



# Internationalisation Monitor

**2016-II**

**Agribusiness**



**CBS**

**Internationalisation**

**Monitor**

**2016-II**

**Agribusiness**

## Explanation of symbols

.	Data not available
*	Provisional figure
**	Revised provisional figure (but not definite)
x	Publication prohibited (confidential figure)
–	Nil
–	(Between two figures) inclusive
0 (0,0)	Less than half of unit concerned
Niets (blank)	Not applicable
2015–2016	2015 to 2016 inclusive
2015/2016	Average for 2015 to 2016 inclusive
2015/'16	Crop year, financial year, school year, etc., beginning in 2015 and ending in 2016
2013/'14–2015/'16	Crop year, financial year, etc., 2013/'14 to 2015/'16 inclusive

Due to rounding, some totals may not correspond to the sum of the separate figures.

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# Foreword

The Netherlands plays a prominent part in worldwide agribusiness. Agribusiness encompasses not only the agricultural sector but also the food and beverage industry, the wholesale and retail trade in food and the supporting services sectors. The OECD qualifies Dutch agribusiness as highly innovative and internationally oriented. About 10 percent of all corporate R&D expenses in the Netherlands are attributable to agribusiness, and companies in agribusiness are more innovative than others.

In spite of the fact that the Netherlands is a very small country with 17 million inhabitants, its agribusiness produces a much higher output than the Dutch population can consume. Nearly 1 in 5 Dutch agribusiness companies is active in the international goods trade. The Netherlands is the second largest agricultural exporter in the world (Scientific Council for Government Policy WRR, 2014). 65 percent of the Dutch trade surplus consists of agricultural and agriculture-related products. For every euro exported by agribusiness, 64 cents is earned in the Netherlands, and as such agribusiness exports contribute 4.4 percent to Dutch GDP. The agriculture and food production is very important for the Dutch economy and is expected to become even more so in the next 15 years (Ecorys, 2014).

Approximately one in twelve Dutch companies and one in ten employees is active in agribusiness. Most companies are found in primary agriculture, while most employees work in the agro-industry. Foreign buyers are not only interested in the basic food products made in the Netherlands, but also in its high quality innovative products such as baby milk powder or modified crops and seeds. At the same time there is a growing demand for food from the ever larger world population, which needs to be met with the lowest possible burden on people and the environment. Dutch knowledge and expertise in agribusiness can play a prominent part in addressing such current and future challenges.

The above are but a few results described in this Internationalisation monitor. More information is available on the website of Statistics Netherlands ([www.cbs.nl/globalisation](http://www.cbs.nl/globalisation)).

**The Director General,  
Dr. T.B.P.M. Tjin-A-Tsoi**



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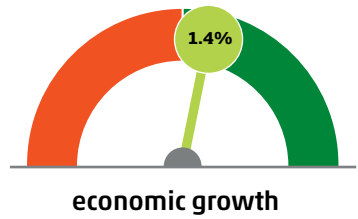
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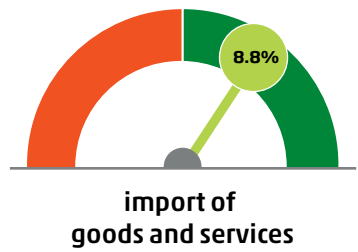


# International economic dashboard

First quarter 2016<sup>1)</sup>



In Q1 2016, the Dutch economy grew by 1.4 percent compared to the same quarter in 2015. Domestic spending (consumption and investments) made a positive contribution to the growth. Foreign trade contributed negatively, mainly due to a sharp increase of imports.



The volume of imports of goods and services increased by 8.8 percent in Q1 2016. The Netherlands mainly imported more electrical machinery, oil products as well as royalties and licenses.



The volume of exports of goods and services grew by 6.4 percent in Q1 2016. The highest growth was in exports of transport equipment, royalties and licenses.

<sup>1)</sup> Volume in the first quarter of 2016 compared to the first quarter of 2015.

# Internationalisation and *agribusiness*: an introduction

Bananas from Ecuador, rice from India and salmon from Norway: products that Dutch consumers take for granted today. But cheese, sprouts, meat and other agricultural products, such as flowers, are also common in the supermarket and specialty stores. Using a shrinking area of land, Dutch farmers and horticulturalists are producing growing amounts of food and other agricultural products. The Netherlands also has a large food processing industry, which transforms many raw agricultural products into edible and drinkable end products, such as baby milk powder and chocolate. Wholesalers and retailers then sell those products to consumers. These closely related sectors together make up Dutch *agribusiness*. Dutch *agribusiness* also includes companies that develop and produce high-tech agricultural machinery and processing systems. Agriculture-related research and development, such as the breeding of crops and seeds, and other support and service industries and suppliers also play an important role in Dutch *agribusiness*. Dutch consumers are important buyers of the *agribusiness* sector's products, machines and innovations, but so are foreign buyers. A large share of the output of the *agribusiness* sector is not intended for the domestic market, but for exports. The Netherlands is the world's second-largest exporter of agricultural products – owing to a large extent to re-exports – after the United States (Ministry of Economic Affairs, 2014; WRR, 2014). Gouda cheese and Dutch tulips are known all over the world. But agricultural know-how and innovations such as modified potato varieties are also major export products.

In chapter 2, 'Trends in the trade in agricultural goods', we explore the trends in the Dutch trade in agricultural products. In 2015, exports of agricultural and agriculture-related products totalled almost 90 billion euros, or 21 percent of the total Dutch exports of goods. The Netherlands specialises far more than any other EU country in the export of flowers and plants.

The purpose of this Internationalisation Monitor is to present an overall picture of the Dutch *agribusiness* chain and highlight the importance of other countries for the sector, starting with agriculture, horticulture and fisheries, moving on to the food and beverage industry, the agro-industry and agricultural services, and then on to wholesale and retail trade in food, beverages and tobacco, ending with consumers in the Netherlands and abroad. Each link in the chain has a relationship with other countries as suppliers, markets, or both. There are also many mutual dependencies within *agribusiness*. For example, a substantial share of the added value generated by food industry exports is created in agriculture and horticulture. In chapter 3, 'The chain and the importance of Dutch *agribusiness*', we investigate

the types of companies that make up agribusiness in the Netherlands, the importance of the sector to the Dutch economy, the composition of the chain of suppliers and customers, including those in other countries, and the share of Dutch GDP attributable to the exports of the agricultural sector.

In chapter 4 we look in more detail at the food and beverage sector, the largest sector in agribusiness, accounting for roughly a fifth of the turnover, jobs, exports and added value of Dutch industry. The companies in this industry that export goods are exceptionally productive. They have higher turnover, more employees and spend more on R&D than do exporting companies in other industries and non-exporters. The export value and the probability of a company starting to export are greater when it has more employees, if it is under foreign control and invests in R&D.

The next issue of the Internationalisation Monitor will focus on economic relations with Germany, the most important trading partner of the Netherlands, and in particular on trade between the various regions in the Netherlands and Germany. A fifth of Dutch exports go to Germany, but the two countries have many other ties apart from trade (tourism, transport, labour migration). Its importance to the Dutch economy cannot be underestimated, hence the decision to devote a special issue to Germany.



