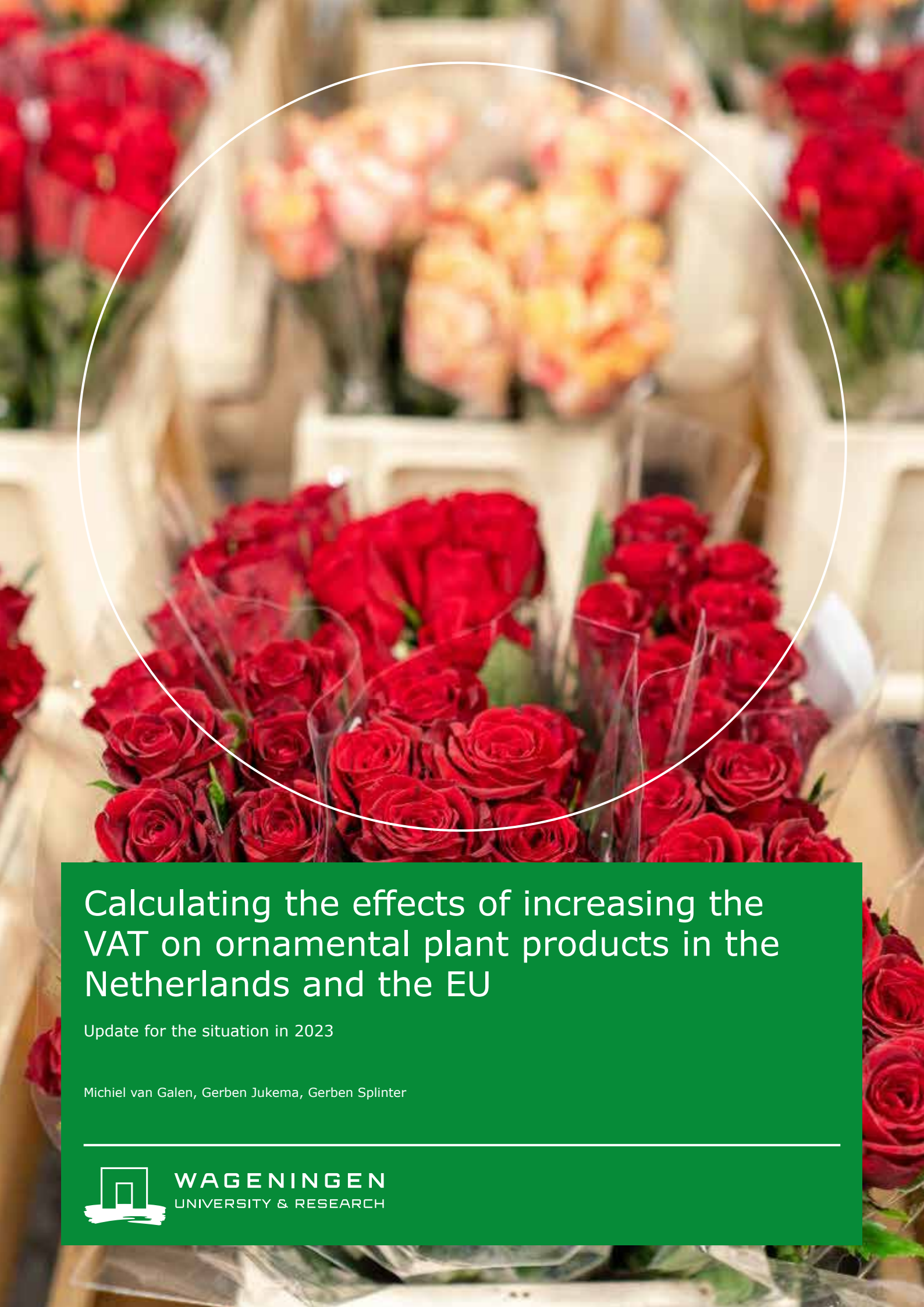

Calculating the effects of increasing the VAT on ornamental plant products in the Netherlands and the EU

Update for the situation in 2023

Michiel van Galen, Gerben Jukema, Gerben Splinter

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This study was conducted by Wageningen Economic Research on behalf of and funded by the Dutch Flower Auctions Association.

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Ornamental horticultural products are taxed at a reduced VAT rate in the Netherlands (9% rather than 21%) as well as in 14 other EU countries. Increasing VAT would have a negative impact on turnover and employment in the supply chain. These calculations show that a VAT increase in the Netherlands would lead to a loss of around €200 million in turnover in the ornamentals sector at wholesale prices (-1.6%). If VAT were to be increased in other EU countries too, this would have a particularly significant impact on the Netherlands' exports and thus on primary production. In this scenario, the drop in turnover for the ornamentals sector (at wholesale prices) would be €930 million (-7%). The expected impact on the government's VAT revenue would be partly offset by fewer flowers and plants being bought, and in the shorter term by a decline in tax receipts and social insurance premiums from businesses and employees, along with an increase in unemployment benefits being paid out.

Sierteeltproducten worden in Nederland in een verlaagd btw-tarief belast (9% in plaats van 21%) en in veertien andere EU-landen ook. Een verhoging van de btw heeft negatieve gevolgen voor omzet en werkgelegenheid in de keten. Deze doorrekening laat zien dat een btw-verhoging in Nederland leidt tot een verlies van ongeveer 200 miljoen euro omzet in de sierteeltketen tegen groothandelsprijzen (-1,6%). Als ook in andere EU landen de btw verhoogd wordt, dan heeft dat vooral effect op de export van Nederland en daarmee ook op de primaire productie. In dit scenario is het verlies aan omzet van de sierteeltketen (tegen groothandelsprijzen) 930 miljoen euro (-7%). Het verwachte effect op de btw-inkomsten van de overheid wordt gedeeltelijk teniet gedaan doordat minder bloemen en planten worden gekocht, en op kortere termijn doordat er minder belastinginkomsten en premies van bedrijven en werknemers worden ontvangen en meer werkloosheidsuitkeringen moeten worden betaald.

Key words: ornamentals sector, VAT rate, employment, export

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Contents

Preface

Instead of the general VAT rate, a reduced VAT rate is applied to ornamentals in the Netherlands and 12 other EU countries. Several times in the past, the Dutch government has considered increasing the VAT on ornamentals. The aim to such a tax reform is to simplify the system and strengthen the tax base. In that context, the lower VAT on various products and services, such as books as well as ornamental plants, is being reconsidered. Ornamentals have been subject to lower VAT since 1975. In 2019, the lower VAT rate in the Netherlands was raised from 6% to 9% by the Rutte III coalition government. The reduced VAT is currently being reviewed in both the Netherlands and the EU. By 2025, EU Member States have to choose from 29 product categories, whereby lower VAT may apply to no more than 24.

Commissioned by the Dutch Flower Auctions Association (VBN) – with support and co-funding from industry organisations VGB, VBW, Tuinbranche NL and CVAH – Wageningen Economic Research has determined the significance of the VAT regime for turnover and employment in the ornamentals sector for two scenarios: one in which the Netherlands unilaterally switches to the general VAT rate and a scenario in which all countries in the EU that currently apply the lower rate, including the Netherlands, start applying the general rate. These results were complemented by an analysis of the impact on government revenue. The study also looked at the impact of inflation in the Netherlands since mid-2021 on the demand for ornamentals in the Netherlands in 2022-2023. The study is an update of the analyses conducted for the VBN in 2021.

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Summary

S.1 Key findings

Effects on turnover and employment

- Under scenario 1, where the reduced VAT rate on ornamentals is abolished in the Netherlands only, the VAT increase results in a €390 million decline in turnover for the Dutch flower retail sector (-12.5%), a €200 million decline for the wholesale sector (-1.6%) and an €80 million decline for the cultivation sector (-1.2%), as well as the loss of a total of 2,440 full-time jobs in the ornamentals sector in the Netherlands (-3.6%). Most of those job losses would be in retail (about 1,710), 440 in the primary production sector, and about 290 in the wholesale trade.
- Under scenario 2, where other EU countries that currently apply a reduced VAT rate also increase it, those increases would result in a €380 million decline in turnover for Dutch retailers (-12.1%), a €930 million decline for wholesalers (-7.2%) and a €480 million decline in primary production (-7.1%). In terms of employment, the effects in scenario 2 amount to a loss of 5,500 full-time jobs (-8.1%) in the Dutch ornamentals sector, of which 2,560 (-7%) are in the primary production sector, 1,340 (-7%) in the wholesale sector, and 1,650 (-12%) in retail.
- For the EU-27 and the UK taken as a whole, under scenario 2, turnover for the primary production sector declines by €1.6 billion. For wholesalers it declines by €3.8 billion and for retailers by €5.2 billion. Nearly 64,000 full-time jobs would be lost across the EU-27 and the UK.

Impact on government finances in the Netherlands

- The effects on government revenues in the Netherlands have been calculated based on the loss of employment and turnover. The net effect of a VAT increase in the Netherlands is a positive impact on public finances in the Netherlands of €159 million (scenario 1). This is based on the increase in VAT revenue less additional spending on social security and the decrease in tax revenue from employment income and profits. This is considerably less than the €345 million increase in VAT revenue per year if consumers would not alter their purchasing behaviour in response to the VAT increase (and there would therefore be no loss of turnover and jobs).
- If the other EU countries that now have a low VAT rate also decide to increase VAT on ornamentals (scenario 2), the positive impact on public finances in the Netherlands will be limited to €75 million. This means that an increase in VAT in other countries will trigger a reduction in demand and lead to a decline in production and exports in the Netherlands, which will then have a negative impact on tax revenues and social security spending in the Netherlands.

