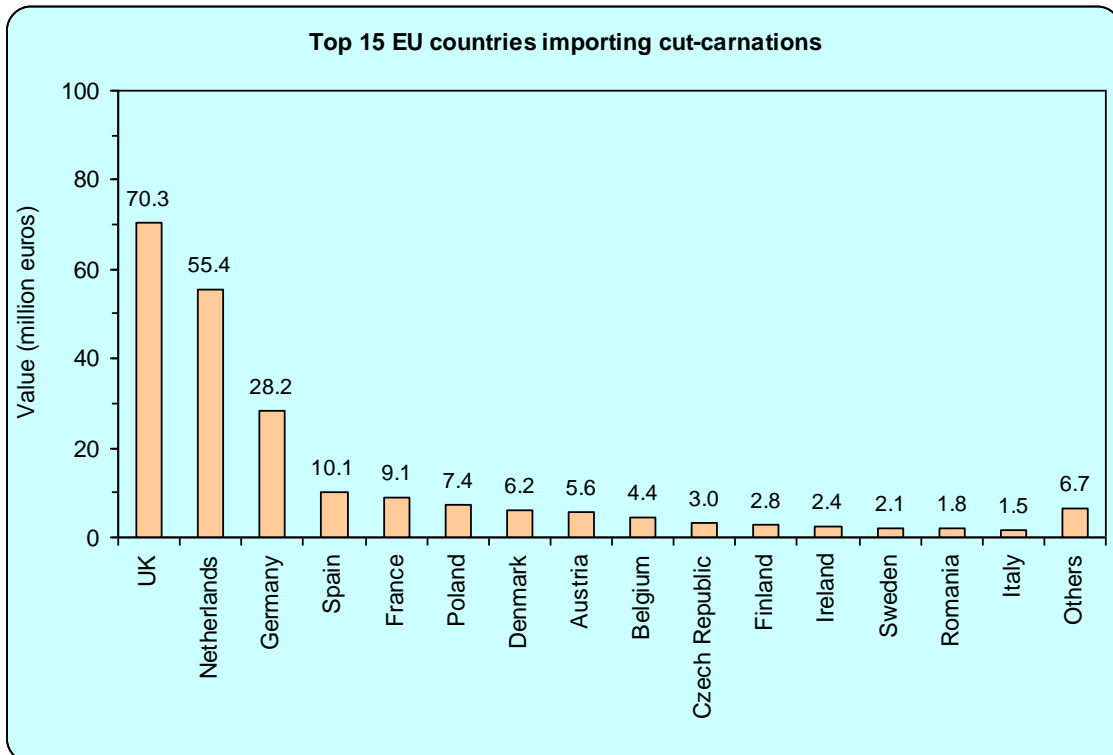
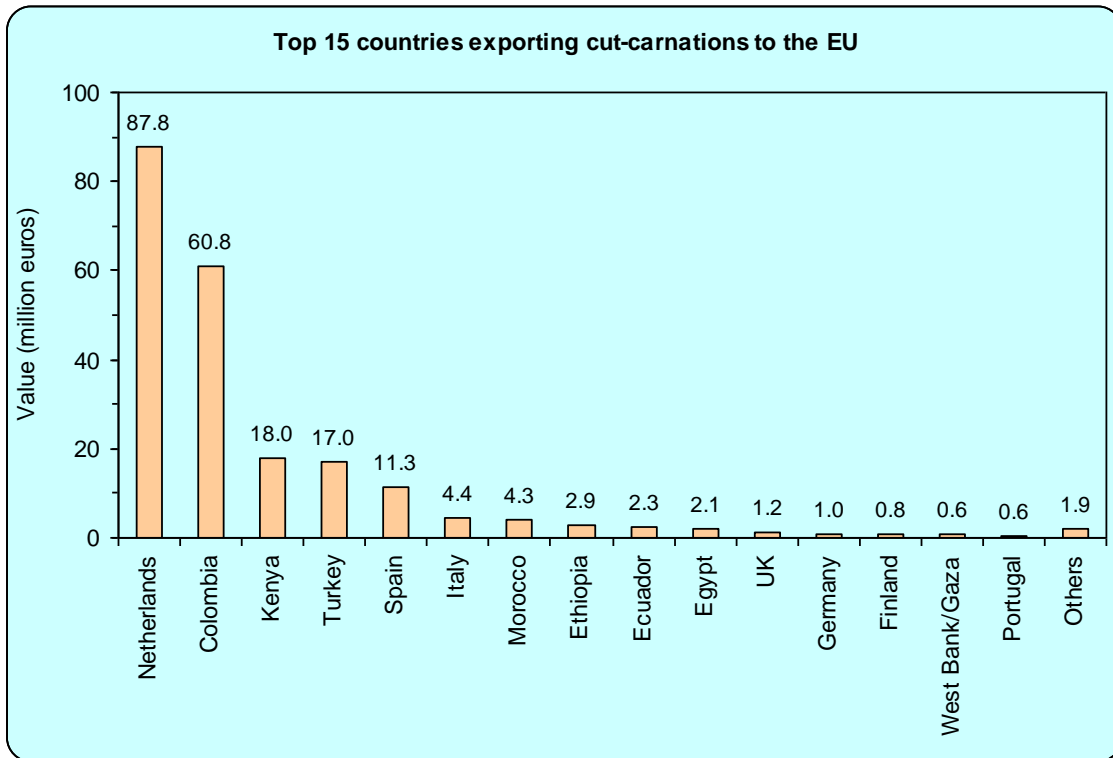


## 7.2 Carnation

The figure below shows that China dominates the production area of cut-carnation, growing over 5,000ha, followed by Columbia (>1,000ha). Other moderate producers, in order, are Italy, Ecuador, Turkey, Mexico, Spain, Japan and Kenya.

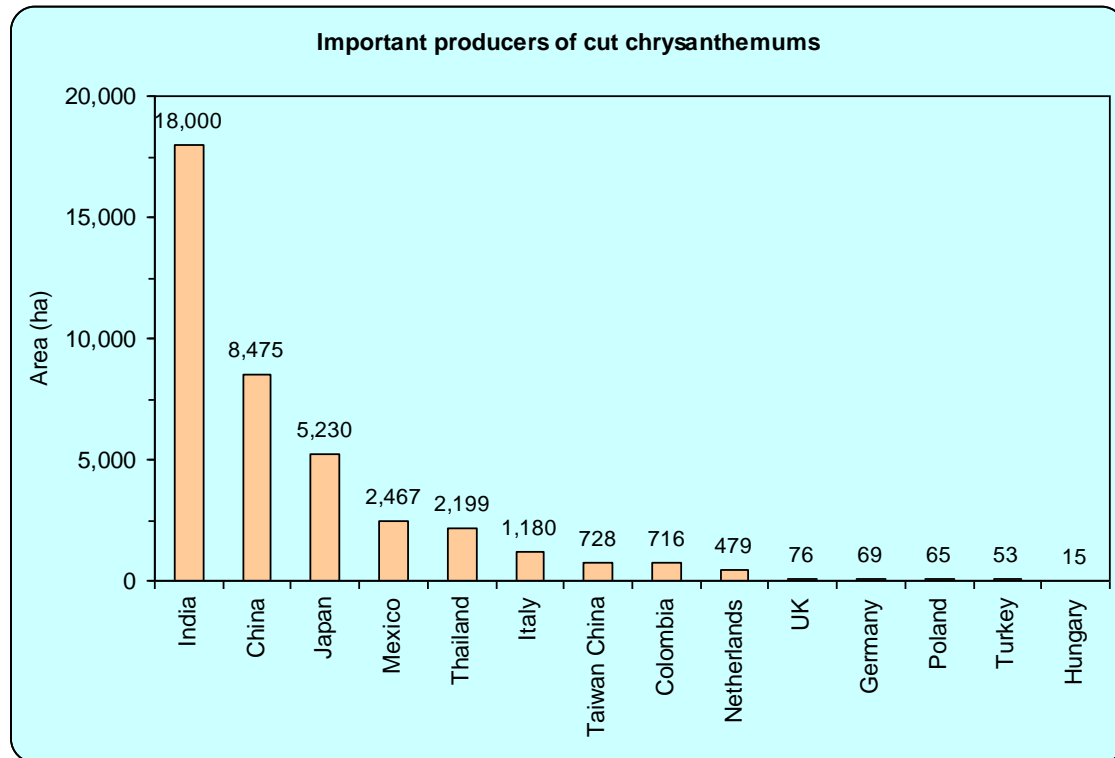


As shown below the Netherlands and Columbia dominate exports to EU countries (€88million and €61million, respectively). Kenya, Turkey and Spain each achieves exports of >€10m. Of the EU countries, the UK imports the largest value of cut-carnation (€88million), followed by the Netherlands (€55million) and Germany (€28million), but carnations remain popular amongst several other EU states.