**1.**

# **Agribusiness**

## **a brief overview**

**Authors**

Pascal Ramaekers  
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Rik van Roekel





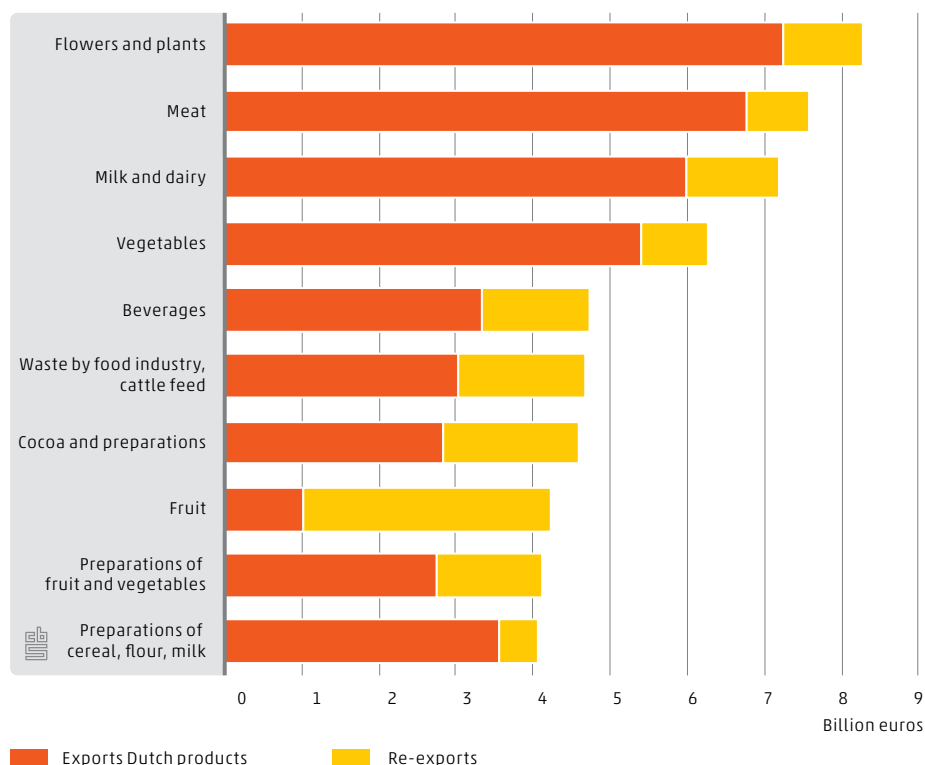
**65%** of the trade surplus comes from agriculture and agriculture-related goods

**51%** of companies within the agribusiness innovate

## 1.1 Flowers and plants most exported agricultural products

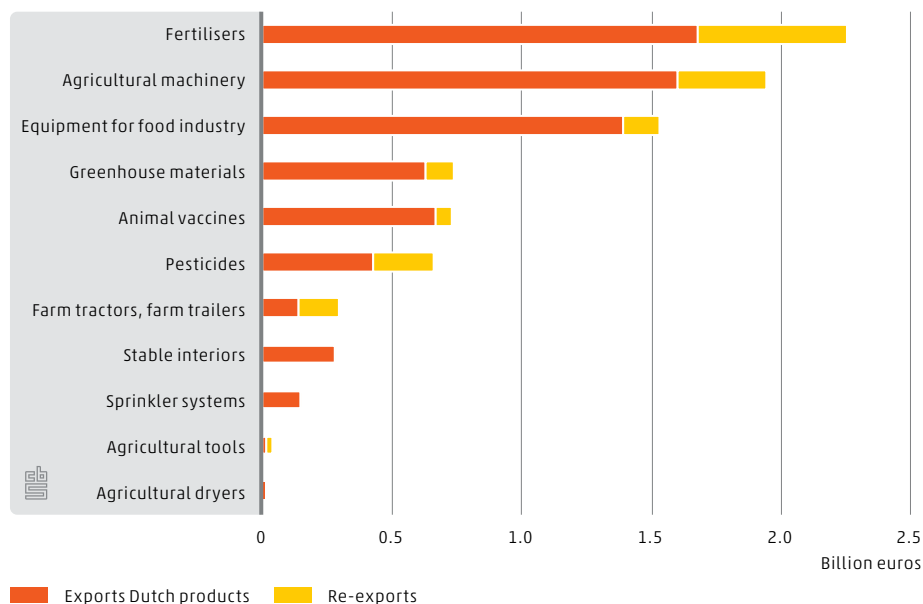
The most exported agricultural products of the Netherlands in 2015 were flowers and plants, including bulbs and other ornamentals. Besides flowers and plants (8.3 billion euros export), meat (7.6 billion), milk and dairy (7.2 billion) and vegetables (6.3 billion) are the top agricultural export products. The ranks of these products remain the same if re-exports are not included. Drinks, cattle feed, cocoa (preparations), fruit and preparations of fruit and vegetables cover the fifth to ninth position in the top ten of agricultural products. All of these are re-exported relatively often and have relatively low exports of Dutch produced products compared to the number ten in the list: preparations of cereal, flour and milk, which mainly consists of baby milk powder. Baby milk powder is almost fully produced in the Netherlands. This makes preparations of cereal, flour and milk the fifth agricultural export product when re-exports are not taken into account.

### 1.1.1 Top 10 agricultural exports, 2015



Apart from agricultural products there are also exports of agriculture-related goods. These are goods produced for agricultural enterprises. The export of these agriculture-related goods amounted to 8.6 billion euros in 2015, of which 81 percent is was Dutch produced. By far the most important agriculture-related export goods are fertilisers, agricultural machinery and equipment for the food industry. Chapter 2 focuses on the trends in the international trade in agricultural and agriculture-related products.

### 1.1.2 Export agriculture-related goods, 2015

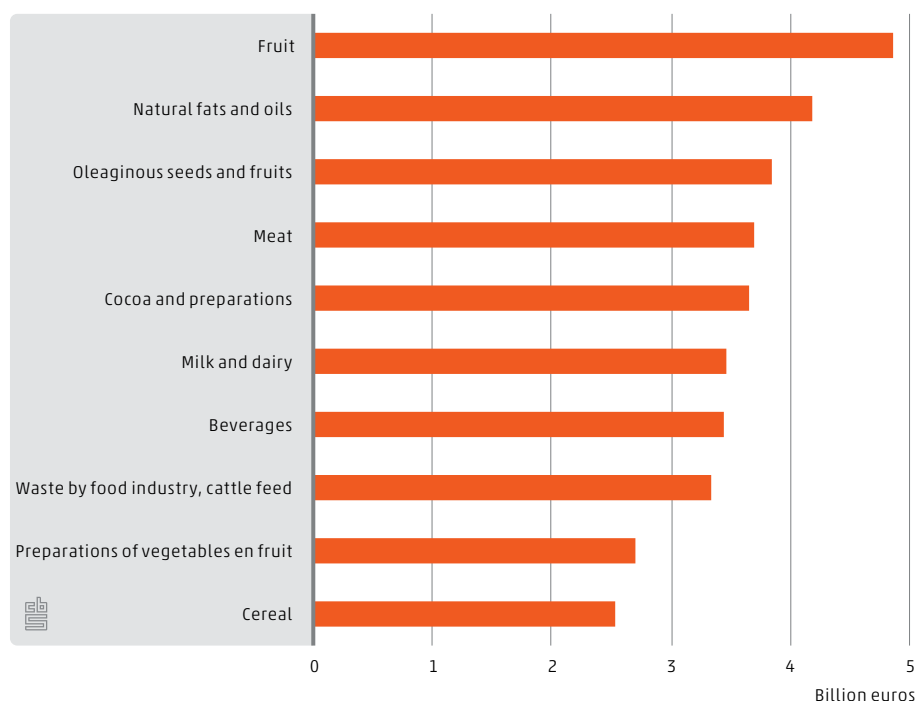


### Fruit the most imported agricultural product

On the import side, fruit was the most traded agricultural product in 2015 with an import value of 4.9 billion euros. The Netherlands gets many pineapples from Costa Rica and oranges and grapes from South Africa. Other examples of much imported agricultural products are: soy beans from Brazil and the USA, cereal and wine from France, cocoa beans from the Ivory Coast and palm oil from Malaysia.



### 1.1.3 Top 10 agricultural imports, 2015



## 1.2 Over half of the trade surplus is attributable to agriculture

About 55 percent of the Dutch trade surplus comes from the trade in agricultural products. In 2015, the agricultural surplus reached 26.1 billion euros versus 47.5 billion euros for all goods. When the agriculture-related products are taken into account, the surplus for agriculture even reaches 30.8 billion euros, which is 65 percent of the total trade surplus.