Effects of inflation

- A possible increase in VAT is not the only thing that could affect demand for flowers and plants. Prices for many other products are rising too. Inflation has been very high in the Netherlands and Europe over the past two years and is expected to remain high for the time being. By using income elasticity (Bunte and Kuiper, 2008), we can see how an inflation rate of 13% since early 2022 has – ceteris paribus – led to about a 14% drop in demand for flowers and plants.

Effects on income groups, health and nature

- We can assume that rising prices for flowers and plants combined with an increase in the VAT rate are likely to make flowers and plants less affordable, especially for lower income groups. Any increase in VAT will also reduce the production and consumption of flowers and plants in the Netherlands, and with it the positive contribution to the value of landscapes, biodiversity and people's health and well-being.

S.2 Methodology

This study calculates what effects an increase in VAT for ornamentals would have on turnover and employment in the Netherlands as well as the EU-27 and the UK. Ornamentals (or at least a proportion of ornamental plant products) are taxed at a reduced VAT rate in the Netherlands and in 14 other EU countries. In the Netherlands the rate is 9% rather than 21%. A decision to increase VAT on ornamentals would have a negative impact on turnover and employment in the sector. Two scenarios were considered:

1. a unilateral increase in the VAT rate on ornamentals in the Netherlands, meaning the application of the general VAT rate of 21% instead of the reduced rate of 9%; and
2. an increase in VAT in both the Netherlands and the other EU countries that currently apply a reduced rate.

The calculations were made using Hortus, the partial equilibrium model developed by Wageningen Economic Research. Hortus was used to look at the relationship between the production, international trade and consumption of horticultural products in EU countries and the rest of the world, using supply and demand equations and the elasticities of supply and demand substitutes. The data for the model have been obtained from validated statistical sources as far as possible. For the ornamental horticulture sector, the model included price elasticities that show how demand for ornamentals changes as prices change. This update of the model has used price elasticities calculated by the GfK research agency in 2021. The model uses data on production, trade and consumption, and makes certain assumptions – such as the price elasticities and substitution elasticities mentioned above – to calculate a new equilibrium following a price shock caused by the VAT change. The outcomes have been expressed as percentage changes from the original situation. The impacts on employment were then calculated outside the model using data on turnover per full-time job (FTE). The effects on public finances were calculated using data on gross wages, social insurance premiums and taxes.

We have also looked at the possible effects of inflation on demand for ornamentals in the Netherlands, and differences in the consumption effects for different income groups. These questions have been addressed concisely based on previous research by Bunte and Kuiper (2008). Finally, the study has also considered other potential effects of the consumption and production of ornamentals in the Netherlands, based on existing literature.

Samenvatting

S.1 Belangrijkste uitkomsten

Effecten op omzet en werkgelegenheid

- In scenario 1, waarin alleen in Nederland het verlaagde btw-tarief op sierteeltproducten wordt afgeschaft, leidt de verhoging van de btw tot een omzetverlies van 390 miljoen euro voor de Nederlandse bloemendetailhandel (-12,5%), 200 miljoen euro in de groothandel (-1,6%) en 80 miljoen euro in de teelt (-1,2%); en een totaal werkgelegenheidsverlies van 2.440 voltijdsbanen in de sierteeltketen in Nederland (-3,6%). Daarvan gaan de meeste banen verloren in de detailhandel (circa 1.710), 440 in de primaire sector, en ongeveer 290 in de groothandel.
- In scenario 2, waarin ook in andere EU-landen die op dit moment een verlaagd tarief hanteren de btw wordt verhoogd, leiden die verhogingen tot een omzetverlies in Nederland van 380 miljoen euro in de detailhandel (-12,1%), 930 miljoen euro in de groothandel (-7,2%) en 480 miljoen euro in de primaire productie (-7,1%). In termen van werkgelegenheid zijn de effecten in scenario 2 berekend op 5,5 duizend voltijdsbanen (-8,1%) in de Nederlandse sierteeltketen, waarvan 2.560 (-7%) in de primaire sector, -1.340 (-7%) in de groothandel en -1.650 (-12%) in de detailhandel.
- In de hele EU-27 en het Verenigd Koninkrijk daalt, in scenario 2, de omzet van de primaire sector met 1,6 miljard euro, de omzet van de groothandel met 3,8 miljard euro en de omzet van de detailhandel met 5,2 miljard euro. Er gaan bijna 64.000 voltijdsbanen verloren in de hele EU-27 en het Verenigd Koninkrijk.

Effect op de overheidsfinanciën in Nederland

- De effecten op de overheidsinkomsten in Nederland zijn berekend op basis van het verlies aan werkgelegenheid en omzet. Het netto-effect van een btw-verhoging in Nederland is een positief effect op de overheidsfinanciën in Nederland van 159 miljoen euro (scenario 1). Dit betreft de toename van de btw-opbrengsten, verminderd met de extra uitgaven aan sociale zekerheid en de afname van de belastinginkomsten uit arbeidsinkomen en winst. Dit is aanzienlijk minder dan de toename van btw-opbrengsten van 345 miljoen euro per jaar als consumenten geen verandering in aankoopgedrag zouden laten zien bij de btw-verhoging (en er dus geen omzet- en banenverlies zou optreden).
- Wanneer de andere EU-landen met een laag btw-tarief ook besluiten om de btw op sierteeltproducten te verhogen (scenario 2), dan blijft nog slechts 75 miljoen euro positief effect op de overheidsfinanciën in Nederland over. Dat betekent dat de verhoging van de btw in andere landen via de daardoor veroorzaakte vraaguitval en afname van de export en productie in Nederland, negatieve gevolgen heeft voor de belastinginkomsten en uitgaven aan sociale zekerheid in Nederland.

Effecten van inflatie

- Niet alleen een eventuele btw-verhoging heeft effect op de vraag naar bloemen en planten. Tegelijkertijd stijgen ook de prijzen van veel andere producten. De inflatie was de afgelopen twee jaar in Nederland en Europa erg hoog en de verwachting is dat die voorlopig hoog blijft. Met behulp van de inkomenselasticiteit (Bunte en Kuiper, 2008) kan worden aangetoond dat een inflatie van 13% sinds begin 2022 – ceteris paribus – heeft geleid tot een daling van de vraag naar bloemen en planten van ongeveer 14%.

Effecten op inkomensgroepen, gezondheid en natuur

- Het is aannemelijk dat stijgende prijzen van bloemen en planten in combinatie met een verhoging van het btw-tarief ervoor zorgt dat bloemen en planten met name voor de lagere inkomensgroepen minder betaalbaar worden. Door een eventuele verhoging van de btw daalt bovendien de productie en consumptie van bloemen en planten in Nederland en daarmee daalt ook de positieve bijdrage aan de waarde van het landschap, de biodiversiteit en gezondheid en welzijn van mensen.

S.2 Methodologie

In dit onderzoek is doorgerekend wat de effecten van een verhoging van de btw op sierteeltproducten betekent voor de omzet en werkgelegenheid in Nederland en de EU-27 en het Verenigd Koninkrijk. In Nederland en in veertien andere EU-landen worden sierteeltproducten (of een deel daarvan) in een verlaagd btw-tarief belast; in Nederland is dat 9% in plaats van 21%. Als zou worden besloten om de btw op sierteeltproducten te verhogen, dan heeft dat negatieve gevolgen voor de omzet en werkgelegenheid in de keten. Er zijn twee scenario's bekeken:

1. een unilaterale verhoging van de btw op sierteeltproducten in Nederland, i.e. toepassing van het algemene tarief van 21% in plaats van het verlaagde tarief van 9%;
2. een verhoging van de btw in zowel Nederland als de andere EU-landen met een verlaagd tarief.

Deze doorrekening is gemaakt met het door Wageningen Economic Research ontwikkeld partieel evenwichtsmodel: Hortus. In Hortus worden productie, internationale handel en consumptie van tuinbouwproducten in de EU-landen en de rest van de wereld aan elkaar gerelateerd met vraag- en aanbodvergelijkingen en vraag- en aanbodsubstitutie-elasticiteiten. De data voor het model worden zoveel mogelijk uit gevalideerde statistische bronnen gehaald. Voor de sierteeltsector zijn bovendien prijselasticiteiten in het model opgenomen die aangeven hoe de vraag naar sierteeltproducten verandert als de prijzen veranderen. Voor deze update van het model zijn prijselasticiteiten gehanteerd die door onderzoeksbureau GfK in 2021 zijn berekend. Het model berekent op basis van gegevens over productie, handel en consumptie en onder bepaalde aannames zoals bovengenoemde prijselasticiteiten en substitutie elasticiteiten, een nieuw evenwicht na een prijsschok als gevolg van de btw-verandering. De uitkomsten zijn procentuele veranderingen ten opzichte van de initiële situatie. De gevolgen voor de werkgelegenheid zijn vervolgens buiten het model berekend met behulp van gegevens over omzet per voltijdsbaan (fte). De effecten op de overheidsfinanciën zijn berekend op basis van gegevens over brutolonen, sociale premies en belastingen.