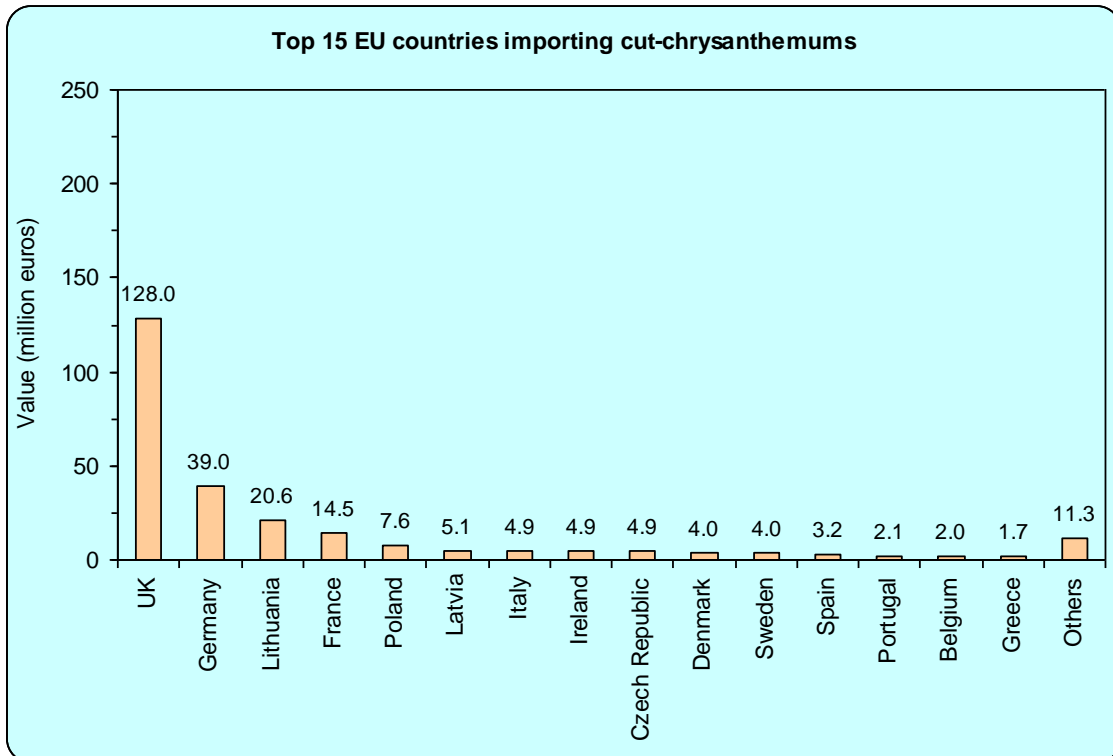
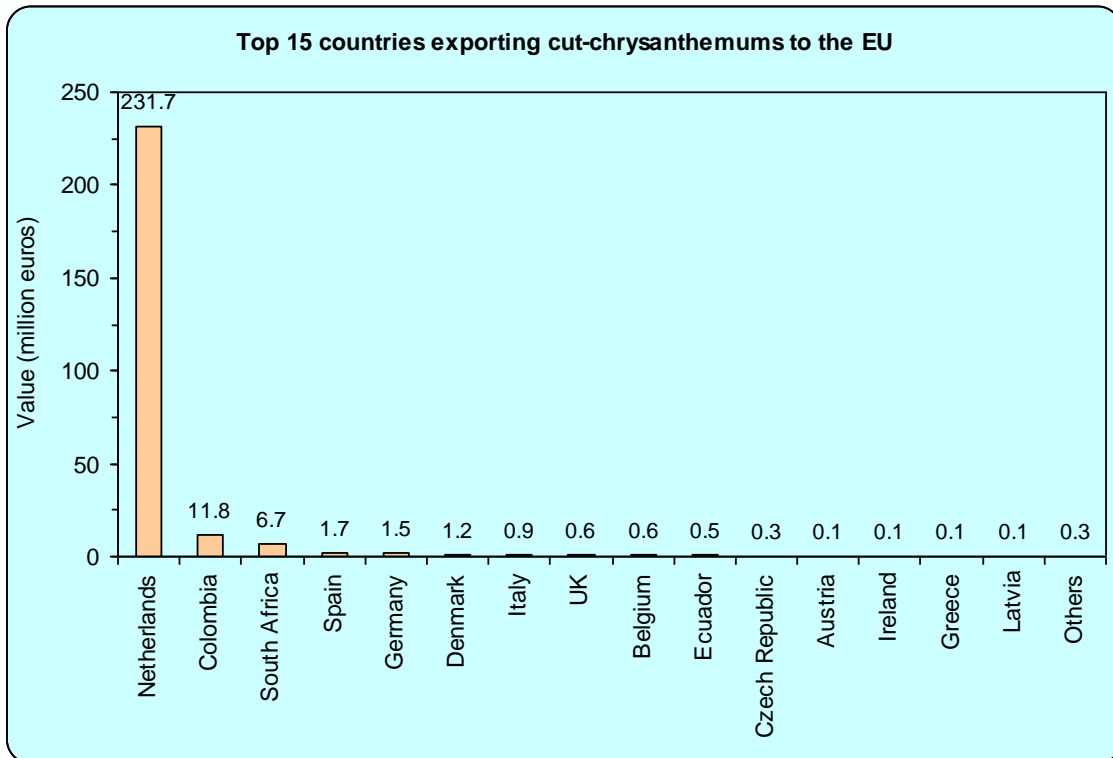
### 7.3 Chrysanthemum

As shown below, India dominates the growing area (18,000ha) followed by China (>8,000ha). Japan, Mexico and Thailand are the next main growers, again ahead of Italy, the main European producer. As always, planted areas may not correspond with the amount of product or its value.



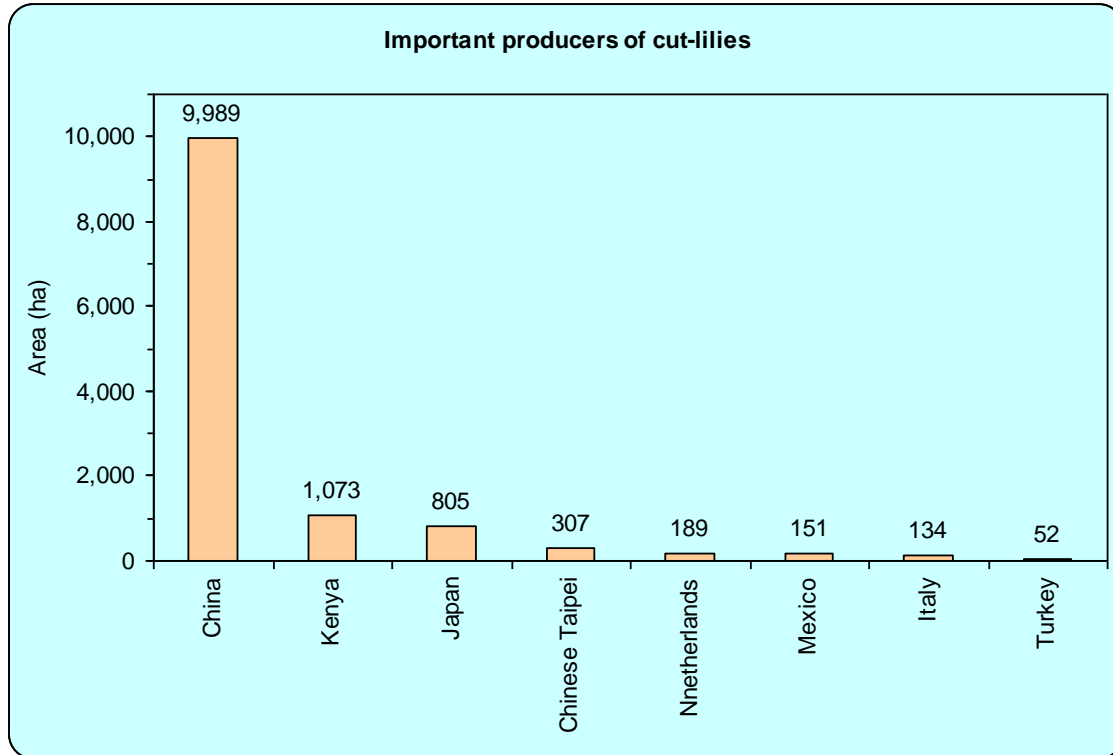
The next two figures show the top 15 countries exporting cut-chrysanthemum to the EU and the chief EU importing countries.

As with roses, the Netherlands dominates trade with intra-EU exports of €232million. The major producing countries (India, China, Japan, Mexico and Thailand) do not make this listing. Reflecting a fondness for chrysanthemum, the UK leads the list of EU importers by far (€128million), with only Germany, Lithuania and France importing >€10million of the product.