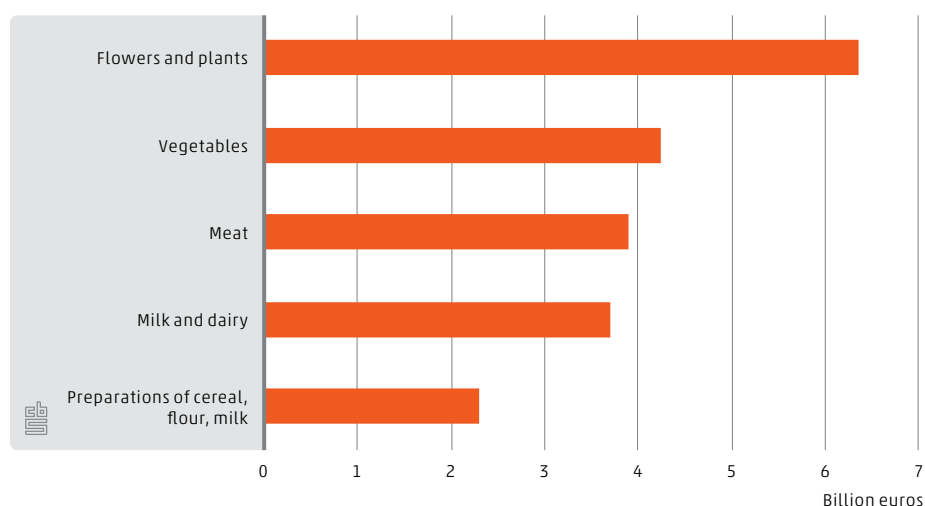
### Flowers, vegetables, meat, dairy and baby milk powder

The greatest contributors to the trade surplus are flowers, plants and other ornamentals (6.4 billion euros). The surplus is carried by the much larger exports than imports of cut flowers for floral arrangements, indoor plants, flower bulbs and

trees. The ornamentals are followed by vegetables (4.2 billion), meat (3.9 billion), milk and dairy (3.7 billion) and preparations of cereal, flour and milk (2.3 billion). The latter mainly involves the exports of Dutch baby milk powder, which is one of the main export products to China and Hong Kong. These goods together account for nearly 80 percent of the trade surplus in agricultural products.

Some agricultural products are imported far more than they are exported. These products are consumed or processed in the Netherlands and to a lesser extent produced in the Netherlands. The largest trade deficits are in cereals (2.0 billion euros), oleaginous seeds and fruits, such as soy beans (1.3 billion), fruit (0.6 billion) en coffee, tea and spices (0.5 billion).

### 1.2.1 The greatest contributors to the trade surplus in agricultural products, 2015

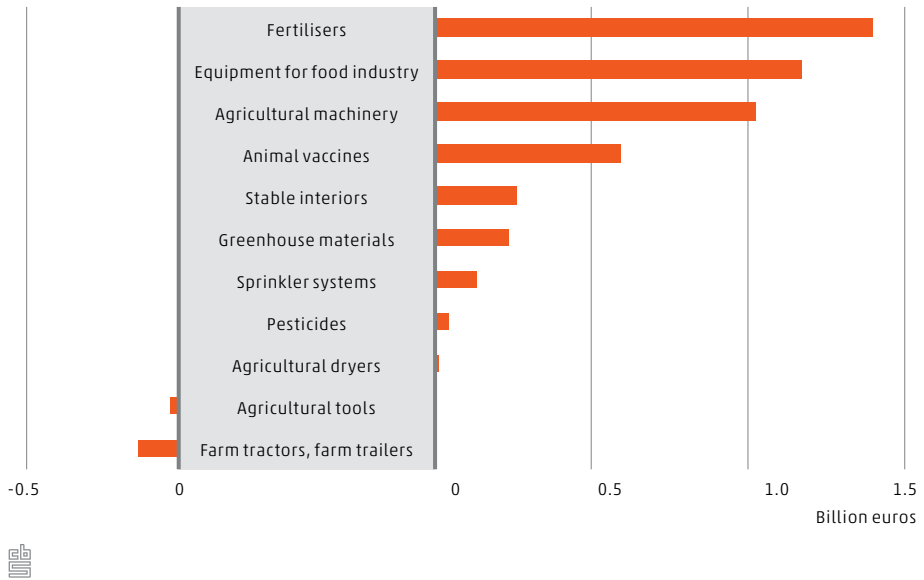


## Surplus even larger with agriculture-related products

Apart from primary agricultural products and preparations and processing of primary products, agriculture-related goods also have a significant share in the trade surplus. When these agriculture-related goods are included, the trade surplus rises from 26.1 billion to 30.8 billion euros in 2015. The share of the total Dutch agricultural surplus correspondingly increases from 55 to 65 percent.

The main contributors to the agriculture-related surplus of 4.7 billion euros are: fertilisers (1.4 billion euros), machinery for the food industry (1.2 billion), agricultural machinery (1.0 billion) and animal vaccines (0.6 billion). There is a small trade deficit in tractors and agricultural tools.

### 1.2.2 Trade balance of agriculture-related goods, 2015



### Agricultural surplus used to be even larger

The agricultural products used to be even more important for the Dutch trade surplus than in 2015. In 2000 the surplus from agriculture actually exceeded the total Dutch trade surplus (115 percent). In the following years the imports in agricultural products grew faster than the exports, and the percentage gradually decreased to the 55 percent of 2015. The trade surplus of non-agricultural products also grew fast. Even when agriculture-related goods are included, the share of agriculture in the total trade surplus is decreasing.

## 1.3 Most farmers in the provinces Noord-Brabant and Zuid-Holland

Noord-Brabant and Zuid-Holland are the provinces where most people worked in the agriculture, horticulture and fisheries in 2014. These provinces also have the most employed persons in the entire agribusiness. Zeeland is the province with the largest share of employed persons in this sector. Most people in the agribusiness work in wholesale or retail specialised in agricultural products. To correct for

seasonal employment, the average number of persons employed in a company over the whole year is used.

## People in Zeeland most often active in the primary sector

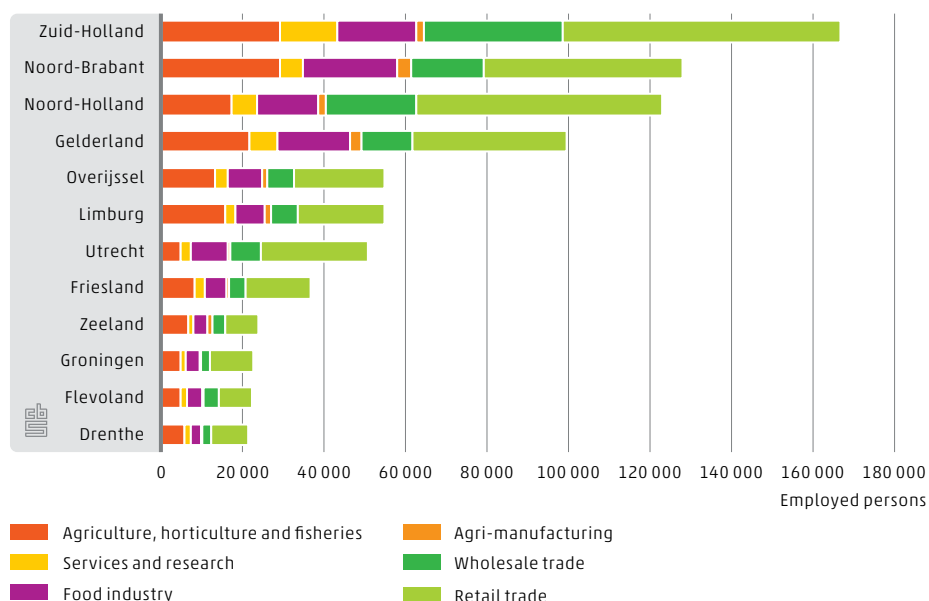
Nearly 4 percent of all employed persons in Zeeland worked in the agriculture, horticulture or fisheries in 2014. This share lies below the 3 percent level in any of the other provinces. In absolute terms most farmers and fishers work in Noord-Brabant and Zuid-Holland. Both provinces have over 29 thousand people working in the primary sector. Five years earlier Zuid-Holland was ranked first with over 31 thousand people employed in this sector. During this period, the number of employed persons in the primary sector stayed the same in Noord-Brabant.