Daarnaast is gekeken naar de mogelijke gevolgen van inflatie op de vraag naar sierteeltproducten in Nederland, en verschillen in effecten op de consumptie voor verschillende inkomensgroepen. Deze vragen zijn beknopt beantwoord op basis van eerder onderzoek van Bunte en Kuiper (2008). Ten slotte is ook gekeken naar mogelijke andere effecten van de consumptie en productie van sierteeltproducten in Nederland, op basis van literatuur.

1 Impact of increasing VAT on ornamentals needs to be understood for effective policy assessment

1.1 Lower VAT rate was introduced to make flowers and plants more affordable and to boost employment

The ornamentals sector is important economically for the Netherlands. In 2021 its total production value was around €7.5 billion and the export value was €10.4 billion.[1] An estimated 80% to 85% of ornamentals produced in the Netherlands are exported. These products include cut flowers, indoor and balcony plants, bedding plants, bulbs, arboricultural crops and perennials. The main export destinations are in the countries surrounding the Netherlands. In order of decreasing importance, they are Germany, the UK, France, Italy, Poland and Belgium.

The reduced VAT has applied to all ornamental plant products in the Netherlands since 1975. The scheme was initiated by the Dutch House of Representatives to make ornamentals more affordable for people with low disposable incomes and to boost turnover and employment in horticulture.[2] In recent decades, the reduced VAT on ornamentals has been reconsidered several times, usually during economic recessions when the government is considering spending cuts.

1.2 Reduced VAT under review

The reduced VAT is currently being reviewed in both the Netherlands and the EU.[3] By 2025, EU Member States have to choose from 29 product categories, whereby reduced VAT may apply to no more than 24. In the context of these developments, the VBN requested Wageningen Economic Research to update their calculations of the negative effects of a VAT increase in the Netherlands and other EU Member States for the Dutch ornamentals sector as published in Van Galen and Jukema (2021). In addition, there are currently major concerns in the ornamentals sector about increased energy costs, labour costs and inflation. Besides the impact of changes in VAT, the VBN also wanted to put the consequences of a potential VAT increase in the context of these developments.

1.3 Any increase in VAT will affect the ornamentals sector and consumers

Currently, the low rate for ornamentals is in effect in 13 EU Member States. In 2019 these Member States represented about 85% of the production value for ornamentals in the EU-27 and the UK combined, and about 75% of the consumption value.[4] If the general VAT rate on ornamental plant products were applied in all these Member States, consumer prices in these countries would rise. This would result in a drop in the consumption of ornamentals and a corresponding decline in net turnover, inter-country trade and employment in retail, wholesale and primary production in the ornamentals sector (Van Galen and Jukema, 2021). If VAT is increased only in the Netherlands (Scenario 1), it will mainly affect consumer demand and retail sales in the Netherlands. The effects on wholesale and primary production would then be caused by the fall in demand in the Netherlands. If VAT is also increased in other countries (Scenario 2), the effect will

[1] Source: CBS. https://www.cbs.nl/nl-nl/maatwerk/2023/24/tuinbouwcijfers-2022.
[2] Tolman Amendment, TK 1974-1975, 13 104 no. 9. Based on EU Directive 2006/112/EC Article 122, the reduced VAT rate can be applied to ornamentals in the EU.
[3] https://www.rijksoverheid.nl/documenten/rapporten/2023/04/03/definitieve-evaluatierapport-verlaagde-btw-tarief.
[4] Based on various sources, mainly from Eurostat and estimates from Wageningen Economic Research.

mainly be reflected in a fall in exports and the related fall in production in the Netherlands. To estimate the overall effect on chain turnover in the Netherlands, the study looked at the effect on turnover at the wholesale level, which corresponds with the effect on both domestic demand and export demand. The study used this approach because turnover at different levels in the chain cannot simply be added together; the turnover (and profit or loss) of the preceding links is part of the turnover of the succeeding links.

1.4 This study quantifies the effects of a VAT increase on ornamentals

The aim of the project is to update the findings of the previous study on the impact of a VAT increase (Van Galen and Jukema, 2021) in the light of the ongoing reviews of VAT policy and the modifications to this policy that are possible from 2025 onwards.[5] In addition, the project aims to gain insight into the possible impact of inflation on the demand for ornamentals in the Netherlands and into the possible impact of rising energy prices and labour costs on the production costs of the ornamental sector in the Netherlands.

1.5 Research questions

The study addressed five research questions:

1. If the VAT on ornamentals in the Netherlands was increased from 9% to 21%, what would be the effects on 1) turnover and employment of the various links in the ornamentals chain, 2) international trade, and 3) Dutch public finances?
2. If the VAT on ornamentals in the Netherlands and in the other EU Member States with reduced VAT was increased, what would be the effects on 1) turnover and employment of the various links in the ornamentals chain, 2) international trade, and 3) Dutch public finances?
3. How has inflation in the Netherlands since mid-2021 impacted the demand for ornamentals in the Netherlands in 2022-2023?
4. What would be the consequences of abolishing the reduced VAT on ornamentals in the Netherlands on the spending of lower income groups?
5. What are the potential impacts of abolishing the reduced VAT on human health and nature?

To answer the first two research questions, an economic model of national and global horticultural production and trade was used: the Hortus model. Besides the production, trade and consumption of ornamentals, this model also describes the fruit and vegetable sectors; this is because substitution effects between the ornamentals sector and other horticultural sectors will occur in some cases. The third, fourth and fifth research questions were answered based on desk studies and available data on prices, and price and income elasticities.

[5] van Galen, M., & Jukema, G. (2021). Calculating the effects of increasing the VAT on ornamental plant products in the Netherlands and the EU Update of the situation in 2021. (Report/Wageningen Economic Research; No. 2021-043 Wageningen Economic Research. https://doi.org/10.18174/544239.

2 The Dutch ornamentals sector is a major player in Europe

2.1 Nearly a third of EU production value originates in the Netherlands

The total value of the EU ornamentals sector in 2022 was estimated at around €25 billion (Figure 2.1). The Netherlands has a 30% share in this turnover, and that share has been about the same for many years. Spain, Italy, Germany and France are other important producers of ornamentals. Other countries have a large share of the production of specific product groups, such as Denmark for potted plants and the UK for certain arboricultural crops and perennials. The Netherlands plays a dominant role in flower bulb production, with an estimated share of almost 90% of global commercial production.[6]

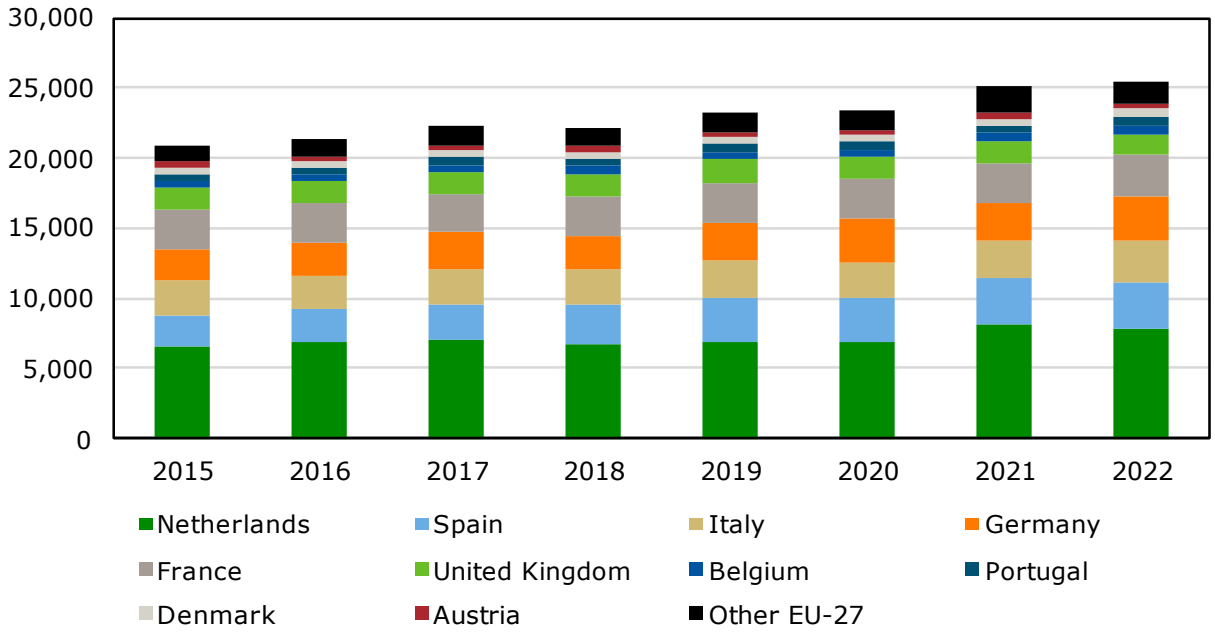

Figure 2.1 *Production value in 2022 of the ornamentals sector in the EU-27 and the UK, in millions of euros (including seeds, cuttings and other propagation materials)*
Source: Eurostat EAA.

2.2 About 75% of EU export value originates from the Netherlands

From the growers, most flowers and plants go (via the auctions) to wholesalers and from there to flower shops, supermarkets and other retail outlets across Europe and beyond. The total export value of all ornamentals from the Netherlands was over €11.4 billion in 2021 and nearly €11.4 billion in 2022.[7] This includes products grown in the Netherlands as well as re-exported flowers and plants. The export value increased not only due to increased demand for flowers and plants (partly a result of the pandemic, which boosted sales for home use), but also due to higher prices resulting from increased energy costs. Because of

[6] Based on data from AIPH.
[7] Based on Eurostat Comext, bulbs, cut flowers, houseplants, arboricultural products.

this, the supply of certain types of flowers and plants fell, especially in the winter months, causing prices to rise even further. In 2022, the Netherlands had a 74% share in the total export value of the EU-27 (see Figure 2.2).