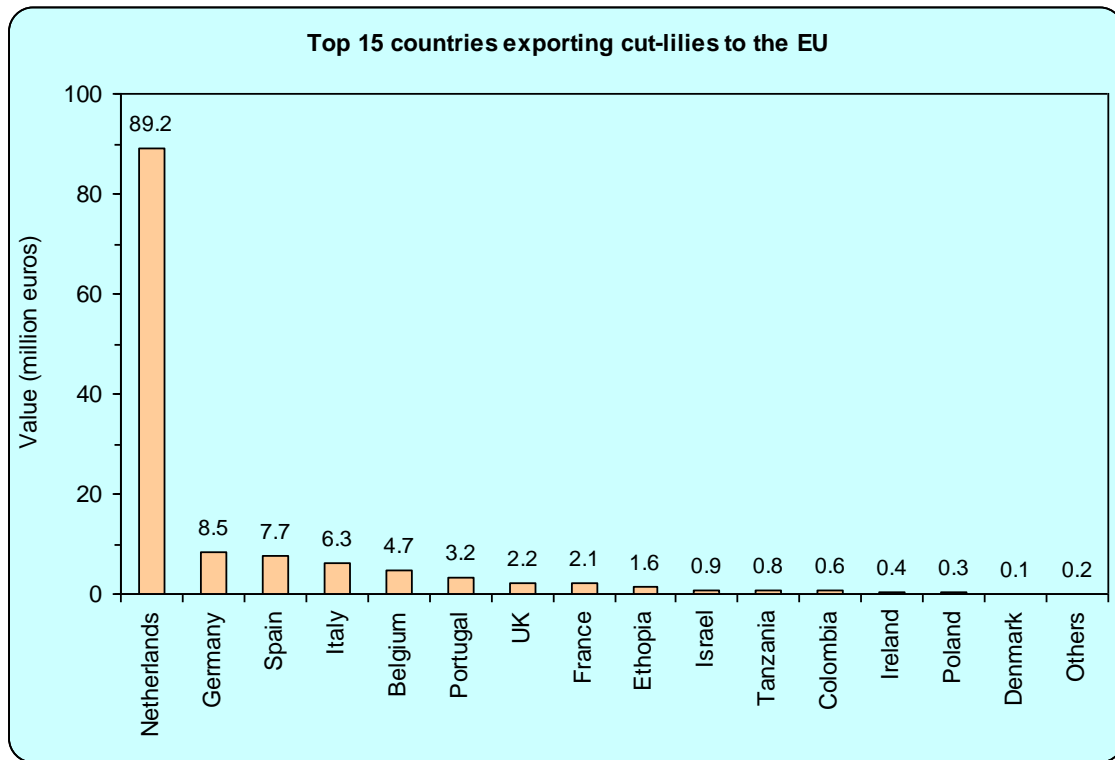
## 7.4 Lily

The next figure shows that China alone dominates the growing area of cut-lilies, with nearly 10,000ha. The next largest growers are Kenya and Japan, with ca 1,000ha each.

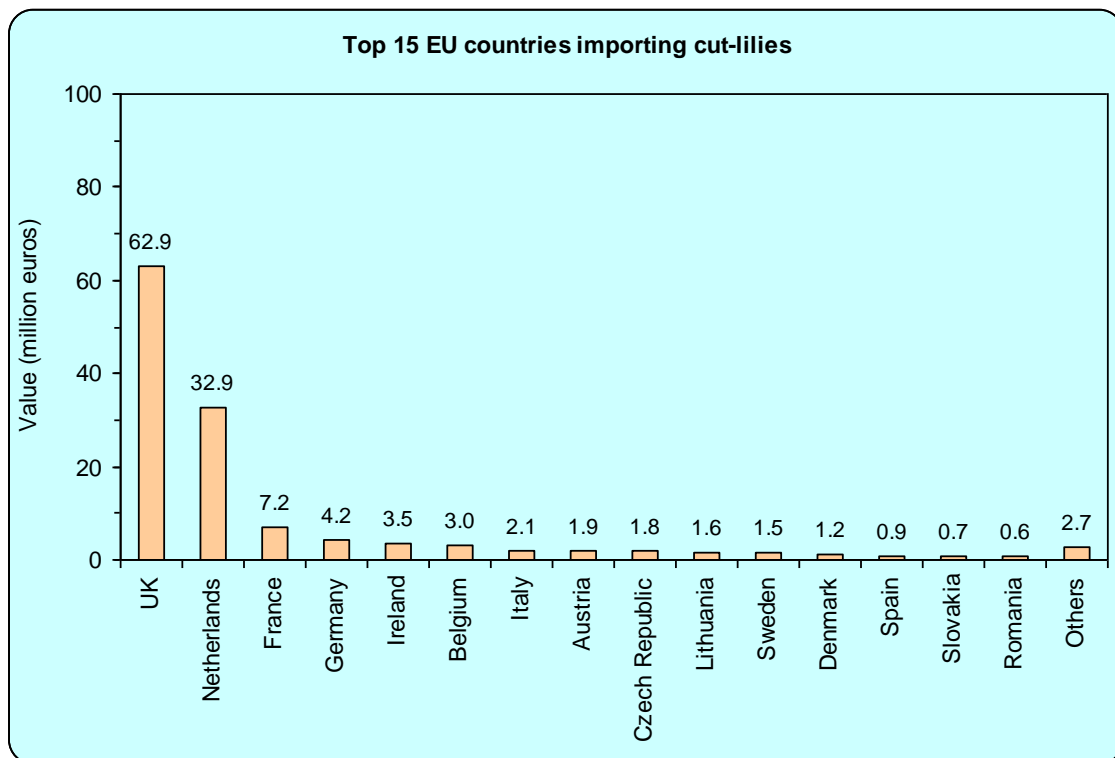


The next two figures show the top 15 countries exporting cut-lilies to the EU and the chief EU importing countries.

For lilies, intra-EU exports are again dominated by the Netherlands. The major growing countries do not appear on this list.

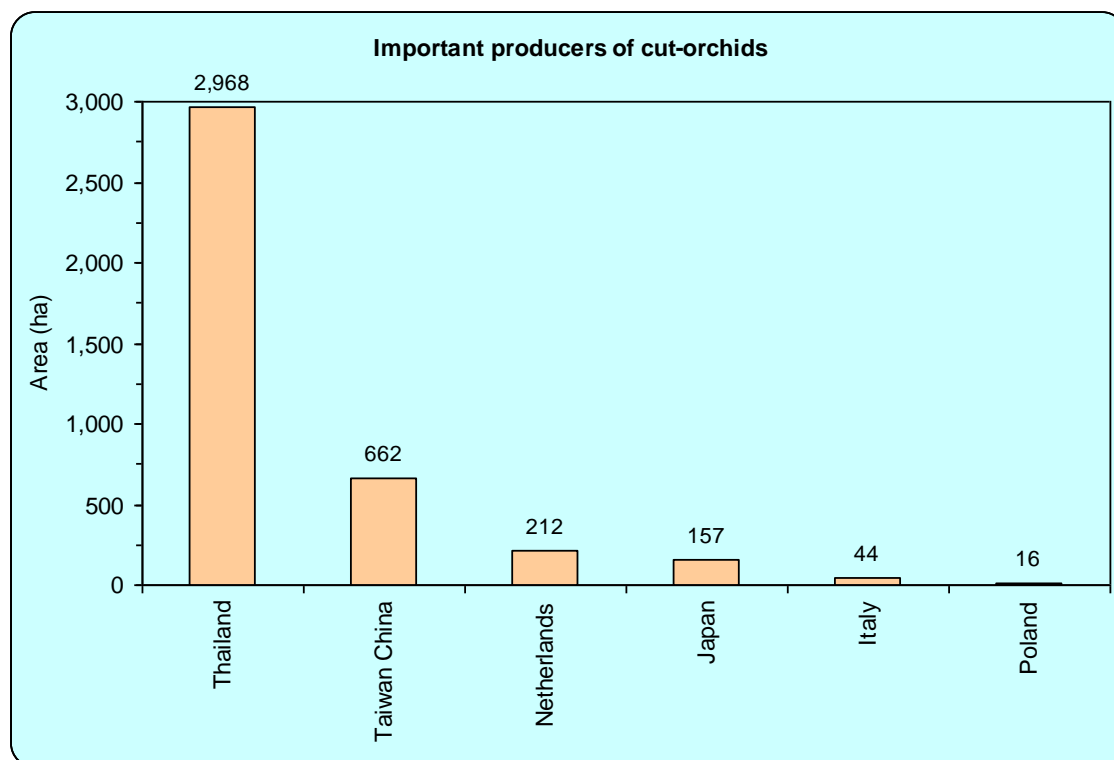


The EU's predominant importing countries are the UK (€63million) and the Netherlands (€33million), with many other EU countries importing small quantities.



## 7.5 Orchids

The figure below shows the important cut-orchid growing countries.<sup>50</sup> Thailand dominates the production area with nearly 3,000ha. Other substantial grower countries are Taiwan China (662ha), the Netherlands (212ha) and Japan (157ha).