**14%** of Zeeland population  
employed in agribusiness



Not just agriculture itself, but the entire agricultural chain – the agribusiness – is important for Zeeland. Over one in seven people there work in the primary sector or in support or supply. The provinces Flevoland and Friesland follow with 13.1 and 12.7 percent respectively. Zuid-Holland is the absolute front runner in terms of persons employed in agribusiness. In this province almost 167 thousand people earn their living in agricultural or related companies.

### 1.3.1 Number employed persons in agribusiness, by sector and province, 2014\*

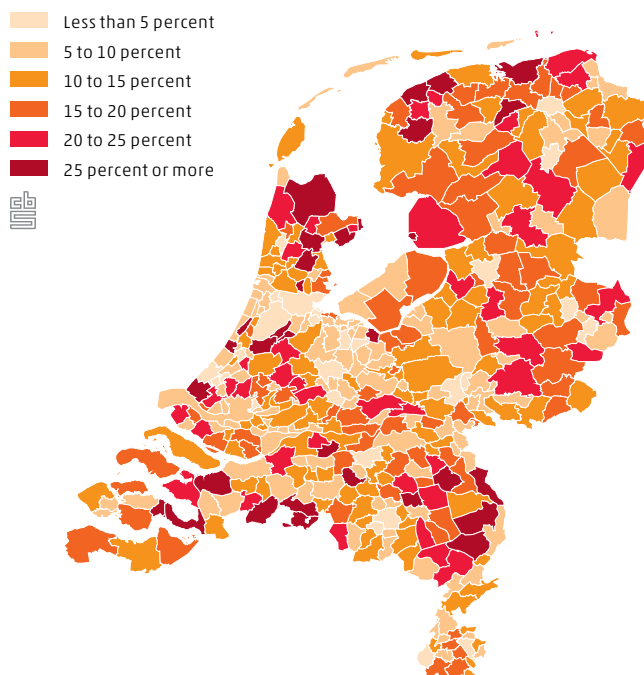


## Wholesale and retail trade are the main employers

Most people in the agribusiness work in the wholesale, market or retail trade specialised in agricultural products. In 2014 nearly 460 thousand people worked in these sectors; 57 percent of the total number of employed persons in the Dutch agribusiness. In the Randstad the trade in agricultural products dominates the agribusiness. In Noord-Holland and Utrecht, for example, two thirds of the people employed in the agribusiness work in these branches. And the branch is also sizable in Zuid-Holland with 61.3 percent.

Nearly 15 percent of the employed persons in the agribusiness work in the food and beverages industry. Noord-Brabant has the largest share of all provinces, namely 18.1 percent. In Utrecht the food and beverages industry is the second largest sector in agribusiness in the province. Only the market and retail trade employ relatively more people. Chapter 4 focuses in detail on the food and beverages industry. It examines the importance of the food and beverages industry for the industrial sector as a whole.

### 1.3.2 Share of employed persons in agribusiness, versus total per municipality, 2014\*



### Large regional differences

In 2014 nearly one in ten people in the Netherlands worked in the agribusiness. But there are large regional differences. In some municipalities the share of employed persons in the agribusiness is substantially larger. In 34 of the 403 Dutch municipalities, at least a quarter of the total number of employed persons work in the agribusiness. In 6 municipalities their share even exceeds a third: Oostzaan (46 percent), Urk (43 percent), Reimerswaal (35 percent), Zundert, Noordwijkerhout and Ferwerderadiel (all 34 percent). However, in absolute figures of employed persons these are relatively small municipalities. The top ranking municipality with over 50 thousand employed persons is Westland (in 12th place with a 30 percent share), which is well-known for its horticulture. Not surprisingly the four major cities are at the bottom of this list: Rotterdam (5.1 percent), The Hague (4.2 percent), Amsterdam (3.8 percent) and Utrecht (3.2 percent).

## 1.4 Half of all agribusiness companies innovate

The Netherlands ranks as the fifth strongest knowledge-based economy in the world. Innovation stimulates labour productivity and therefore contributes to the international competitiveness of the Netherlands. R&D forms the basis of innovation. Traditionally, R&D focuses on fundamental scientific and applied research in new knowledge and technology. Innovation is the process of translating this knowledge into commercial applications.

The Dutch agricultural sector is internationally renowned for its innovative character (OECD, 2015). In this section R&D and innovation in the Dutch agribusiness is examined and compared to the total business population and other sectors for 2014.

### Half of all companies innovate in the widest sense of the word

The widely acknowledged Oslo Manual of the OECD underlies the concept innovation in the Community Innovation Survey (OECD, 2005). The manual distinguishes several types of innovation, namely product innovation, process innovation, organisational innovation and marketing innovation, and assigns them to one of two types of innovation: technological and non-technological innovation (see glossary for additional information).

Almost half of all companies in the Netherlands were innovative in the period 2012-2014, namely 48 percent. This involves innovation in the widest sense of the word: technological and non-technological innovation. Of all Dutch companies, 19 percent were both technologically and non-technologically innovative.<sup>1)</sup> Furthermore, 18 percent of Dutch companies were only technologically innovative; and one in ten companies was exclusively non-technologically innovative.

The percentage of innovative companies in agribusiness is slightly higher than for the total Dutch business population: almost 51 percent. The ratios are also different in agribusiness. 14 percent of all agriculture-related companies are innovative in the technological and non-technological sense, while 27 percent of the Dutch

<sup>1)</sup> The literature shows that technological and non-technological innovation is the most profitable combination for a company (Schmidt en Rammer, 2007).

agribusinesses are only technologically innovative. The remaining 10 percent were exclusively innovative in non-technological domains.

So the agribusiness tends to take on less non-technological innovations than other companies, whereas the sector is almost equally active in technological innovation (41 percent of companies in agribusiness versus 37 percent of all companies).

## **Technological innovation in agribusiness mainly product innovation**

Companies are technologically innovative when they work on product and/or process innovation. Figure 1.4.1 shows the distribution of technological innovations within the various sectors, namely in manufacturing, services, agribusiness, other and total. It shows that of all companies active in technological innovations, agribusiness and manufacturing were most engaged in product innovation, 72 percent for agribusiness and 77 percent for manufacturing, versus 68 percent of all Dutch companies in the period 2012-2014. The services sector is most engaged in process innovation: 69 percent versus 67 percent of the total. Of all innovative companies in agribusiness 61 percent is involved in process innovation.

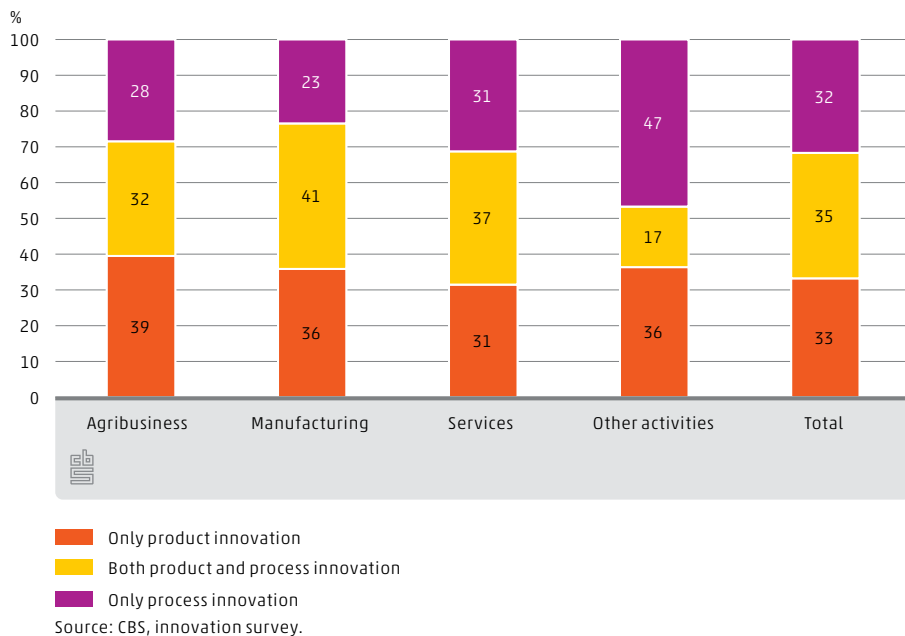
Figure 1.4.2 shows company spending on technological innovation in 2014.