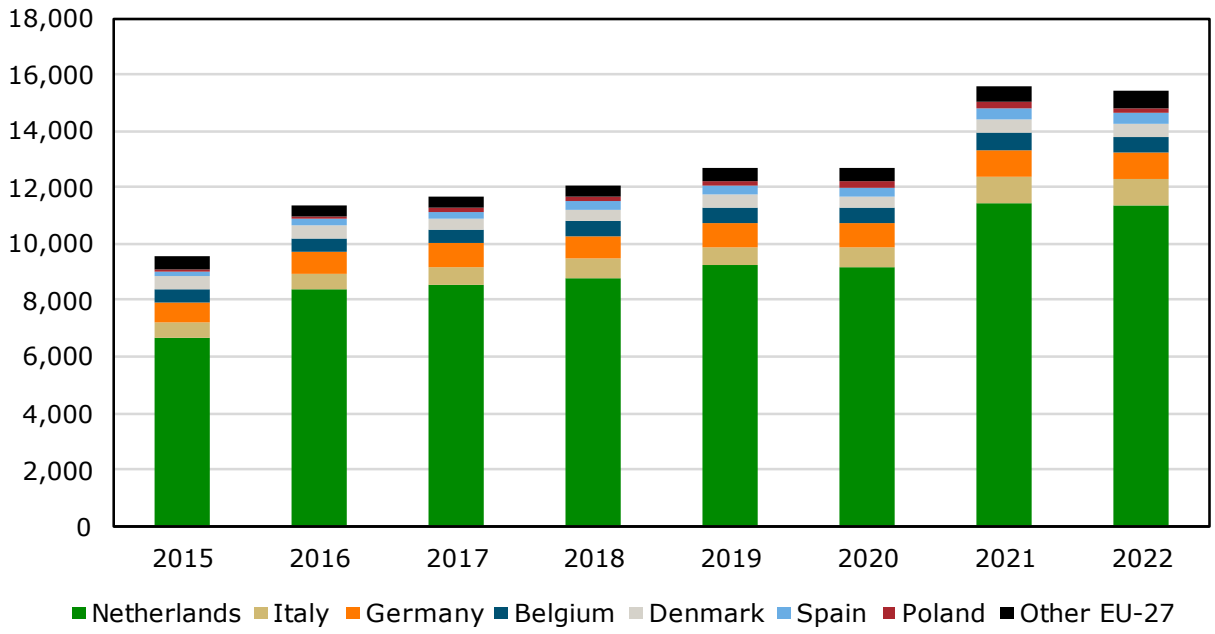

Figure 2.2 *Exports of ornamentals from the Netherlands and other EU-27 countries, in billions of euros, 2015-2022*
Source: Eurostat.

2.3 The ornamentals sector provides 66,000 jobs

In the Netherlands in 2020, an estimated 66,000 full-time jobs (FTE) are provided in the ornamentals sector, including production, specialised wholesale and retail. This is about 12% of the total estimated 570,000 full-time jobs in the ornamentals sector in the EU and the UK (Table 2.1). About 267,000 of these jobs were in the primary sector, 57,000 in wholesale trade, and 247,000 in retail trade.[8] The numbers of employees are higher due to the large amount of part-time work. Based on Eurostat data for the EU and UK combined, the number of employees is estimated at 69,000 in the ornamentals wholesale sector and 330,000 in the retail sector for flowers and plants. No figures are available on the number of employees in the primary ornamentals sector in the EU.

[8] This concerns Eurostat data on the specialised retail trade in flowers and plants, and pet shops. For individual countries, better data are not available. Jobs are also provided in non-specialised retail, for example in supermarkets that also sell ornamentals, but no statistics are available on this part of the chain. This employment is therefore not included in the table. In the Hortus model calculations, however, that employment is included on the basis of a similar labour requirement per euro of turnover as in floral retail.

Table 2.1 *Estimated ornamentals sector employment for 2020 in selected countries and the EU in total, expressed in units of 1,000 FTE*

	Production	Wholesale, a)	Retail, b)	Total
Germany	18	10	59	86
United Kingdom	19	4	57	80
The Netherlands	36	16	13	66
France	26	3	24	53
Rest of the EU	168	23	94	285
Total	267	57	247	570

a) Eurostat, Wholesale of flowers and plants. This only includes specialised wholesale. In the Hortus model, trade activities at other types of businesses are also included under wholesale of ornamentals.

b) Eurostat, Retail sale of flowers, plants, seeds, fertilisers, pet animals and pet food in specialised stores. These figures differ slightly from total employment because they exclude market stalls and supermarkets. On the other hand, pet shops are included.

Better data are currently not available at the individual country level. Source: Eurostat FADN and Annual detailed enterprise statistics for trade (NACE Rev. 2 G) [SBS_NA_DT_R2], AIPH, Eurostat, model calculations Wageningen Economic Research.

3 VAT rates in the EU vary by country

VAT is a value-added tax that governments levy on products and services. VAT is generally paid by the final consumer, and businesses paying VAT on intermediate inputs in production can claim it back. As a result, consumers or government agencies/public bodies end up paying VAT.

Since 1975, ornamentals in the Netherlands have been subject to the low VAT rate, which is currently 9%. The scheme was initiated by the Dutch House of Representatives in the 1970s to make ornamentals more affordable for people with low disposable incomes and to boost turnover and employment in horticulture.[9] Based on EU Directive 2006/112/EC Article 122, the low VAT rate may be applied to ornamentals (cut flowers, garden plants and pot plants, flower bulbs and arboricultural products).

Table 3.1 *EU and UK VAT rates (in percent) in 2023 (countries with reduced VAT rate on ornamentals are shown in bold)*

	Low rate	General rate	Rate for ornamentals	Difference
Belgium	**6 / 12**	**21.0**	**6.0**	**15.0**
Bulgaria	9.0	20.0	20.0	
Cyprus	5 / 9	19.0	19.0	
Denmark	none	25.0	25.0	
Germany	**7.0**	**19.0**	**7.0**	**12.0**
Estonia	9.0	20.0	20.0	
Finland	10 / 14	24.0	24.0	
France	**5.5 / 10**	**20.0**	**10.0**	**10.0**
Greece	**6 / 13**	**24.0**	**13.0**	**9.0**
Hungary	5 / 18	27.0	27.0	
Ireland	9 / 13.5	23.0	23.0	
Italy	**5 / 10**	**22.0**	**10.0**	**12.0**
Croatia	**5 / 13**	**25.0**	**5.0 bulbs and arboriculture 25.0 cut flowers and foliage**	**20.0**
Latvia	12.0	21.0	21.0	
Lithuania	5 / 9	21.0	21.0	
Luxembourg	**7.0**	**17.0**	**7.0**	**10.0**
Malta	5 / 7	18.0	18.0	
The Netherlands	**9.0**	**21.0**	**9.0**	**12.0**
Austria	**10 / 13**	**20.0**	**13.0**	**7.0**
Poland	**5 / 8**	**23.0**	**8.0**	**15.0**
Portugal	**6 / 13**	**23.0**	**6.0 bulbs and arboriculture 25.0 cut flowers and foliage**	**17.0**
Romania	**5 / 9**	**19.0**	**9.0 bulbs and arboriculture 19.0 cut flowers and foliage**	**10.0**
Slovenia	**9.5**	**22.0**	**9.5**	**12.5**
Slovakia	10.0	20.0	20.0	
Spain	**10.0**	**21.0**	**10.0**	**11.0**
Czech Republic	**10 / 15**	**21.0**	**15.0**	**6.0**
United Kingdom	5.0	20.0	20.0	
Sweden	6 / 12	25.0	25.0	

Source: Taxes in Europe Database v3 (europa.eu).

[9] Van Dis and Tolman Amendment, TK 1974-1975, 13 104 nr. 9 (https://repository.overheid.nl/frbr/sgd/19741975/0000202300/1/pdf/SGD_19741975_0003446.pdf). Amendment to the Turnover Tax Act of 1968 (wetten.nl - Informatie - Wet op de omzetbelasting 1968 - BWBR0002629 (overheid.nl)).

On 1 January 2023, there were 15 EU Member States with the reduced VAT for ornamentals (see Table 3.1). In this group, Croatia, Portugal and Romania apply reduced VAT to arboricultural products and bulbs, but not to cut flowers.

If the general VAT rate were applied in these 15 Member States, consumer prices in these countries would rise. As a result, the consumption of ornamental plant products would fall (see, for example, Van Galen and Jukema, 2021). This would lead to declines in net turnover in the ornamentals sector, inter-country trade and employment. Because the Netherlands is a major player in the production and trade of ornamentals and is strongly export-oriented, such a drop in demand in the rest of the EU would have a major impact on the Dutch sector. The effects of the VAT regime on consumer prices of ornamentals vary from country to country due to differences between the low and the general VAT rate.