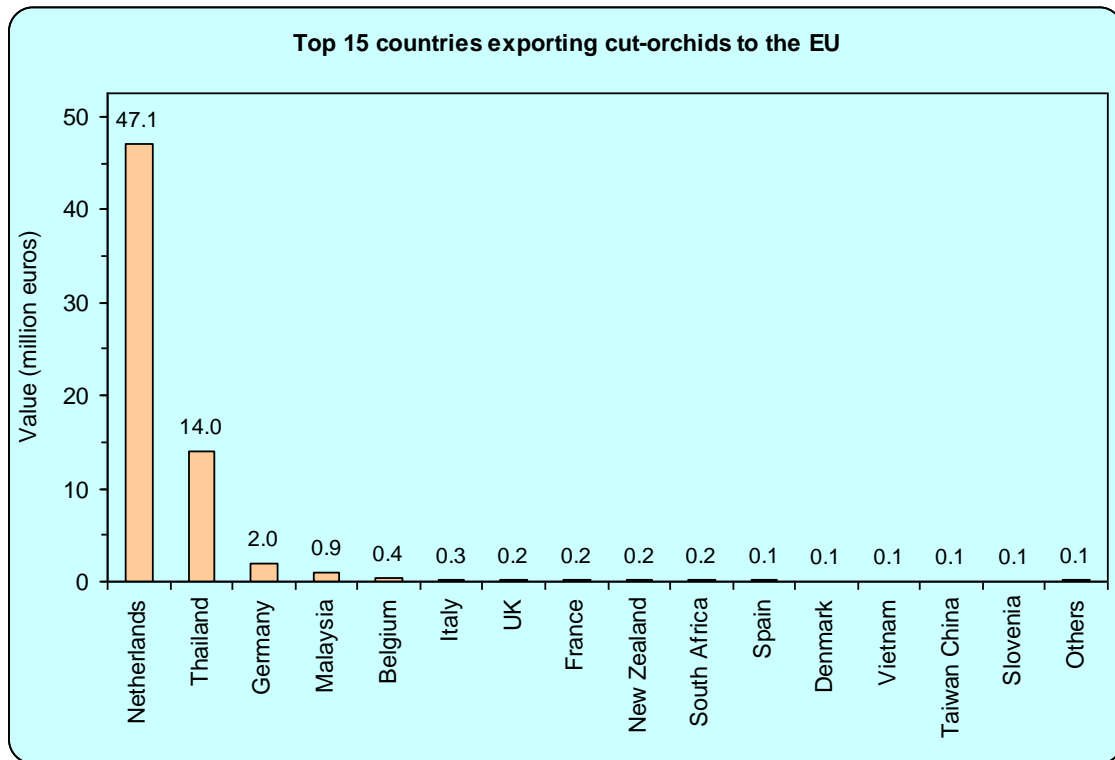


The exporting and importing countries are shown on the figures below.

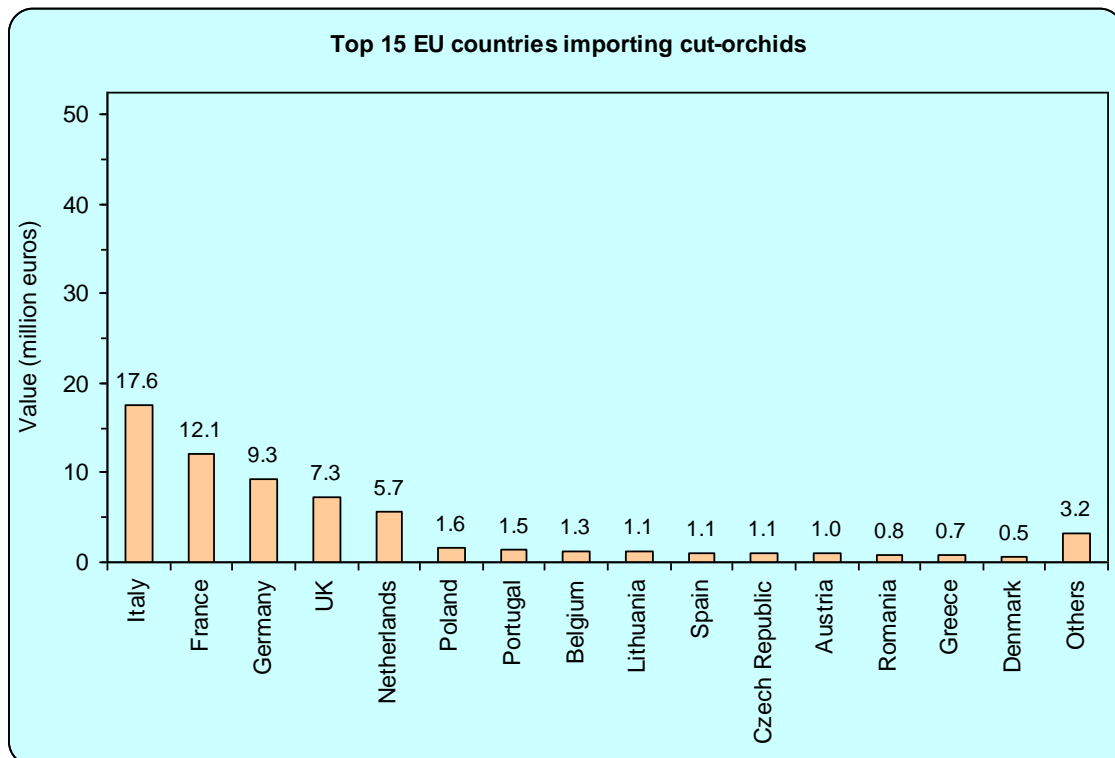
<sup>50</sup> *ISFP 2014* annotates its figures for Thailand, Taiwan China and Poland (but not the other countries) 'area pot plants'.



Exports to EU countries are dominated by the Netherlands (€47million) and Thailand (€14million), with only modest amounts from elsewhere.

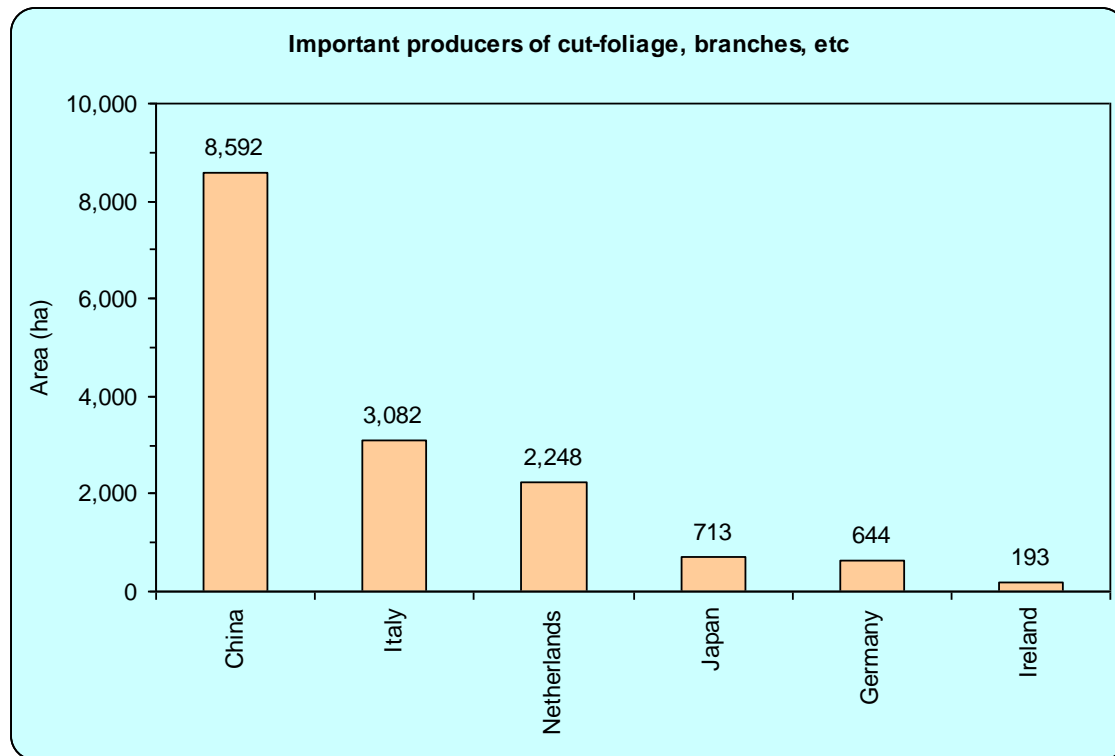


The main EU importing countries, in descending area, are Italy (€18million), France, Germany, the UK and the Netherlands (€6million). Several others import around €1million each.