Most spending is on in-company research and development by employees of the company itself. In the Dutch agribusiness spending on technological innovation is below the national average. Nearly a quarter of the budget for innovation in agribusiness is spent on R&D outsourced to other companies or institutions. Agribusiness and the other sectors spent relatively little money on purchasing knowledge from other parties, such as licences and patents. Compared to other sectors, agribusiness spent more on other costs; these include personnel training, both in-house and elsewhere, market introduction activities, design and other preparations.

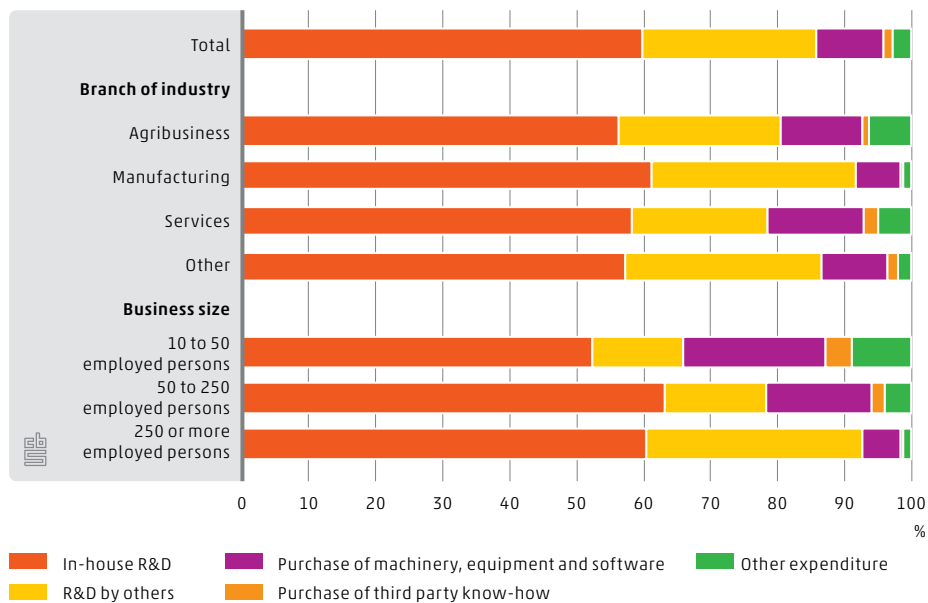
Purchasing products, such as advanced (not developed in-house) machinery, equipment and software is the largest expense for SMEs: 15.8 percent for small and 21.1 percent for medium-sized enterprises. This constitutes approximately 6 percent of the total innovation budget for major companies.



### 1.4.1 Product and process innovators, 2012-2014



### 1.4.2 Innovation expenditure, by category, 2012-2014<sup>1)</sup>



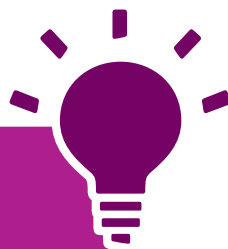
Source: CBS, innovation survey.

<sup>1)</sup> Technologically innovative companies with 10 or more employed persons.

## Agribusiness accounts for more than 5 percent of total R&D

Investments in R&D are important for gaining new insights and knowledge. The aim to innovate is characteristic for R&D. This section focuses on R&D spending and R&D personnel involved in agribusiness during 2014 and compares this with the contributions made by companies.

**5%** of R&D produced by  
agribusiness



### 1.4.3 R&D with in-house personnel: spending, labour and R&D intensity, 2014

	2014
	Million euros
<b>R&amp;D expenditure</b>	
Total	13,268
Total companies	7,433
Agribusiness <sup>1)</sup>	728
	1,000 FTE
<b>R&amp;D personnel</b>	
Total	124.1
Total companies	76.7
Agribusiness	7.1
	%
<b>R&amp;D expenditure as a percentage of GDP<sup>2)</sup></b>	
Total	2.00
Total companies	1.12
Agribusiness	0.11

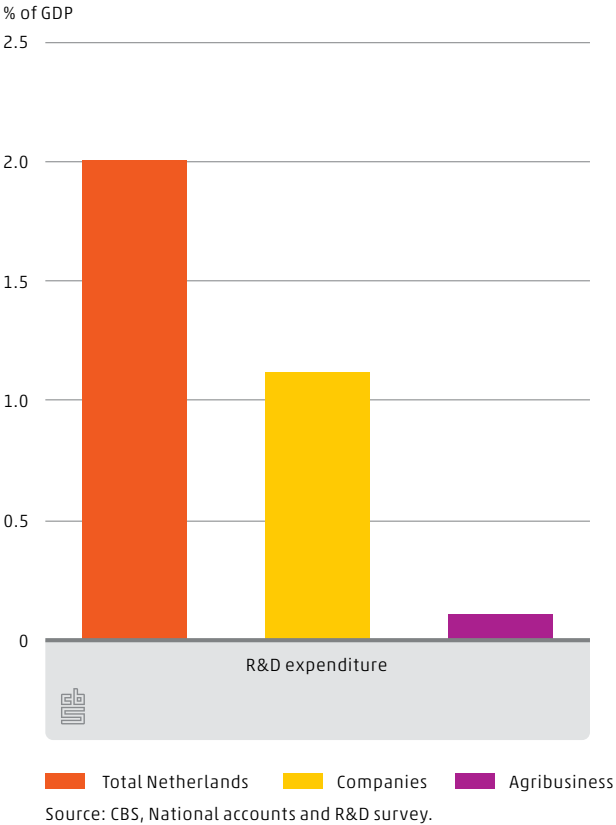
Source: CBS, National accounts and R&D survey.

<sup>1)</sup> Agribusiness companies with 10 or more employed persons.

<sup>2)</sup> R&D expenditure as a percentage of GDP is preliminary because the gross domestic product is still preliminary.

In 2014, Dutch companies and institutions spent 13.3 billion euros on R&D, see table 1.4.3. In 2014, Dutch companies contributed over half of all R&D spending in the Netherlands (56 percent). The rest of R&D spending came from the Dutch government, universities and other institutions. Companies in the agribusiness spent 5.5 percent of the total spending on R&D in the Netherlands. This means that nearly 10 percent of R&D spending in the business sector came from the agribusiness. This spending is shown in table 1.4.3 as percentages of GDP, and is graphically displayed in figure 1.4.4.

**1.4.4 R&D intensity, national and agribusiness, 2014**



In 2014 over 124 thousand FTEs were involved in R&D in the Netherlands. Most of the FTEs in R&D are company-based, namely 62 percent. The agribusiness employed 5.7 percent of these FTEs. This comes down to nearly 1 in 10 full time R&D researchers in the private sector in 2014. Companies and institutions do not always undertake R&D activities for themselves or for their own sector. Companies may well undertake R&D commissioned by the

government and public research institutes. Universities may also carry out R&D commissioned by companies (see later in this chapter).

## Most R&D in agro-industry

In the previous sections, we compared the Dutch agribusiness with other sectors and national averages and totals. In table 1.4.5 the R&D activities of agribusiness enterprises are divided by sector and company size. Within the agribusiness, manufacturing accounts for most of the spending in R&D of the agribusiness: 64 percent. This includes the manufacturers of beverages and food, but also producers of fertilisers or agricultural machinery. Within agribusiness, 41 percent of all companies engaged in R&D are in manufacturing. In the Dutch agribusiness, the average amount spent on R&D in manufacturing is 3.5 times as high as that spent in services, namely 1,106 thousand versus 320 thousand euros. This is mostly due to the technological nature of R&D in industry, which necessarily implies significant spending on equipment and laboratories.

### 1.4.5 R&D with in-house personnel: agribusiness, 2014

	R&D companies	R&D expenditure	R&D personnel
	Number of companies	Million euros	1,000 FTE
<b>Sector</b>			
Manufacturing	423	468	4.1
Services	390	99	1.2
Other facilities	215	161	1.8
<b>Company size</b>			
10 to 50 employed persons	653	76	1.2
50 to 250 employed persons	285	133	1.5
250 or more employed persons	90	519	4.4
<b>Total</b>	1,028	728	7.1

Source: CBS, R&D survey.