Box 1 VAT increase in Spain in 2012

Spain abolished the VAT scheme for ornamentals in July 2012. VAT on ornamentals was increased from 8% to 21%.[1] This increase had a negative impact on the turnover of Spanish florists, which fell by over 25% between 2012 and 2014. This was partly due to the economic and financial crisis, but the turnover of Spanish florists did plummet during this period.[1] According to the Spanish florist authority AEFI, 23% of its members went bankrupt between 2012 and 2014.

Moreover, the drop in demand probably affected Spanish imports of ornamental plant products from the Netherlands, which declined sharply in the winter of 2012-2013 (Figure 3.1).[1] Subsequently, imports from the Netherlands gradually increased again, partly due to improving economic conditions and partly due to substitution of Spanish ornamentals with imports from the Netherlands. The Spanish ornamentals sector experienced a substantial contraction during this period, causing Spain to import more. However, imports of ornamental horticulture products began falling even before the VAT increase. The economic recession from 2008 was responsible for this. By 2012, however, consumer income had stabilised and it is plausible that the dip in 2012-13 was largely the result of the VAT increase. Spain reintroduced the low VAT rate for ornamentals in 2015, and a rate of 10% currently applies.

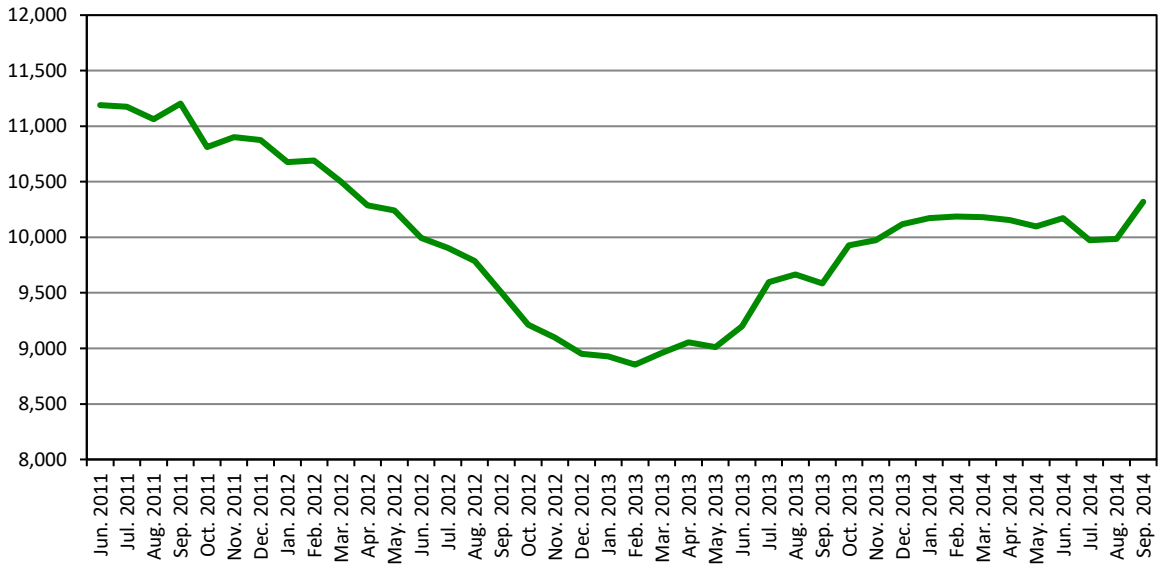

Figure 3.1 *Dutch exports of ornamentals to Spain, in thousands of euros, 12-month average*
Source: AEFI 2014 and Eurostat 2015.

Bunte and Van Galen (2015) previously published this framework, which was only slightly modified textually above.

Box 2 Practical experience: an example from France

In August 1991, the VAT on ornamentals in France was raised from the low rate to the high rate: from 5.5% to 18.6%. The net retail turnover of ornamentals in France fell from 17.5 billion francs in 1991 to 15.3 billion francs in 1992. Gross retail turnover rose slightly from 18.5 to 18.8 billion francs. Consumers spent about the same amount on ornamentals in 1991 and 1992. The government simply received a larger share of consumer spending. Due to lower net retail turnover, employment in the ornamentals chain fell by 5,000 in 1992 and 6,000 in 1993. The increased VAT revenue was therefore at the cost of lower income tax revenue and probably higher spending on unemployment benefits. Consequently, the measure was reversed in 1993, and the low VAT rate once again applied to ornamentals in France.

Source: ADAVF 1993. This framework was previously published in Bunte and Van Galen (2015).

4 Method: the Hortus model

4.1 Two scenarios

To answer the first two research questions, two scenarios were developed in this study:
1. An increased VAT rate – from 9% to 21% – on ornamentals in the Netherlands;
2. Increased VAT in the Netherlands and the other EU Member States with a reduced rate on ornamentals.

As the leading ornamentals producer and trader in Europe, the Netherlands has an interest in other countries not increasing VAT on ornamentals. An increased VAT rate in the markets for Dutch flowers and plants would negatively impact not only the demand in those countries, but also the ornamentals sector in the Netherlands. As long as the Netherlands continues to apply the reduced VAT rate itself, this makes it easier to ask other countries to consider the interest of the Dutch ornamentals sector in their choices about VAT. An increase in VAT in the Netherlands will thus undermine a key argument used by the Dutch industry to argue for a reduced VAT rate abroad. Therefore, this study not only considered a scenario in which the Netherlands increases its VAT on ornamentals, but also looked at a scenario in which such a decision leads to increased VAT in other EU countries.

4.2 Hortus model

The effects of the VAT increases were calculated using the Hortus model specially developed by Wageningen Economic Research to simulate the effects of supply and demand changes on European horticulture (Bunte and Van Galen, 2005). The Hortus model is a supply and demand model for horticultural products in the EU-27, the UK, and the rest of the world as a whole.[10] The Hortus model (version 10) distinguishes 24 horticultural products (vegetables, fruits, and ornamentals). Ornamentals include cut flowers, potted plants (house plants, balcony plants and bedding plants), arboricultural products, and flower bulbs. The model relates production, international trade and consumption through stepped supply and demand equations. For the ornamental horticulture sector, the model included price elasticities that show how demand for ornamentals changes as prices change. The model includes differences in production technology between countries, which is reflected in differences in capital and labour intensity in the production and use of intermediate inputs in cultivation.

Based on an initial set of data on production, trade and consumption and under the conditions of the parameters used, the model calculates a new equilibrium after a shock due to the changes in VAT. The results of the model are the changes (in percentages) from the initial situation. Based on turnover per FTE, the impact on employment is then calculated outside the model using productivity indicators for the various links in the chain. The underlying data originates from the Farm Accountancy Data Network (FADN) and statistics on economic activities in the European Union (NACE Rev. 2 G) [SBS_NA_DT_R2]. These sources do not distinguish between product groups within the ornamentals sector. For the employment effects, therefore, the same turnover per FTE is calculated for each product group.

Some of the model's assumptions are explained below:
- The model assumes that successive markets in the production and distribution chain are characterised by perfect competition. This means that no parties in the chain exercise market power (i.e. they cannot manipulate either the supply or demand). This is a valid assumption given the number and size of companies operating in the chain. The assumption that the chain is characterised by perfect competition implies that the increase in the VAT rate is initially passed on in full in the consumer price. Indeed, research by Bunte and Kuiper (2008) has shown that a 1% increase in the producer price leads to a 1%

[10] For the rest of the world, some of the data, especially regarding production and consumption, are unavailable for ornamentals. The results of the model for the rest of the world are therefore less reliable and are not presented in this report.

increase in the consumer price. Despite the emergence of increasingly large wholesale businesses, the auction for flowers and plants still plays an important role. Consequently, any changes in the tax burden will be passed on to consumers. CPB (2003) drew similar conclusions for labour-intensive services.

- Price elasticity determines the extent to which a price change leads to a change in demand by consumers. The greater (more negative) the price elasticity, the greater the effect on demand. For this report, Royal FloraHolland commissioned the GfK research bureau to study the price elasticity of ornamentals in 2021.[11] Based on consumer panel research in which consumers were presented with choices about purchasing flowers and plants with varying prices, GfK determined the following price elasticities that were used in the current version of the model:
  - cut flowers: -1.6
  - houseplants: -1.3
  - garden plants: -1.3
  - flower bulbs: -1.5.
- Business market share: Since businesses can reclaim VAT, a VAT hike will not directly affect business demand. The higher the business market percentage, the lower the effect of a VAT increase.
  - Based on data from Royal Floraholland, it was assumed that for cut flowers and potted plants about 85% of sales in the Netherlands are aimed at the consumer market and 15% at the business market (companies and institutions). Government agencies cannot reclaim VAT and are therefore not included in the business market here.
  - No recent figures are known for arboriculture and flower bulbs, but a 30% business market percentage has been assumed. Bunte et al. (2007) estimated the institutional arboricultural market at 40%. A substantial part of this market consists of government spending, but no figures are available on its magnitude. In this study we assumed that the business market comprises 30% of sales. In Bunte et al. (2007) and Bunte and Van Galen (2015), the authors assumed that 90% of flower bulbs were for the institutional market (forcing into bloom). Rabobank (2018) calculated that 70% is for forcing and 30% for dry sales. However, as the flower bulb sector is also affected by a drop in demand for flowers (bulbs destined for forcing will also be sold as cut flowers to some extent), in this version we decided to reduce the share of the business market for flower bulbs to 30%, equal to arboricultural products.
- Finally, assumptions were made about gross margins in the chain. Unlike products such as tomatoes or apples, the production and consumption of ornamental plant products cannot be added up in pieces or kilograms. Therefore, we rounded up ornamentals in euros at wholesale prices. For this purpose, the production value was converted to wholesale value. To calculate back from retail value to wholesale value, we used data from VBW on florists' operating accounts, and data from Retailinsiders.[12] These data were compared with known estimates of consumption in the Netherlands and a number of other countries (confidential figures from Royal FloraHolland).