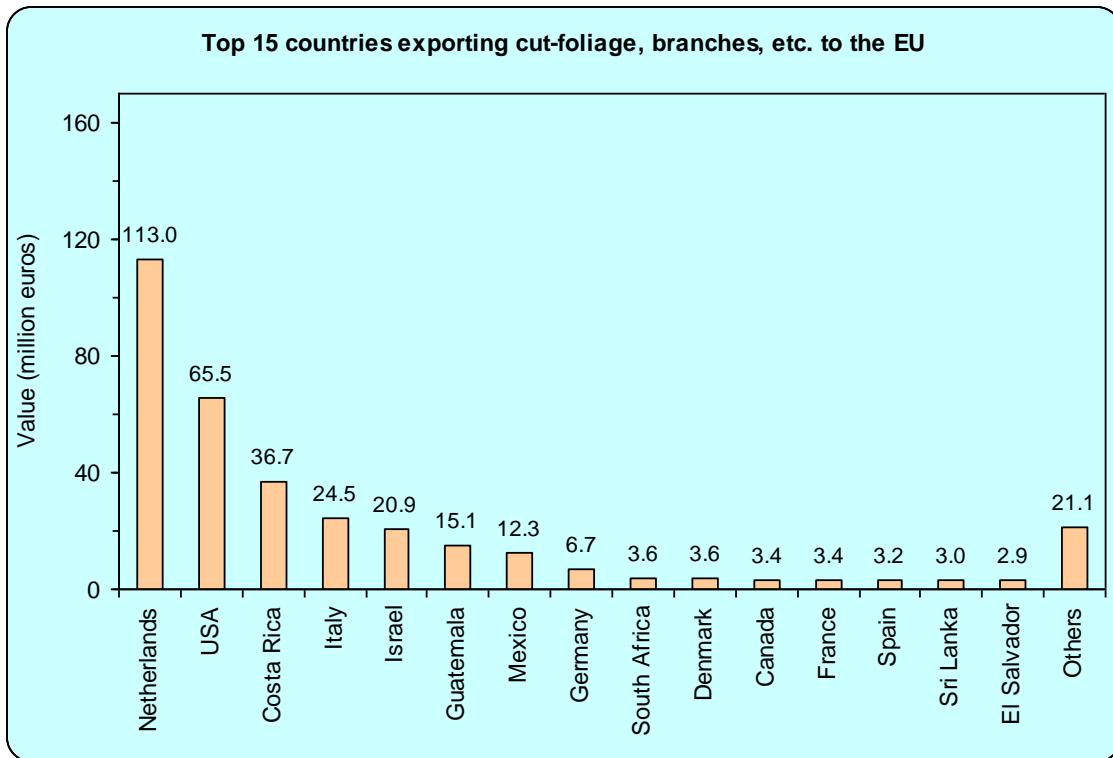


## 7.6 Cut-foliage, branches, etc.

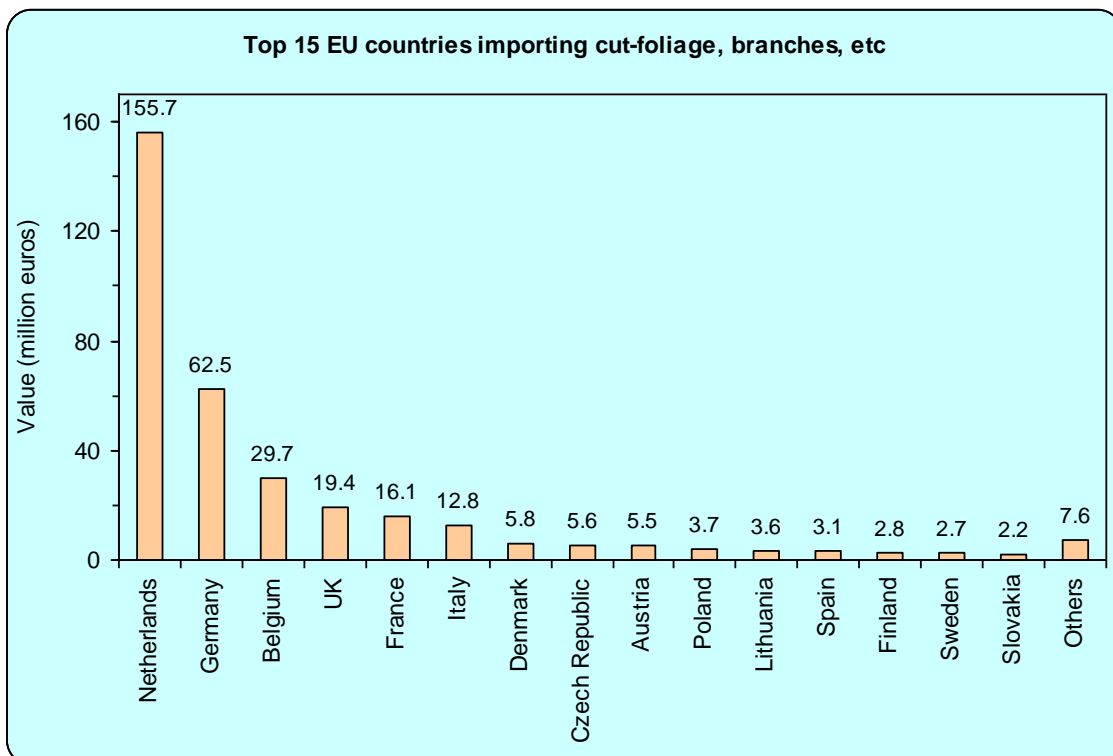
Taken together, cut-foliage - including flowering branches, etc. - make up an important sector. As the next figure shows, China again has by far the largest growing area, some 8,500ha, but in this case followed by Italy (>3,000ha) and the Netherlands (>2,000ha). Although with a relatively smaller area, Ireland figures here, with nearly 200ha of foliage in production.



The next figure shows that, once again, the Netherlands dominates intra-EU trade, with exports to other EU countries >€100million. Other key exporters to the EU are the USA and Costa Rica (€65million and €37million, respectively), and amongst other important exporters are several Central American countries, Israel and Sri Lanka, presumably developing niche products in this dynamic, expanding sub-sector.



The following figure shows that the EU importing countries are dominated by the Netherlands (€156million), followed by Germany (€62million), Belgium (€30million), the UK (€19million), France (€16million) and Italy (€13million).



## **8.0 Summary and conclusions**

### Background

1. The HDC (now AHDB Horticulture) funded the National Cut Flower Centre (CFC) to provide 'know-how' and stimulate growth in the sector and the commercialisation of alternatives to the traditional UK cut-flowers, particularly those that can be grown in low-cost polythene tunnels (Spanish tunnels) and in the open. As part of the CFC's information-gathering role, the worldwide statistics of cut-flower and foliage production have been reviewed.

### Sales

2. Despite a rise in the UK's cut-flower imports from £125m in the late-1980s to £550m in the early-2000s, the farm-gate value of UK-grown cut-flowers has remained static at around £50m to £60m *per annum*, including the non-bulb outdoor flower sector worth some £5m to £10m annually. Hence, there would seem to be scope for expansion by UK growers.
3. Amongst EU countries, Norway's annual *per capita* spend on plants and flowers is exceptionally high at €283 (although the population is small), while those of the Czech Republic and Spain are low (€41 and €28, respectively). *Per capita* consumption in the UK has risen from historically low levels, but at €86 currently is still relatively low for a western European country. Over the period 2011 to 2012, cut-flower consumption in most EU countries remained static, though in Italy there was a marked reduction in spending while there was a significant increase in Sweden: on the whole, these figures do not paint too pessimistic a picture for future sales of horticultural products.
4. Across the EU, most cut-flower sales, on average over three-quarters of the total, are made in florists and supermarkets. A major difference between countries is the ratio of florist to supermarket sales, and here the UK is an exception, having the largest proportion of supermarket sales (56%) and the smallest of sales at florists (20%). Sweden and Switzerland appear to be following this course. Cut-flower sales in the UK look set to continue being dominated by the supermarkets unless a novel marketing initiative can be made towards boosting other outlets.
5. In terms of wholesale markets, FloraHolland and Landgard are dominant, with 2013 turnovers of €million 7,350 and €million 1,216. Between 2007 and 2013 FloraHolland's turnover increased by 7% and Landgard's by 38%. In comparison, many of the other world wholesale markets are modest in size, though the growth of two should be noted: Veiling Holambra (São Paulo, Brazil) and OTA Floriculture Auction (Japan) currently have turnovers of €million 163 and 300,

respectively, showing increases of 143 and 67% over the same period. In comparison the turnover of New Covent Garden in the UK was €million 37 in 2012, a fall of 51% since 2007.

6. Figures on the top-selling cut-flowers are available from auction houses. At FloraHolland rose, tulip and spray chrysanthemums easily maintained their dominance in terms of numbers sold, but figures showed an overall fall in the number of stems sold of 13% between 2009 and 2012 as a result of large decreases in the numbers of many cut-flowers sold, particularly anthurium, cymbidium, freesia, gypsophila, hypericum and zantedeschia. However, the overall average price increased by 9%, with many subjects – alstroemeria, bloom chrysanthemum, spray chrysanthemum, cymbidium, freesia, hypericum and peony - showing increases of 20% or more. But the price of one of the top subjects, tulip, remained static, which must be a cause for concern.
7. Another, smaller Dutch auction house, Plantion, showed similar recent trends, with decreasing sale volumes and increasing prices. Plantion's sales are dominated by roses, which decreased from 201 million stems in 2011 to 48 million in 2013, a drop of 76%, with prices increasing by 54% over the same time. Next in importance are tulips, with sales decreasing by 29% and prices increasing by 12% over the period, and gerbera, with both sales and prices decreasing (by 19 and 15%, respectively).
8. For Veiling Rhein-Maas, Germany, the major products are mini-gerberas, large-flowered roses and single-flowered tulips. No clear trends on quantities or prices can be seen in recent years' data, but the high-values of cut-foliage and of hippeastrums were notable.
9. Wholesale cut-flower volumes and average prices in the USA showed a somewhat different pattern, with the downward trend in volume less consistent and average prices more or less static. Numerically (in descending order), sales were dominated by tulip, gerbera, lily and iris, whose volumes and prices changed relatively little over the period, and gladiolus – which showed a 42% drop in sales partly compensated by a 21% rise in price. Leather-leaf fern showed sales increased by 14%, though prices fell a little. There was a substantial reduction in both volumes and prices of orchids.
10. Flower auction sales and prices are also available for the Taiwan China auctions, where lily is the predominant crop, with a following group of chrysanthemum, gerbera and rose. Only chrysanthemum and lily showed a marked increase in sales volume in 2013 compared with the previous year, while prices fell or were

little changed over the same period, except for standard chrysanthemum and gerbera which showed modest increases.