Another important reason for the large share of the agro manufacturing industry in R&D expenditures, is that some major industrial multinationals spend huge amounts of money on R&D, raising the share of R&D spending in agro manufacturing. Hence, they raise the average of R&D spending per company in agro manufacturing tremendously. This is shown by the average R&D spending of the companies with 250 or more employed persons, which stands at 5.8 million euros per company in 2014. Agribusiness R&D companies with 250 or more employees made up 9 percent of all R&D companies within the agribusiness in 2014, whereas they accounted for 71 percent of all R&D spending in agribusiness.

## Small agribusiness companies also contribute to R&D

Many companies involved in R&D are small companies. In part, this is because there are far more small companies than large ones. This trend is reflected in the agribusiness. Nearly 64 percent of the companies in the agribusiness that were involved in research and development in 2014, employed fewer than 50 people. These small agribusiness companies contributed 10 percent of total R&D spending in agribusiness and employed nearly 17 percent of R&D personnel in the agribusiness in 2014 (expressed in FTEs). Over a third of all agribusiness companies employ 50 or more people. These medium and large enterprises (MLEs) are characterised by higher R&D spending, both per company and per labour year. MLEs accounted for nearly 90 percent of R&D spending and 83 percent of R&D employment in agribusiness in 2014.

The publication *ICT, Kennis en Economie 2016* (IKE 2016) by Statistics Netherlands focuses in detail on technological and non-technological innovation and R&D. The publication is written in Dutch, but there is an English summary available. The authors of IKE 2016 make similar comparisons as we did in this section for the agribusiness, but focused on companies and institutions in all sectors in the Netherlands. However, the agribusiness is not explicitly analysed in IKE 2016, hence the overview that we present here is unique. We only used numbers and figures that are published in IKE 2016 when strictly necessary.



**2.**

# **Trends in the trade of agricultural products**

Author  
Pascal Ramaekers





**2nd** place for the Netherlands in the ranking of largest agricultural exporters in the world

**8.3** billion euros worth of flowers and plants exported in 2015



**Agricultural and agriculture-related products are a major part of trade between the Netherlands and other countries. This chapter describes the top trading goods, the trading partners involved as well as the imports and exports of agricultural products in which the Netherlands is specialised.**

## 2.1 Introduction

The Netherlands has an international top position in agriculture and horticulture. In order to maintain and strengthen this position it is important to expand access to the markets within and beyond the EU. The Dutch agro sector is thought to have great unused export potential (Ministry of Economic Affairs, 2014). Stimulating international trade is not only important for the Dutch economy. It also makes a substantial contribution to raising the availability of food in other countries. In this chapter, we provide details on the volume and the importance of the international trade in agricultural products by the Netherlands. The chapter starts with a definition of the concept of agricultural products. What exactly are they? Next we quantify the importance of the trade in agricultural products by comparing it with the trade in other goods. We then examine the import side. Which agricultural products are particularly important? Are the imports destined for consumption in the Netherlands, or elsewhere (re-exports)? What are the main countries of origin?

The next section focuses on the export side of the trade in agricultural products. What are the main export products? Which part of the exports is 'made in the Netherlands' and which part entails re-exports of goods produced elsewhere? What are the main countries of destination?

We then place the imports and exports within a European perspective to see the extent to which the Netherlands is specialised in specific products compared to the rest of the EU. We also make a world-wide comparison at the total level to see how the Dutch figures compare with the rest of the world.

In section 2.7 we leave the main definition of agricultural products and look at the breakdown into primary (untreated) and secondary (treated) agricultural products and the addition of tertiary (agriculture-related) goods. Here too we examine the main trends in imports and exports. We end with a specific explanation of agriculture-related goods.

## 2.2 The main definition of agricultural products

The international trade in agricultural products is traditionally defined on the basis of the "Combined Nomenclature" (CN)<sup>1)</sup>. Its first 24 chapters cover most of the traditional agricultural products.

There are also agricultural products in Chapters 29-53, under 'Other agriculture'. See the Annex (section 2.9) for the lists. By joining the first 24 Chapters and the 'Other agricultural products'<sup>2)</sup> we arrive at the 'main definition of agricultural products' referred to (see also: LEI, 2016).

In section 2.7 the agricultural products are broken down into primary (untreated) and secondary (treated) agricultural products. We also take a look at agriculture-related goods (here: tertiary agriculture). These tertiary products, such as agricultural machinery and fertilisers, fall outside the main definition.

In this entire chapter we describe the trade of goods on the basis of the trade value and border crossing. That is, how many euros worth of agricultural goods cross the Dutch border. Because of the heterogeneity in agriculture, with all its many agricultural products (which makes comparisons difficult) we have opted not to breakdown the trends in trade value into volume and price changes.

## 2.3 Imports, exports and trade balance

A comparison of the years 2000, 2005, 2010 and 2015 gives a good indication of the medium-term trends. The imports of agricultural products have more than doubled during these 15 years versus a 75 percent growth of total imports. The share of agriculture in imports rose from 12 percent in 2000 to 15 percent in 2015.

The export value of agricultural products grew almost as fast (about 85 percent) as the total export value, so that the share of agriculture remained at 19 percent.

<sup>1)</sup> The CN classification is set every year by the European Commission and is based on the "Harmonised System" of the World Customs Organization (Belastingdienst, 2016).

<sup>2)</sup> In this entire chapter we will only discuss the trade in agricultural products and not the trade in agricultural services. However, the Netherlands does trade in services related to agriculture, forestry and fisheries. Statistics Netherlands only has high level figures available on these. In 2015 the Netherlands exported 58 million euros worth of agricultural services versus services imports worth 38 million. This is substantially more than in 2014 (exports of 54 million, imports of 27 million euros).

Exports of agricultural products far exceed the imports, leading to a massive trade surplus. In 2015 the agriculture surplus was more than 26 billion euros due to exports of over 81 billion euros and imports of more than 55 billion euros. Compared to 15 years earlier, the share of agriculture in the total Dutch trade surplus did diminish though. In 2000 the agricultural share was still over 100 percent, but in the meantime it has fallen to 55 percent. This mainly has to do with the sharp increase in the trade surplus of non-agricultural products, and slightly less with the fact that imports grew faster than exports in agriculture.

### 2.3.1 Dutch trade in agricultural products and other goods

	2000	2005	2010	2015
	<b>Billion euros</b>			
<b>Imports</b>				
All goods	216	250	332	378
Agricultural products	25	29	42	55
	<b>%</b>			
Share of agriculture	12	11	13	15
	<b>Billion euros</b>			
<b>Exports</b>				
All goods	232	281	372	426
Agricultural products	44	50	68	81
	<b>%</b>			
Share of agriculture	19	18	18	19
	<b>Billion euros</b>			
<b>Trade balance</b>				
All goods	16	32	40	48
Agricultural products	18	22	26	26
	<b>%</b>			
Share of agriculture	115	69	65	55

## 2.4 Imports

### Trends in imports

The import value of agricultural products grew by a whopping 117 percent in the period 2000–2015, so it more than doubled. About two thirds can be attributed to a volume increase, and about one third to rising prices.

The import value of all goods rose between 2000 and 2015 and this is also true when the comparison is made with the more recent years (2005, 2010). The fastest growing imports were those of natural fats and oils (+3.2 billion euros), fruit (+3.0), cocoa (+2.6) and meat (+2.3). The imports of these products also grew rapidly percentage-wise. The smallest absolute growth took place with vegetable juices, plaiting materials and tobacco.