4.3 Inflation, differences between income groups and effects on human health and nature

Research questions three, four and five were answered based on literature research and desk research. The effect of inflation can be estimated by looking at the income elasticities of demand for ornamentals. These elasticities were calculated in a previous study by Bunte and Kuiper (2008). The same study also provides insight into the differences in effects of price changes on demand from lower and higher income groups. For the final research question on the positive contribution of consumption of flowers and plants to human health and well-being, we used a number of published studies. However, this question was addressed to only a limited extent in the present report.

[11] GfK, 2021, internal memorandum from FloraHolland.
[12] https://www.retailinsiders.nl/branches/huis-tuin/tuincentra/.

5 Calculation of effects

This chapter presents the effects on employment and turnover in the ornamentals sector for the two VAT scenarios. It also presents the results of estimates of effects on public finances, spending by lower income groups, and effects on human health and nature. First it discusses the scenario in which VAT on ornamentals is increased from 9% to 21% in the Netherlands alone. This is followed by the scenario in which VAT is also increased in the other 15 Member States that currently apply reduced VAT to sales of flowers and plants. The results show that the effects on the Dutch ornamentals sector become significantly larger as more countries decide to increase VAT.

5.1 VAT increase in the Netherlands leads to lower turnover and loss of jobs

The results of the first scenario are shown in Table 5.1 (turnover) and Table 5.2 (employment). In this scenario, the increased VAT on ornamentals in the Netherlands – from 9% to 21% – leads to a turnover loss of €390 million for the Dutch flower retail sector, and a loss of 2,440 FTE in the ornamentals sector as a whole.

If the general VAT rate is applied to ornamentals in the Netherlands instead of the low rate, consumer prices will increase by 11%.[13] As a result, demand for ornamental plant products in the Netherlands would fall. The effect on demand in the Netherlands – via the price elasticity of demand (-1.6 for cut flowers, -1.5 for flower bulbs and -1.3 for house plants and garden plants) – is somewhat dampened by the fact that sales are not only from consumers, but also from businesses that can reclaim VAT. The drop in demand impacts retail sales and the production of ornamentals in the Netherlands. Both production area and prices adapt to this situation. Ultimately, a negative impact on production, turnover and employment remains. Because the Dutch ornamentals sector is largely export-oriented, the percentage effect on Dutch production and wholesale is smaller than on retail, and also smaller than in the second scenario in which demand also falls in key export markets.

Table 5.1 *Effects of a VAT increase in the Netherlands on the turnover of the ornamentals sector in the Netherlands, in millions of euros and in percent (base-year calculations 2021)*

	Production		Wholesale		Retail, a)	
	(€ millions)	%	(€ millions)	%	(€ millions)	%
Flower bulbs	0	-0.6	-10	-0.8	-20	-11.4
Arboriculture	-20	-1.6	-50	-2.0	-90	-9.9
Potted plants	-30	-1.4	-50	-1.7	-100	-12.1
Cut flowers	-30	-1.0	-90	-1.5	-180	-14.9
Total	-80	-1.2	-200	-1.6	-390	-12.5

(a) in addition to the retail value of flowers and plants at florists, garden centres, supermarkets and other outlets, retail turnover includes estimated sales to businesses and government agencies/public bodies.

Note: the turnovers of the various links cannot be added together because of the double counting that would occur.

Source: Wageningen Economic Research, Hortus model. Rounded to 10.

[13] Calculated as (121/109)-1 x 100%.

The effects are greatest on the turnover of cut flowers. This is because the price elasticity is relatively high for this product and because it accounts for a significant proportion of total turnover. Compared to the previous calculations (Van Galen and Jukema, 2021), the percentage effects are essentially the same. However, the absolute effects decreased slightly for retail (from €420 million to €390 million) and increased slightly for wholesale (from €170 million to €200 million). This is due to revised estimates of the total consumption of cut flowers and potted plants, which fell slightly from previous estimates based on figures from Royal FloraHolland. In addition, the prices of flowers and plants had increased in 2021 compared to 2018 (the base year of the model in the previous study).

The impact on employment is a loss of about 2,440 FTE. Most of those job losses would be in retail (about 1,710), 440 in the primary production sector, and about 290 in the wholesale trade. As in the case of turnover, the impact of this scenario is particularly large in the retail sector. Retail is relatively labour intensive; the turnover per employee in retail is lower than in both wholesale and production. That means the loss of turnover will result in relatively more job losses.

Table 5.2 *Effects of a VAT increase in the Netherlands on employment in the ornamentals sector in the Netherlands, in FTE and percent (base-year calculations 2021)*

	Production		Wholesale		Retail		Total	
	FTE	%	FTE	%	FTE	%	FTE	%
Flower bulbs	-20	-0.6	-20	-0.8	-90	-11.4	-130	-2.0
Arboriculture	-120	-1.6	-70	-2.0	-370	-9.9	-570	-3.8
Potted plants	-150	-1.4	-70	-1.7	-460	-12.1	-680	-3.6
Cut flowers	-150	-1.0	-130	-1.5	-790	-14.9	-1,070	-3.8
Total in FTE	-440	-1.2	-290	-1.6	-1,710	-12.5	-2,440	-3.6
Total in number of employees	Not known		-360		-2,780			

Source: Wageningen Economic Research, Hortus model. Rounded to 10 FTEs.

Since part-time work is also involved, the number of employees affected exceeds the number of full-time jobs lost. The table also shows the estimated total number of employees affected in wholesale and retail; 360 in wholesale and 2,780 in retail.

5.2 EU-wide VAT increase leads to additional losses in turnover and jobs

The second scenario describes the situation in which VAT on ornamentals is increased to the general rate both in the Netherlands and in the other 15 EU Member States that currently have reduced VAT on these products. In this scenario, turnover in the ornamentals sector in the Netherlands falls by €480 million in primary production, €930 million in wholesale and €380 million in retail (Table 5.3). Employment in the Netherlands falls by 5,500 FTE (-8%), including 2,560 in the primary sector, 1,340 in wholesale and 1,650 in retail (Table 5.4). In the entire EU-27 and the UK, primary sector turnover falls by €1.6 billion, wholesale turnover by €3.8 billion and retail turnover by €5.2 billion. Nearly 64,000 full-time jobs (-8%) will be lost in the entire EU-27 and the UK. Employment in Germany, which is a relatively large market and producer, will be particularly hard hit with an overall loss of 13,400 FTE (-12%). Most jobs will be lost in the retail sector.

Regarding turnover and jobs in the primary and wholesale sectors, the Netherlands will be most affected by these VAT increases due to its leading position in ornamentals. But Germany, Italy and France, for example, will also experience sharp declines in chain turnover and employment. In Germany, the impact will be mainly in retail turnover, which will fall by 12.5% or €1.45 billion. These flowers and plants largely originate from the Netherlands, which also causes an indirect effect on the Dutch ornamentals sector. In Italy and France,

the impact in the chain is relatively large, as these countries are both major markets and relatively important producers.

Table 5.3 *Effects of a VAT increase in all EU countries with reduced rates on turnover in the ornamentals chain in the EU-27 and the UK, in millions of euros (seven countries with the greatest loss in turnover), (base-year calculations 2021)*

	Production		Wholesale		Retail	
	(€ millions)	%	(€ millions)	%	(€ millions)	%
Belgium	-70	-12.1	-210	-12.8	-280	-15.1
Germany	-210	-10.5	-810	-11.6	-1,450	-12.5
France	-190	-9.5	-510	-9.6	-940	-9.8
Italy	-300	-11.0	-580	-11.1	-940	-11.8
The Netherlands	-480	-7.1	-930	-7.2	-380	-12.1
Poland	-130	-14.9	-310	-15.1	-590	-16.4
Spain	-150	-10.6	-260	-10.7	-430	-11.0
Rest of the EU-27 and the UK	-80	-2.3	-190	-1.8	-230	-1.3
Total	-1,610	-8.1	-3,810	-8.1	-5,230	-8.8

Note: the turnovers of the various links cannot be added together because of the double counting that would occur.

Source: Wageningen Economic Research, Hortus model. Rounded to 10.

Table 5.4 *Following a VAT increase in all EU countries with reduced VAT on ornamentals, the effects on employment in the ornamentals sector in the EU-27 and the UK, in FTE (seven countries with the most job losses), (base-year calculations 2021)*

	Production		Wholesale		Retail		Total	
	FTE	%	FTE	%	FTE	%	FTE	%
Belgium	-560	-12.1	-200	-12.8	-680	-15.1	-1,440	-13.4
Germany	-1,850	-10.5	-1,600	-11.6	-9,960	-12.5	-13,400	-12.0
France	-2,480	-9.5	-1,470	-9.6	-5,210	-9.8	-9,150	-9.7
Italy	-4,870	-11.0	-1,600	-11.1	-2,780	-11.8	-9,250	-11.2
The Netherlands	-2,560	-7.1	-1,340	-7.2	-1,650	-12.1	-5,550	-8.1
Poland	-6,360	-14.9	-1,550	-15.1	-4,370	-16.4	-12,280	-15.4
Spain	-3,240	-10.6	-1,590	-10.7	-2,690	-11.0	-7,520	-10.8
Rest of the EU-27 and the UK	-1,930	-3.0	-1,130	-2.8	-1,920	-1.3	-4,980	-2.0
Total	-23,860	-8.9	-10,460	-8.1	-29,260	-7.8	-63,570	-8.3

Source: Wageningen Economic Research, Hortus model. Rounded to 10.