#### UK production

11. Despite a setback in the late 1990's, the UK area of bulbs and outdoor flowers increased by 22% over the 18 years to 2004 to stand at 6,376ha. Over the same time period, protected ornamentals increased from a very small base by 70% to 1,029ha. The value of protected ornamentals (including forced bulbs) increased steadily, from £135m in 1986 to £335m in 2013, and the value of flowers and bulbs in the open remained steady at around £38m (£44m in 2013).
12. The area of flowers and bulbs in the open is dominated by daffodils - 80% of the total – and with minor fluctuations the area remained at ca 4,000ha from 1986 to 2004. Other bulbs and flowers accounted for ca 1,300ha until 1994, fell sharply until 1999, and then remained steady at ca 600ha, until at least 2004. The gladiolus crop was recorded from 1998 and has remained steady at ca 100ha.
13. For non-bulb flowers grown in the open, separate figures are collected only for natural-season chrysanthemum and pinks/sweet william. The latter were recorded on about 100ha in 1996, and were about halved by 2008, while natural-season chrysanthemum fared even less well, falling from 130ha in 1995 to only 16ha in 2008. As seen in many other datasets in this report, of the types recorded the 'others' category has been most widely grown. After settling to around 300ha for most of the period the 'other' cut-flowers have enjoyed a rise in popularity since 2005, rising to over 400ha in 2008. Dried flowers were recorded on 400ha in 1996, since when they have declined steadily to stand at 25ha in 2008. Foliage, recorded separately only since 2003, remained steady at around 40 to 60ha.
14. The production values for flowers and bulbs in the open show that despite considerable fluctuations along the way, the values were virtually the same in 2004 as in 1986 - £13m to £14m for each sub-sector. Other flowers and bulbs in the open climbed rapidly from 1986 to peak at £35m in 1993-1994, before falling back. Daffodils increased later, peaking at £25m in 1996.
15. In protected cut-flowers, a striking change occurred between the late-1980s and 2004 with the area of chrysanthemum (both all-year-round (AYR) and others) experiencing a substantial fall of about 75%, to 25ha (AYR) and 18ha (others). The smaller areas of alstroemeria (average 21ha) and carnation/pinks (16ha) were maintained over the period 1987 to 2004. Although the 'other' species also suffered a large drop in area over this period – partly due to recording

alstroemeria and carnation/pinks separately starting in 1987 - they have held their own since 2001 and now dominate the sector with some 52ha grown in 2004.

16. After something of a trough in production in the intervening years, the 2004 values for forced bulbs were back to 1986 levels of £18m to £19m. Over the same period the value of alstroemeria climbed from £1m to £5m, but the values of AYR chrysanthemum fell from £12m to £6m, other chrysanthemum from £6m to £1m, and 'other' flowers from £11m to £4m. The carnation/pinks crop dwindled below £1m. The area for protected bulb-flowers (including forced crops) fell from a peak of 231ha (1987) to 145ha in 1995; thereafter it remained steady, with 161ha in 2004. This sector will formerly have included large quantities of forced daffodil, while more recently lily and tulip will have predominated.

#### UK imports and exports

17. The UK's cut-flowers imports grew substantially between 1988 and 2013, with the 'other' category most notable and going from £31m to £173m over the period, with a peak reaching £339m between 2000 and 2012 (part of this post-2011 decrease may have been due to the separate collection of data for lily).
18. Over the same period the imports of rose climbed from £12m to £168m, of chrysanthemum from £24m to £109m, and of carnation from £44m to £60m. In 2012 and 2013 imports of lily were £53m to £83m.
19. Smaller categories of imports comprised 'prepared flowers and buds', only £7m in 1988 but reaching £84m in 2013, with a massive increase between 2006 and 2013. Gladiolus increased from <£1m to £10m over the same period, and orchids from £2m to £6m.
20. Imports of all cut-flowers from the Channel Islands (CI) were recorded separately until 2004; they had been running at £16m to £28m annually.
21. Tulip bulb imports rose from £5m to £13m over this period. Imports of daffodil, hyacinth and gladiolus bulbs remained at up to £5m each over the whole period. In contrast, imports of other bulbs rose steadily, from £14m in 1988 to £65m by 2013 and increasing massively between 2009 and 2011.
22. The main cut-flower export categories were 'other' cut-flowers, up to £16m in 2013 from £4m in 1988, and 'prepared flowers and buds', up to £4m from £1m. Smaller export categories comprise rose (£3m in 2013), carnation (£2m), lily and chrysanthemum (ca £1m each), the export of which had been negligible in the late-1980s. Note that 'exports' include re-exports, not all exported product was necessarily grown in the UK.

23. Despite some fluctuations in the intervening years, exports of daffodil bulbs at the start and end of the period (1988-2013) remained about £4m. Exports of other bulbs rose erratically from £1.5m to £4m over the same period. Exports of gladiolus, hyacinth and tulip bulbs each remained at <£1m annually, apart from occasional blips.

#### UK imports and exports country by country

24. The UK's total imports of cut-flowers (including all types) are dominated by the Netherlands with massive imports worth nearly €550m annually. Dutch exports are followed by those of Kenya (€60m), Columbia (€35m), Spain (€11m) and South Africa (€8m), with a further ten countries each sending over €1m worth of product. The UK's exports are primarily to the Netherlands (€11m), 'other EU countries' (those not involved with major imports and exports of flowers) (€11m) and Denmark (€2m), with smaller amounts going to several other countries.

25. The Netherlands dominates rose imports to the UK, worth €131m annually. This is followed by imports from Kenya (€49m), Columbia (€8m), Zambia (€4m), Uganda (€2m) and India (€2m), with smaller imports from a number of other countries.

26. The Netherlands also dominates UK imports of chrysanthemum, worth €109m annually. Other significant imports are from Columbia (€11m), South Africa (€6m) and Spain (€1m).

27. The Netherlands (€35m), Columbia (€14m), Kenya (€9m) and Spain (€6m) also lead carnation imports to the UK, followed by Morocco (€4m).

28. The bulk of the cut orchids that are imported to the UK come from the Netherlands, valued at €7m. Other substantial sources are Thailand (€0.4m) and Malaysia (€0.1m), with a small amount from 'other EU countries' (€0.01m). It is apparent that the bulk of these imports are traded through the Netherlands.

29. The UK imports of 'other' cut-flowers (once the main types - rose, chrysanthemum, carnation and orchids - and any 'treated' cut-flowers have been removed) are dominated by the Netherlands, with a value of nearly €200m, and no other country comes close to this: Kenya, Columbia, 'other EU countries', Spain, Tanzania, Italy, South Africa and Ecuador each sends exports worth €1m to €3m to the UK. The UK exports some product in this category, primarily to the Netherlands (€0.1m) and the 'other EU countries' (€0.1m), Denmark, Germany and the USA.

30. Following the trends in the data for (fresh) cut-flowers, the UK's imports of 'treated' cut-flowers are dominated by the Netherlands (€83m), with smaller



amounts from Columbia (€9m) and Kenya (€5m), while the only substantial UK exports are to the 'other EU countries' (€4m).

31. UK's imports of fresh foliage come mostly from the Netherlands (€13m), besides which only the 'other EU countries', Italy and Sri Lanka send more than €1m of exports each. Imports of 'treated' foliage also derive largely from the Netherlands (€7m), with only South Africa and India supplying more than €1m each. Modest UK exports of foliage go to 'other EU countries' and the USA.
32. The UK's imports of mosses and lichens come primarily from the Netherlands (€0.6m) with over €0.1m each from Italy and Denmark, while the UK exported small quantities to the USA and Taiwan China.
33. The UK also imports large quantities of flower-bulbs from the Netherlands, worth €48m in 2013. Other sizeable imports came from Germany (€2m), with nearly €1m from Spain. The UK is an active exporter of flower-bulbs, mainly daffodil, sending €4m to the Netherlands, €2m to 'other EU countries' and €1m to the USA.