### 2.4.1 Import value of agricultural products

	2000	2005	2010	2015	Changes 2000–2015	
	Billion euros					%
<b>Agricultural products (goods chapter)</b>						
Live animals (1)	0.5	0.6	0.8	1.1	0.5	103
Meat (2)	1.4	2.0	2.9	3.7	2.3	171
Fish and other seafood (3)	1.1	1.1	1.5	1.8	0.7	66
Milk and dairy (4)	2.4	2.4	2.8	3.5	1.1	46
Other products of animal origin (5)	0.1	0.1	0.3	0.4	0.3	178
Flowers and plants (6)	1.1	1.1	1.3	1.9	0.9	82
Vegetables (7)	1.4	1.4	1.9	2.0	0.7	48
Fruit (8)	1.9	2.6	3.6	4.9	3.0	162
Coffee, tea, spices (9)	0.7	0.5	0.8	1.4	0.7	94
Cereals (10)	1.0	1.2	1.9	2.5	1.5	141
Flower, malt, starch (11)	0.2	0.2	0.5	0.7	0.4	177
Oleaginous seeds and fruits (12)	1.9	1.6	2.7	3.8	1.9	102
Vegetable juices (13)	0.1	0.1	0.1	0.1	0.0	47
Vegetable plaiting materials (14)	0.0	0.0	0.0	0.1	0.0	124
Animal or vegetable fats and oils (15)	1.0	1.8	2.8	4.2	3.2	325
Preparations of meat and fish (16)	0.6	0.7	1.2	1.4	0.8	133
Sugar and confectionary (17)	0.4	0.5	0.6	0.9	0.5	112
Cocoa and preparations (18)	1.0	1.5	2.5	3.6	2.6	261
Preparations of cereal, flour, milk (19)	0.7	0.9	1.2	1.7	1.1	158
Preparations of vegetables and fruit (20)	1.5	1.2	2.0	2.7	1.2	83
Other edible preparations (21)	0.7	0.9	1.3	1.9	1.2	182
Beverages (22)	1.4	1.8	2.6	3.4	2.0	147
Residues food industry, animal fodder (23)	1.3	1.5	2.8	3.3	2.1	164
Tobacco and tobacco substitutes (24)	1.1	1.0	1.2	1.3	0.2	20
Other agriculture	2.1	2.0	2.7	2.9	0.8	36
<b>Total agriculture</b>	<b>25.4</b>	<b>28.6</b>	<b>42.0</b>	<b>55.2</b>	<b>29.7</b>	<b>117</b>

The most imported agricultural products in 2015 were fruit (4.9 billion euros), natural fats and oils (4.2), oleaginous seeds and fruits (3.8), meat (3.7) and cocoa (products) with an import value of 3.6 billion euros. Most of the imports of oleaginous seeds and fruits consist of soy beans from Brazil and the United States. Soya is not only used for direct consumption (food, cosmetics, fuels) but it is also re-exported, often processed in meat and dairy products (PBL, 2012).

## Imports for re-exports and for the Dutch market

Statistics Netherlands can break down the imports of goods into 'imports for the domestic market' and imports for re-exports' thanks to a new estimation method. The former concerns consumption as well as imports for intermediate use. The latter concerns imports for re-exports abroad involving goods produced abroad which will be transported abroad without any significant treatment in the Netherlands.

The calculations by Statistics Netherlands are estimates, but they give a fair indication of the destination of the imports of agricultural products. Over a third of the agricultural imports are destined for re-exports and almost two thirds for the domestic market. Goods that are mostly imported for the Dutch market are cereal (90 percent for the Dutch market), flour (88 percent), vegetable juices (82 percent) and meat (81 percent). Flowers and plants<sup>3)</sup> (49 percent imported for re-exports) and fruit (54 percent) on the other hand are important products with a relatively high re-export component.

<sup>3)</sup> The estimate for the (import for) re-exports of flowers and plants came about with figures supplied by FloraHolland (2016). Re-exports of flowers and plants consists mainly of foreign roses originated in Kenia and Ethiopia, sold at auction in the Netherlands.

## 2.4.2 Import value agricultural products by destination, 2015

	Import value	of which for re-exports	of which for Dutch market
	Billion euros	%	
<b>Agricultural products (goods chapter)</b>			
Live animals (1)	1.1	23	77
Meat (2)	3.7	19	81
Fish and other seafood (3)	1.8	31	69
Milk and dairy (4)	3.5	31	69
Other products of animal origin (5)	0.4	60	40
Flowers and plants (6)	1.9	49	51
Vegetables (7)	2.0	38	62
Fruit (8)	4.9	54	46
Coffee, tea, spices (9)	1.4	28	72
Cereals (10)	2.5	10	90
Flower, malt, starch (11)	0.7	12	88
Oleaginous seeds and fruits (12)	3.8	35	65
Vegetable juices (13)	0.1	18	82
Vegetable plaiting materials (14)	0.1	31	69
Animal or vegetable fats and oils (15)	4.2	21	79
Preparations of meat and fish (16)	1.4	21	79
Sugar and confectionary (17)	0.9	28	72
Cocoa and preparations (18)	3.6	41	59
Preparations of cereal, flour, milk (19)	1.7	25	75
Preparations of vegetables and fruit (20)	2.7	44	56
Other edible preparations (21)	1.9	49	51
Beverages (22)	3.4	34	66
Residues food industry, animal fodder (23)	3.3	44	56
Tobacco and tobacco substitutes (24)	1.3	45	55
Other agriculture	2.9	24	76
<b>Total agriculture</b>	<b>55.2</b>	<b>34</b>	<b>66</b>

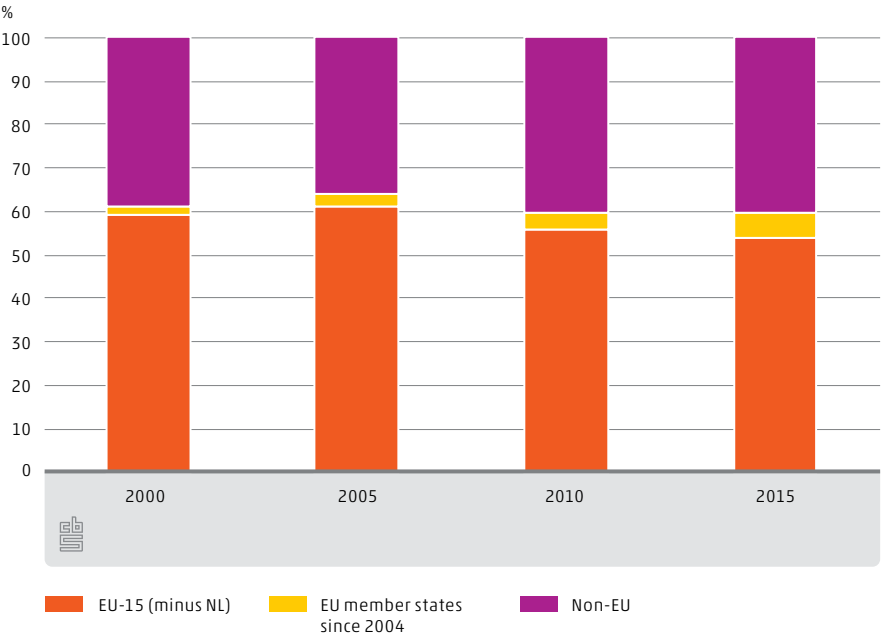
## Main countries of origin

The imports of agricultural products are very stable in terms of their EU and non-EU distribution<sup>4)</sup>. In the period 2000–2015 the share of the current 28 EU countries in total Dutch imports only decreased slightly from 61 to 60 percent. If the exact distribution among the EU countries is examined a bit closer, there are some observable shifts. There is a sharp increase in the importance of the new EU countries (member states since 2004) from 2 to 6 percent, whereas the

<sup>4)</sup> All these years refer to the current 28 EU member states (minus the Netherlands), also in the breakdown 'old' and 'new'. EU countries we take the same number of countries, regardless of the EU extensions between 2000 and 2015, to make accurate comparisons. See Glossary.