5.3 Government revenue in the Netherlands increases less than expected

One of the justifications for possibly increasing VAT on ornamentals from the low rate to the general rate is the expected increase in government revenue. In this section, we examine the effects of a VAT increase on government revenue and expenditure. Besides higher VAT revenue, a number of other effects should be taken into account.

If one assumes that consumers do not respond to price increases by buying less, then after a VAT increase from 9% to 21%, government revenues would increase by €345 million per year to €604 million. However, consumers do respond to price increases (price elasticity). As a result, turnover falls and VAT revenue also falls proportionally. If the effects on consumer spending on ornamentals predicted by the Hortus model are included, then the increase in VAT revenue will be smaller: €217 million (Scenario 1) and €219 million (Scenario 2). (See Table 5.5).

In addition, due to lower employment in the chain, in the near future there will be a loss of income tax revenue and an increase in social security expenditure. Unemployed people pay less taxes and social security contributions. In Scenario 1, about 2,440 FTEs are at stake in the Netherlands. The average wage per FTE in the Dutch agricultural sector in 2021 was around €35,700. In wholesale, it was €55,000 and in retail €30,500.[14] On average, an employee with an income of around €40,000 will pay around 19.6% income tax in 2023. The average income of an unemployed person in 2020 (latest year available) was €10,300, according to Statistics Netherlands (CBS).[15] This includes those receiving unemployment benefits or other benefits. Because we cannot determine in advance which people become unemployed and to what extent those people are entitled to unemployment benefits, we have used these figures as a starting point.[16] The average employee in the Dutch agricultural sector accounted for around €9,400 in social security contributions (via their employer) in 2021, and in the wholesale and retail sectors it was €13,800 and €8,500, respectively (see Table 5.6).

In total, the impact on public finances of a VAT increase in the Netherlands has been estimated at €159 million of additional government revenue, compared to the originally expected increase in VAT revenue of €345 million per year if no change in consumer behaviour is assumed (and thus no loss of turnover and employment). If the other EU countries also decide to increase VAT on ornamentals, only €75 million of additional revenue will remain. This means that an increase in VAT in other countries will trigger a reduction in demand and lead to a decline in production and exports in the Netherlands, which will then have a negative impact on tax revenues and social security spending in the Netherlands.

Table 5.5 *Effects on VAT revenue in the Netherlands per scenario, in millions of euros*

	Scenario 1	**Scenario 2**
Without behavioural change:		
Gross turnover before VAT increase	3,135	3,135
Net turnover before VAT increase	2,876	2,876
VAT before increase (9%)	259	259
Expected VAT revenue (after increase to 21%)	604	604
Expected increase in VAT revenue	345	345
With behavioural change:		
Gross turnover after VAT increase	2,742	2,756
Net turnover after VAT increase	2,266	2,278
Actual VAT revenue after increase	476	478
Actual impact of VAT increase on VAT revenue	217	219

Source: Hortus model; calculations by Wageningen Economic Research.

The decline in income tax revenue is unlikely to continue in the long term, as employment and tax revenues will be generated in other sectors. 'Long term' in economics is the time it takes for the economy to adapt to changes in, for example, the tax structure. Economic theory does not indicate how much time the economy needs to achieve the new equilibrium.

In addition, we note that part of the additional government revenue involves a redistribution from local governments to the national government, as local governments will have to pay more VAT on the ornamentals they purchase for public green spaces which, in turn, may cause a decline in the greening of public spaces. There will also be indirect effects on other sectors that purchase ornamentals.

[14] CBS Salaries and volume of work of employees; industry, national accounts. StatLine - Beloning en arbeidsvolume van werknemers; bedrijfstak, nationale rekeningen (cbs.nl).

[15] CBS Employed and non-employed population; Average income and employment position; Average personal transfer income. StatLine - Beroeps- en niet-beroepsbevolking; gemd. inkomen en arbeidspositie, '11-'20 (cbs.nl).

[16] This includes both people who previously held full-time jobs and those who held part-time jobs. No separate figures are available on the average gross income of an unemployed person who previously held a full-time job. Since we calculated the job losses as full-time jobs, we have underestimated the impact on government spending for unemployment benefits (since part-timers tend to earn less than full-time workers). On the other hand, the duration of unemployment benefits is limited and after that everyone gets more or less the same national assistance benefit.

Table 5.6 *Effects on income taxes and social security contributions in the Netherlands per scenario, in millions of euros*

	Scenario 1	Scenario 2
Jobs lost in FTEs	2,440	5,550
- Primary sector	440	2,560
- Wholesale	290	1,340
- Retail	1,710	1,650
Average salary, in thousands of euros, per FTE		
- Primary sector	35,700	35,700
- Wholesale	55,000	55,000
- Retail	30,500	30,500
Gross income of unemployed persons, in thousands of euros	10,300	10,300
Taxation percentage	19.6	19.6
Impact on income tax revenue, in millions of euros	-12	-31
Social security contributions, in thousands of euros, per FTE		
- Primary sector	9,400	9,400
- Wholesale	13,800	13,800
- Retail	8,500	8,500
Impact on social security contributions	-23	-57
Increase in social security costs	-20	-46
Impact on corporate income tax	-4	-11
Net impact on income tax and social security contributions	-58	-144
Actual impact on VAT revenue (Table 5.5)	217	219
Net impact on government revenue	159	75

Source: CBS, Hortus model. Calculations by Wageningen Economic Research.

5.4 High inflation has reduced demand for flowers and plants by 14%

It is not only a VAT increase that impacts the demand for flowers and plants. Prices for many other products are rising too. Inflation has been very high in the Netherlands and Europe over the past two years and is expected to remain high for the time being. Figure 5.1 shows the consumer price index from 2015 to the present for flowers and plants in a number of key European markets, and the total consumer price index for all products (Harmonised Consumer Price Index HCPI). This shows not only that the prices of flowers and plants have risen substantially between 2018 and now, but also that prices of flowers and plants in these countries have risen more than the general price level.

The effect of inflation on demand for flowers and plants works mainly through income elasticity. Inflation reduces consumer purchasing power. Income elasticity measures the effect of a change in income on demand. In Bunte and Kuiper (2008), income elasticities were calculated for cut flowers and potted plants, and for garden products in which garden plants have an important share. The income elasticity of flowers and plants was calculated at 1.08 and that of garden products at 3.05. This means that an increase in income leads to an increase in consumption. This increase is much larger for garden products than for cut flowers and potted plants, which is probably because people with higher disposable incomes (in urban areas) are more likely to have gardens. Conversely, based on this, we can also say that if real incomes fall, which is the case due to inflation, consumption of flowers and plants and garden products will also fall. For cut flowers and potted plants, this decline is slightly larger than the decline in income. With the consumer price index rising from 115 in January 2022 to 128 in June 2023, demand for flowers and plants can be expected to have fallen by around 14%. At the same time, prices of flowers and plants are rising, which in turn increases the total value sold.

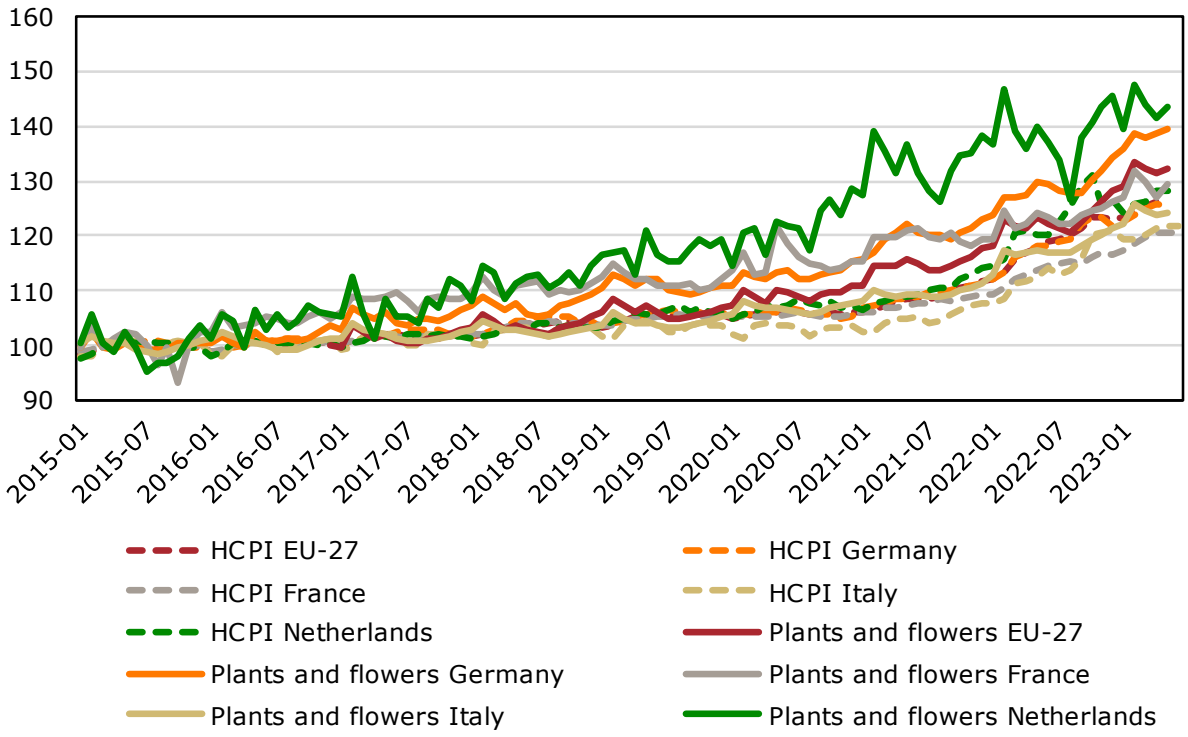

Figure 5.1 *Consumer price index for all products (HCPI) and for plants and flowers, for EU-27, Germany, France, Italy and the Netherlands, index 2015=100*
Source: Eurostat.