#### Worldwide production of ornamentals

34. The striking feature of data is the enormous production area - though not necessarily value - and numbers of holdings in China and India. This is mainly for internal use - little is destined for western markets, as export/import figures show. Japan and the Philippines also have huge numbers of holdings, though they lack the production areas and values. How will producers in the West cope when horticultural production in India, China and some other Asian economies adopts new technology and ways of working?
35. In Europe, the largest areas of production and number of holdings are found in Italy, France, Germany, Spain and Poland, though it is the UK that concentrates its production on relatively few holdings and the Netherlands that excels in production value. In Africa, South Africa has by far the largest production area, dwarfing that of new producer countries Kenya and Ethiopia. In the Americas, the USA has a large production area and number of holdings, and substantial areas of production in Brazil and Mexico are also linked to large numbers of holdings, whereas in Columbia the substantial area of production is associated with relatively few holdings.
36. As expected, the Netherlands leads bulb growing, but China, the UK, the USA and France also have substantial production areas. It is interesting to note that in the Netherlands and Japan similar numbers of holdings are involved - despite a 40-fold difference in production areas.

### Production in key countries

37. The striking feature of the Dutch production area statistics is the overall steady decline in production of cut-flowers under glass, down by one-third over the 2005–2013 period, while over the same period the area of cut-flowers and foliage grown in the open has increased. In addition, ‘shrubs for cutting in the open’ were down from 252ha in 2007 to 156ha in 2013. The large spring-flowering flower-bulb area remained relatively stable, with summer flower-bulbs suffering a small decline over the same period, and both dipped in area in 2009–2012.
38. Over the 2005–2013 period the decline in the area of cut-flowers under glass in the Netherlands was shared by virtually all crops – only the area of orchids remained stable. Rose was overtaken by chrysanthemum for first place in 2010. The major losses were in rose and carnation (each falling by about 50%), freesia and other cut-flowers (>40% falls) and alstroemeria and anthurium (>30% falls). Chrysanthemum, gerbera, lily and lisianthus suffered smaller – though still substantial – falls of 20 to 26%. These figures reflect the production, of rose particularly, in the new producer countries of Africa and South America. Could some of the decreased production of Dutch glasshouse flowers be substituted for part of the year by tunnel-grown UK crops? Alstroemeria, lisianthus and ‘others’ might provide opportunities for UK growers - promising results have already been achieved in the HDC-funded trials at CFC.
39. While the overall area of Dutch bulbs has remained more or less stable in recent years – down just 3% between 2005 and 2013 – there have been some important changes for individual genera. Tulip and ornamental allium growing have increased during this period (by 5 and 16%, respectively), the hyacinth area has remained stable, and the production of most other species has declined to some extent – iris by almost half and the ‘minor’ bulbs by almost a third. Dutch tulips and ornamental alliums appear to have the most promising future, though the reasons for the decline in spring-flowering ‘minor’ flower-bulb genera is unclear – perhaps difficulties in reliable production, which could indicate a niche opportunity for specialist growers.
40. The total number of stems produced in Canada in 2013 was a 16% increase over the 2009 figures, notable increases being recorded for chrysanthemum (74%), tulip (40%), gerbera (29%) and antirrhinum (17%). However, production of alstroemeria, daffodil, lily and rose fell over this period. Canadian data also records the area of flowers grown in glasshouses or other structures: while the overall area fell slightly over this period, an increase in glasshouse area was

compensated by a fall in the area of rigid plastic structures, which may reflect the types of ornamentals being grown.

41. China's production of ornamental plants rose hugely over the period 2005-2013, with the production area for all cut-flowers and foliage increasing by 68% over this period. All the recorded crops showed an increase – particularly gerbera (185%), carnation (125%) and lily (104%). The small dried flower sector also showed a large increase, 121%. But the area of flower-bulbs cultivated fell slightly (9%).
42. Columbian production is dominated by rose, occupying 36% of the total area, with carnation, pompon chrysanthemum and hydrangea making up another one-third of the total. The crops grown include 'exotics' such as heliconia and leucadendron, foliage (eucalyptus, ferns, ruscus) and a substantial assembly of 'others'.
43. In Ecuador the total area of cut-flowers changed little between 2006 and 2012 – an increase of 4% - though the area under protection increased by 31% and the area in the open fell by 43%. The paramount crop is rose, now grown virtually all under protection and making up 75% of the protected cut-flower area and 61% of the total cut-flower area. Gypsophila is second-ranking, grown equally under protection and in the open, though under protection the area dropped considerably after 2008 before recovering later. Carnation under protection make up the third main crop. Sunflower remains a small-scale crop, but expanded both outdoors and in between 2006 and 2012. The areas of 'other' annuals and perennials under protection fell, but both have increased in the open. Most other crops have fallen in area during this time, including once popular lines such as aster, chrysanthemum, delphinium, heliconia, hypericum, ginger, liatris and limonium. Maybe these changes indicate a single-mindedness to concentrate on only the most profitable products.
44. Finland has a small cut-flower industry, and between 2005 and 2013 the area of cut-flowers fell from nearly 40ha to under 10ha, largely because of the great reduction in cut-rose production (from 28ha to <5ha) – presumably the result of cheaper imports. Over the same period the production of bulb-flowers increased from 44 to 59 million pieces. Amaryllis and hyacinth production remained more or less steady, but the production of daffodil, lily and other bulb flowers fell.
45. For Germany the area of cut-flowers and foliage grown in the open fell between 1992 and 2012. The areas of chrysanthemum and dried flowers fell by nearly 80%. In contrast the areas of annual and perennial flowers, although fluctuating widely, finished the period 34% up, and shrubs for cutting increased by 40%. The

rose area remained relatively stable. The area of 'other' cut-flowers, including gladiolus and tulip, approached 1,000ha by 2012. In contrast the production of cut-flowers and foliage under glass declined dramatically over the same period. The area of most subjects has fallen, drastically so in the case of chrysanthemum (85%) and rose (48%), while the growing of 'other cut-flowers and foliage' also fell dramatically at the start of this period then seems to have revived more recently to reach 172ha by 2012. Overall, the figures may reflect the higher energy costs for glasshouse production, competition from new producer countries, and perhaps a fashion shift towards more 'natural looking' products.

46. For Greece, only relatively dated statistics are available, showing that between 1990 and 1995 the overall production area was quite stable at around 400ha. The areas of the main crops – carnation, chrysanthemum, gladiolus and rose – were equally stable.
47. Only very limited information is available on Hungarian cut-flower production. With some intervening fluctuations the area of cut-flowers and foliage remained stable between 1997 and 2009. Under cover, the main crops in order of importance were carnation, rose, gerbera and asparagus, though carnation growing reduced sharply in the late 1990s. In the open, the main crops in 2006 were dried flowers and gladiolus.
48. The cut-flower statistics for India may look unfamiliar to European growers, with the large amount marigold grown and the sale of cut-flowers 'loose' (both connected to the floral decorations that play a large part in Hindu festivals). Marigold and jasmine production currently occupy about 40ha each, being sold 'loose'. Chrysanthemum, gladiolus, rose and tuberose are important, with about 70ha in all and production generally on the increase, and only chrysanthemum being sold loose in any quantity. Anthurium, carnation, gerbera and tulip are grown in small quantities and sold conventionally. The production of 'other' cut-flowers is extensive and makes up some 40% of the total area, being sold both conventionally and 'loose', mostly the former. There is a suggestion of a slightly expanding production area with a trend for somewhat lower yields.
49. Ireland's horticultural industry is noted for its development of the cut-foliage crop, consisting mainly of eucalyptus, laurel, ozothamnus and pittosporum.
50. The cut-flower and foliage production area in Israel increased over the period 1995 to 2004, but production in number of pieces appeared to decline and to continue to do so after 2008. Gypsophila, rose, solidago and wax flower occupied around 200ha each in 2004, followed by smaller areas of carnation, gerbera and limonium. 'Other' cut-flowers occupied a substantial area, nearly 800ha in 2004,

while cut-foilage, probably largely ruscus, occupied over 400ha. However, the production amounts showed that total production and the production of gerbera, gypsophila, rose and wax flower fell over the period to 2008; in the case of rose the fall was dramatic, from 340 million pieces in 1995/96 to 10 million in 2008, presumably reflecting the impact of the new producer countries. In contrast, the production of ruscus increased between 2000 and 2008, while the substantial production of 'other' cut-flowers seems to have reversed the decline since 2000 and is now increasing. Israel seems to be an example of rapid change in the profile of crops grown, accompanied by a search for novel, replacement products. These data examined did not cover the flower-bulb sector which is a dynamic aspect of Israeli horticultural production.

51. Italian statistics show the overall importance of cut-foilage and branches grown both outside and under protection, while traditional cut-flower crops, like carnation, chrysanthemum and rose also remain important, along with newer crops such as gerbera and ranunculus. There is also much production of 'other' cut-flowers, suggesting a quest for innovation. Cut-foilage production includes the expected asparagus, eucalyptus, pittosporum and ruscus but also aspidistra, while flowering branches include genista, mimosa and viburnum.
52. Japanese statistics illustrate the importance of the traditional chrysanthemum crop that occupies almost one-third of the overall area – over 5,000ha of the about 17,000ha total. Production areas of alstroemeria, carnation, gerbera, gypsophila, lily, limonium, lisianthus, orchid and rose are small in comparison, but would be considered very substantial in other situations. The area of 'other' cut-flowers – over 8,000ha or nearly half of the total cut-flower area – suggests a very broad spectrum of species and a search for innovative products. Additional areas include >700ha for cut-foilage, >3,000ha for cut-tree branches, and nearly 500ha of flower-bulbs. Apart from cut-foilage, all these crops and sub-sectors saw decreases in production areas between 2006 and 2012, though these were relatively modest compared with those in some European countries.
53. The Kenyan cut-flower production area fell between 2010 and 2011, but more than recovered in the following year, to >4,000ha. Rose is the predominant crop, making up >2,000ha in 2012, but this had fallen from the 2011 figure. The areas of Easter lily and eryngium showed major rises in 2012, the former from 24ha in 2011 to >1,000ha, and eryngium from 56ha to 176ha. Asclepia, carnation and 'other' cut-flowers showed smaller increases over the same period, while in contrast the area of arabicum was halved and that of alstroemeria was down by one-third. Kenya looks like another emerging producer seeking its best options.