5.5 Lower income groups in particular buy fewer flowers and plants due to a VAT increase and inflation

The rise in prices of flowers and plants has been even higher than inflation (see Section 5.4). This price rise has several effects on the demand for flowers and plants. The direct effect on demand is measured by the specific price elasticity: cut flowers -1.6, house plants -1.3, garden plants -1.3, and flower bulbs -1.5 (see Chapter 4). However, this measured price elasticity is an average for all consumers. The price elasticity is larger for low-income groups than for high-income groups (see Bunte and Kuiper, 2008). This means that people with lower disposable incomes in particular buy fewer flowers and plants when the price rises. One of the main reasons for introducing a reduced VAT rate on flowers and plants was to keep them affordable for people with lower disposable incomes.

For garden plants Bunte and Kuiper (2008) reported that the price elasticity of demand of the two lowest income quartiles (those with the lowest 25% income, and those with the lowest 25%-50% incomes) was -4.3 and -2.4, while the overall price elasticity in that study was about -1.5. For cut flowers and potted plants as well, Bunte and Kuiper reported that lower income groups have a stronger response to price changes than higher income groups. For people with incomes in the second 25%-50% quartile, the elasticity was -2.2 compared to -1.1 for the whole population.[17] This shows that a price increase for lower income groups has a much stronger effect than for higher income groups. It is likely that rising prices of flowers and plants combined with an increase in the VAT rate will make flowers and plants much less affordable especially for lower income groups.

[17] For the lowest income quartile, the measured price elasticity was -1.29, which is not significantly different from the mean of -1.13. However, this is largely explained by a small number of observations.

5.6 Potential impacts on human health and nature

Finally, it is important to mention that consumption of flowers and plants not only represents value for consumers and generates revenue for the government through VAT, but can also make a positive contribution to the value of the landscape, biodiversity and human health and well-being. Any increase in VAT will reduce the production and consumption of flowers and plants in the Netherlands, and thus reduce their contribution to the aforementioned aspects of well-being in the Netherlands.

For example, previous research has shown that shade from trees and shrubs can have an effect on cooling in the city, thus counteracting the negative effects of climate change. Planting sufficient greenery in cities in public areas as well as in private gardens has the effect of lowering the average temperature – especially in the summer months – by up to 2 degrees and in parks by as much as 4 degrees.[18] Flowers and plants have also been shown to have a positive effect on the well-being of patients in hospitals (Park and Mattson, 2009).[19] In a study conducted in the USA[20], the length of stay after surgery decreased by almost 10% when patients had a view of trees (compared to a view of a brick wall). In the same study, patients with a view of trees used up to 30% less pain medication. Hall and Knuth (2019) examined the effects of plants and flowers on a wide range of health-related and social aspects, including sleep, diabetes, heart failure and respiratory problems, as well as satisfaction with the surroundings, reduced crime and children's school performance. The positive externalities of the production and consumption of flowers, plants, bulbs and arboricultural products should also be factored into the decision to increase VAT. However, there are also some negative externalities of ornamentals, such as the use of plant protection products in horticulture, which should also be considered. However, quantification of these effects was outside the scope of this study.

[18] https://degroenestad.nl/onderzoek/elementor-pagina-14125/.
[19] GREEN HEALTHY HOSPITALS - The Green City.
[20] R.S. Ulrich (1984), View through a window may influence recovery from surgery. Science 224:420-421.

6 Conclusions

In this study we considered the effects of a possible increase in VAT on ornamentals on 1) production and employment in the ornamental sector in Europe and the Netherlands, 2) public finances in the Netherlands, 3) spending on ornamentals by lower income groups, and 4) human health and nature in the Netherlands. The research questions were as follows:

1. If the VAT on ornamentals in the Netherlands was increased from 9% to 21%, what would be the effects on 1) turnover and employment of the various links in the ornamentals chain, 2) international trade, and 3) Dutch public finances? (Scenario 1)
2. If the VAT on ornamentals in the Netherlands and in the other EU Member States with reduced VAT was increased, what would be the effects on 1) turnover and employment of the various links in the ornamentals chain, 2) international trade, and 3) Dutch public finances? (Scenario 2)
3. How has inflation in the Netherlands since mid-2021 impacted the demand for ornamentals in the Netherlands in 2022-2023?
4. What would be the consequences of abolishing the reduced VAT on ornamentals in the Netherlands on the spending of lower income groups?
5. What are the potential impacts of abolishing the reduced VAT on human health and nature?

6.1 Effects on turnover and employment: 2,440 FTE lost in the Netherlands in Scenario 1 and 5,550 FTE lost in Scenario 2

Regarding the effects on turnover and employment, two scenarios were calculated with the Hortus model, corresponding to research questions 1 and 2: a VAT increase on ornamental plant products in the Netherlands from 9% to 21%; a VAT increase in both the Netherlands and other EU Member States applying the reduced rate.

On 1 January 2023, there were 15 EU Member States, including the Netherlands, Germany, France and Italy, that applied reduced VAT to sales of ornamentals (see Table 3.1). In this group, Croatia, Portugal and Romania apply reduced VAT to arboricultural products and bulbs, but not to cut flowers. An increase in VAT leads to rising consumer prices and therefore to a fall in demand. This has negative effects on turnover and employment in the chain. The size of those effects depends, among other things, on the price effects in different markets and the extent to which products are exported to other countries. The Netherlands has a strong export orientation; a VAT increase in key foreign markets is therefore a major threat to the Dutch sector.

- In Scenario 1, the VAT increase results in a €390 million decline in turnover for the Dutch retail sector in flowers, house plants and arboricultural products (-12.5%) (including all retail channels and the institutional sector), a €200 million decline for the wholesale sector (-1.6%) and an €80 million decline for the production sector (-1.2%), as well as the loss of a total of 2,440 FTE in the Dutch ornamentals sector (-3.6%). Most of those job losses would be in retail (about 1,710), 440 would be in primary production, and about 290 in wholesale.
- In Scenario 2, the increased VAT in the Netherlands and other EU countries leads to a turnover loss in the Netherlands of €380 million in retail trade (-12.1%), €930 million in wholesale trade (-7.2%) and €480 million in primary production (-7.1%). Employment in the Netherlands falls by 5,500 FTE (-8.1%), including 2,560 in the primary sector, 1,340 in wholesale and 1,650 in retail.

6.2 In Scenario 2, employment falls by almost 64,000 FTE in the EU-27 and UK as a whole

- While turnover for the primary sector declines by €1.6 billion, for wholesalers by €3.8 billion and for retailers by €5.2 billion. Nearly 64,000 full-time jobs would be lost across the EU-27 and the UK.

6.3 Increased VAT revenue is partly offset by less consumer spending, increased government spending on benefits and lower corporate taxes

- The calculations show that, in Scenario 1, a VAT increase in the Netherlands does not yield €345 million of additional VAT revenue, which would be the case if consumer purchases remained the same, but only €217 million. In addition, the government has to pay more benefits and receives less income tax from workers and businesses. In that case, the net increase in revenue is €159 million (less than half the expected impact without economic adjustments).
- In Scenario 2, the drop in demand for Dutch growers and trade is greater than in Scenario 1, resulting in more people losing their jobs. As a result, income tax revenue falls. The total net benefit to public finances in Scenario 2 is only €75 million.

6.4 Inflation also reduces demand for flowers and plants

- Using income elasticity (Bunte and Kuiper, 2008), it can be calculated that an inflation rate of 13% since the beginning of 2022 – all other things being equal – has led to a drop in demand (in volume) for flowers and plants of about 14%. It is difficult to separate this effect from the price increases that have also taken place, and especially on flowers and plants. The rise in energy prices has caused the production costs of ornamentals to rise very sharply. These additional price hikes come on top of inflation and, together with any VAT increase, will have a negative impact on the sector.

6.5 And in particular, people in lower income groups will buy fewer flowers and plants.

- Another important observation is that people with lower disposable incomes in particular buy fewer flowers and plants when the price rises or their real income falls. The affordability of flowers and plants for low-income groups was a major justification for introducing the reduced VAT in 1975.
- Finally, the consumption of flowers and plants makes a positive contribution to human health and well-being. This positive contribution is evident from various studies and will have to be taken into account when considering whether or not to increase VAT on ornamentals.

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