54. In Mexico the area of cut-flowers grown under glass more than doubled in the period 2007 to 2012, mainly because of a large increase in rose production in 2010, while the area in the open fell slightly. The area of cut-foilage increased by about 50% over the same period. Under protection, only a small area (10ha) of chrysanthemum was grown before 2010, and by 2012 it had risen to >1,000ha; over the same time, the rose area started at nearly 700ha, doubled in 2010 and 2011, and then fell back to the earlier level by 2012. The other glasshouse crops – carnation, gerbera, lily, solidago and ‘others’ – all increased modestly over the period. Amongst crops grown in the open, the dynamics of chrysanthemum and rose growing remained steady from 2007 to 2012, despite the changes under glass: around 2,250ha for chrysanthemum and 700ha for rose. The primary outdoor crop, however, was gladiolus, with approaching 4,000ha grown consistently over the period, and there were around 1,000ha of tagetes. Among the other, but still substantial crops, carnation and tuberose increased modestly, while gypsophila decreased slightly and the other crops remained more or less stable in extent. In 2011 there was a doubling of the sunflower area, indicating flexibility in cropping plans. Unlike the situation under glass, in the open a large area of ‘other’ cut-flowers – around 1,000ha - was grown. Chamaedorea formed the bulk of the cut-foilage area, increasing from >1,000ha in 2007 to about 1,500ha in 2012.
55. Limited statistics for Morocco show that over the period 2007 to 2008 production appeared stable. Some two-thirds of the total production area, 113ha out of 165ha, was under protection and dominated by the rose and carnation crops, with small areas of ‘other’ cut-flowers. In outdoor growing there was a small amount of rose production but most was down to strelitzia and ‘other’ crops.
56. Patchy statistics for Norway’s cut-flower production show that production had been stable or growing slightly between 1995 and 2006, but between 2006 and 2010 production was greatly reduced by nearly 50 million pieces. All crops were affected, but particularly rose, chrysanthemum and ‘other’ cut-flowers. Lily and tulip saw smaller reductions. This is another example of a European country affected by the new producer countries.
57. The amount of data available on Polish cut-flower production is limited but shows an interesting pattern: between 2002 and 2013 the total areas of cut-flowers grown under cover, and in the open (including flower-bulbs), increased continuously and steadily, with apparently none of the knock-on effects see in the data of several other European countries. There is a large area (around 600ha) of

'other' cut-flowers, and smaller areas of chrysanthemum and rose grown, both of which increased modestly over this period.

58. Cut-flower production in Spain fell steadily between 2008 and 2012. For most crops – mainly carnation and rose - production areas fell by about half over this period. The large area of 'other' cut-flowers lost only about 20% of its area.
59. Some rather incomplete statistics for Sweden show that over the period 2002 to 2011 the production area for cut-flowers appears to have fallen considerably, involving alstroemeria, chrysanthemum and rose, though the area of 'other' flowers has increased recently. For flower-bulbs, the total number has increased steadily from 2002 to 2011, made up of a considerable increase in the numbers of tulips produced, accompanied by large falls in the numbers of daffodil and 'other' bulbs.
60. The total area of cut-flowers grown in Taiwan China fell by 24% between 2004 and 2012. The most serious reductions were for dahlia (90%), tuberose (45%), heliconia (38%), chrysanthemum (32%), rose (26%) and gladiolus (21%). The area of bulbs also fell sharply, though this was in any case a very small sector. On the other hand, the production areas of anthurium, lisianthus and gerbera all increased, by 48, 46 and 22%, respectively.
61. Data available for Turkish cut-flower production appear to show more or less steady production between 2004 and 2013. The majority of crops are increasingly grown under plastic. The production of carnation, gillyflower, hyacinth and rose have seen usually small falls in production during this period, while the area of daffodil has greatly decreased. Other subjects have seen stable production levels or small increases.
62. In the USA statistics show the last ten years have seen a major change in the production of cut-flowers and cut-foliage ('florist greens'), presumably as a result of cheaper imports from Central and South America and elsewhere. The overall figures for the period 2002 to 2012 showed a drop of almost one-third in production in the open, without any compensating increase in production under protection. Between 2007 and 2012 production in the bulb sector remained steady, presumably as bulbs are less amenable to growing in the new producer countries. Despite the overall fall in production of cut-flower crops from 2006 to 2013 of 21%, in the same period the production of tulips – already the most numerous product by far - increased by 18%, with alstroemeria and lisianthus also increasing by 31 and 9% respectively. This confirms the enduring popularity of tulips and, perhaps, of an increased appreciation of alstroemeria and lisianthus as cool-grown crops - also noted in CFC trials. Production of the other listed

crops fell over the same period, most dramatically in the case of carnation (by 90%), rose (63%) and gladiolus and orchids (each by 47%).

The main cut-flower types – production and trade with the EU

63. The cut-flower trade is dominated by - rose, carnation, chrysanthemum, lily and orchids, plus cut-foliage. The sheer dominance of this group may partly explain the slow pace at which alternative or novel cut-flowers catch the imagination of the industry as worthy of exploitation.
64. The production area of a crop is often dominated by one or two producer countries. In the case of rose, India has >28,000ha of crops, China >14,000ha, and the next largest producer, Ecuador, ca 4,000ha. Other emerging South American and African countries follow, ahead of the largest European grower, Italy (1,221ha). Of course, area grown does not equate to the amount of marketable product or market value, but those figures, which might allow the amount or value of product per hectare to be estimated, are often unavailable. Two striking features common to this series of statistics are the predominance of the Netherlands in the import-export trade and as an intra-EU exporter, and the non-appearance of new, major Asian producer countries in the list of exporters to the EU. Aside from the Netherlands, Kenya, Ethiopia and Ecuador are the EU's main source of imports. The major EU importing countries are (in descending order) the Netherlands, Germany, the UK, France, Belgium and Italy, but most other EU countries import some cut-roses.
65. China dominates the production area of cut-carnation, growing over 5,000ha, followed by Columbia (>1,000ha), and other moderate producers, in order, are Italy, Ecuador, Turkey, Mexico, Spain, Japan and Kenya. The Netherlands and Columbia dominate exports to EU countries (€88million and €61million, respectively), and Kenya, Turkey and Spain each achieves exports of >€10m. Of the EU countries, the UK imports the largest value of cut-carnation (€88million), followed by the Netherlands (€55million) and Germany (€28million), but carnations remain popular amongst several other EU states.
66. For cut-chrysanthemum too, India dominates the growing area (18,000ha) followed by China (>8,000ha). Japan, Mexico and Thailand are the next main growers, again ahead of Italy, the main European producer. As always, planted areas may not correspond with the amount of product or its value. As with roses the Netherlands dominates trade with intra-EU exports of €232million, and the major producing countries mentioned do not make this listing. Reflecting a fondness for chrysanthemum, the UK leads the list of EU importers by far



(€128million), with only Germany, Lithuania and France importing >€10million of the product.

67. China alone dominates the growing area of cut-lilies, with nearly 10,000ha; the next largest growers are Kenya and Japan, with ca 1,000ha each. Intra-EU exports are again dominated by the Netherlands, with the major growing countries not appearing on this list. The EU's predominant importing countries are the UK (€63million) and the Netherlands (€33million), with many other EU countries importing small quantities.
68. For cut-orchids Thailand dominates the production area with nearly 3,000ha, and other substantial grower countries are Taiwan China (662ha), the Netherlands (212ha) and Japan (157ha). Exports to EU countries are dominated by the Netherlands (€47million) and Thailand (€14million), with only modest amounts from elsewhere. The main EU importing countries, in descending area, are Italy (€18million), France, Germany, the UK and the Netherlands (€6million). Several others import around €1million each.
69. Finally, for cut-foliage, including flowering branches, etc., China again has by far the largest growing area, some 8,500ha, followed by Italy (>3,000ha) and the Netherlands (>2,000ha). Although with a relatively smaller area, Ireland figures here, with nearly 200ha of foliage in production. The Netherlands again dominates intra-EU trade, with exports to other EU countries >€100million. Other key exporters to the EU are the USA and Costa Rica (€65million and €37million, respectively), and amongst other important exporters are several Central American countries, Israel and Sri Lanka, presumably developing niche products in this dynamic and expanding sub-sector. The EU importing countries are dominated by the Netherlands (€156million), followed by Germany (€62million), Belgium (€30million), the UK (€19million), France (€16million) and Italy (€13million).