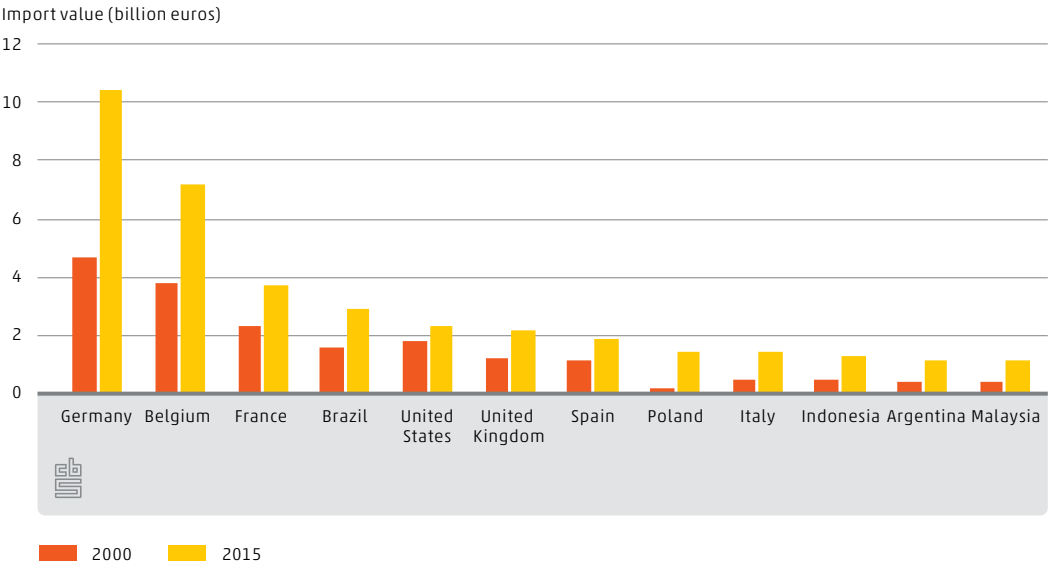
share of the traditional EU countries (EU-15 minus the Netherlands fell from 59 to 54 percent). Imports from Poland have shot up over the last 15 years, increasing almost tenfold from 152 million euros in 2000 to 1.45 billion euros in 2015. Nearly half of the imports from all 13 new member states come from Poland. There are also sharp increases in the imports from Lithuania (12 times greater), Romania (factor 20) and Bulgaria (factor 18), but the amounts involved are modest.

**2.4.3 Import value of agricultural products by origin**



Poland now ranks as the eight largest importer of agricultural products. This mainly concerns the imports of meat, dairy and tobacco products. The neighbouring countries account for almost a third of the Dutch imports of agricultural products. The top seven consists of Germany (dairy), Belgium (meat), France (cereal and wine), Brazil, USA (both soy beans), United Kingdom (meat, dairy and beverages) and Spain (vegetables and fruit). After Poland there is Italy (fruit and wine), Indonesia (palm oil, CBS (2016)), Argentina (cattle feed) and Malaysia (palm oil). These twelve main countries of origin together account for a whopping two thirds of total Dutch agricultural imports.

### 2.4.4 Main countries of origin for agricultural products



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times more imports from Poland than 15 years

## 2.5 Exports

### Trends in exports

The export value of agricultural products rose by 86 percent in the period 2000–2015, quite a bit less than we saw earlier in imports (117 percent). This is in line with the earlier conclusion that the share of agricultural products in total trade did increase for imports but not for exports. Like imports, about two thirds of the growth in export value comes from volume increases and about a third from a price rises.



The export value of all agricultural products except tobacco and tobacco products was higher in 2015 than in 2000. This comes as no surprise given the world-wide decline in the use of tobacco products and the closure of Dutch tobacco companies. The fastest absolute growth was in the export of cocoa and cocoa preparations (+3.0 billion euros), vegetables (+2.9) and fruit (+2.8). The Netherlands has the largest cocoa processing industry in the world, making Amsterdam the largest cocoa port in the world (PBL, 2012). Most imported cocoa beans, paste and butter come from African countries like Ivory Coast, Ghana, Cameroon and Nigeria. On the export side the Netherlands not only exported chocolate but also cocoa butter, cocoa powder, fat and oil. Including re-exports, flowers and plants (8.3 billion euros export) meat (7.6 billion), milk and dairy (7.2 billion) and vegetables (6.3 billion) are the top agricultural export products of 2015.

### 2.5.1 Export value of agricultural products

	2000	2005	2010	2015	Changes 2000–2015	
	Billion euros					%
<b>Agricultural products (goods chapter)</b>						
Live animals (1)	0.8	1.3	1.9	1.9	1.1	132
Meat (2)	4.9	5.0	6.1	7.6	2.7	56
Fish and other seafood (3)	1.5	1.9	1.9	2.4	0.9	57
Milk and dairy (4)	4.7	4.6	6.3	7.2	2.5	53
Other products of animal origin (5)	0.2	0.2	0.4	0.5	0.3	116
Flowers and plants (6)	6.3	7.2	7.8	8.3	1.9	30
Vegetables (7)	3.4	4.0	5.8	6.3	2.9	84
Fruit (8)	1.4	2.3	3.3	4.2	2.8	195
Coffee, tea, spices (9)	0.2	0.3	0.6	0.9	0.6	261
Cereals (10)	0.2	0.3	0.4	0.5	0.3	131
Flower, malt, starch (11)	0.5	0.4	0.5	0.7	0.2	47
Oleaginous seeds and fruits (12)	0.9	1.2	1.9	2.6	1.7	186
Vegetable juices (13)	0.1	0.1	0.1	0.1	0.0	29
Vegetable plaiting materials (14)	0.0	0.0	0.0	0.0	0.0	871
Animal or vegetable fats and oils (15)	1.4	1.9	3.5	4.0	2.6	184
Preparations of meat and fish (16)	0.8	0.8	1.0	1.5	0.6	77
Sugar and confectionary (17)	0.7	0.8	1.0	1.4	0.7	96
Cocoa and preparations (18)	1.6	2.1	3.6	4.6	3.0	192
Preparations of cereal, flour, milk (19)	1.3	1.5	2.4	4.0	2.7	204
Preparations of vegetables and fruit (20)	2.2	2.3	3.3	4.1	1.9	89
Other edible preparations (21)	1.5	2.1	2.9	4.2	2.7	188
Beverages (22)	2.0	2.4	3.5	4.7	2.7	136
Residues food industry, animal fodder (23)	2.2	2.6	3.9	4.7	2.5	116
Tobacco and tobacco substitutes (24)	3.2	3.3	3.1	2.1	-1.1	-35
Other agriculture	1.6	1.7	2.3	2.9	1.3	82
<b>Total agriculture</b>	<b>43.7</b>	<b>50.3</b>	<b>67.6</b>	<b>81.3</b>	<b>37.6</b>	<b>86</b>

## Exports and re-exports of Dutch products

There are no Dutch re-export figures available for 2000, but there are for 2005 and later years. The figures from 2005 onwards show that the fast growth in the fruit exports can mostly be explained by the rise in re-exports. The Netherlands earns relatively little<sup>5)</sup> from the increased fruit exports. In the case of cocoa (products) over half of the export growth comes from re-exports. The strong growth in vegetables comes from Dutch products.

The largest growth in exports of Dutch products between 2005 and 2015 came from meat (+2.4 billion), preparations of cereal, flour and milk (2.3 billion), milk and dairy (+2.1 billion) and vegetables (+2.00). In the case of preparations of cereal, flour and milk this mainly consists of the export increase of Dutch baby milk powder to China and Hong Kong. This export flow increased fifty-fold within a decade (CBS, 2015).

Apart from the re-export flows where a Dutch company becomes the temporary owner of the goods during the transit through the Netherlands, there is also the quasi-transit trade<sup>6)</sup> where a foreign company remains the owner throughout the entire transit period.

By excluding quasi-transit trade and re-exports we get a picture of the major Dutch produced agricultural export products. Just like the total Dutch exports these consist predominantly of flowers and plants (7.2 billion euros), meat (6.8 billion), milk and dairy (6.0 billion) and vegetables (5.4 billion). These were also the dominant products in 2005, when total agricultural exports excluding quasi-transit trade consisted for 74 percent of Dutch produced products and for 26 percent of re-exports of products of foreign origin. The quasi-transit trade of agricultural products is a relatively modest flow, which is only substantial in the case of fruit (1.1 billion).

<sup>5)</sup> One euro in re-exports adds an average of 10.6 eurocents to the economy. This is less than a fifth of the yield per euro of exported Dutch produced goods, which contributes an average of 56.6 eurocents. These are the results of the most recent calculations by Statistics Netherlands (figures on 2014).

<sup>6)</sup> The quasi-transit trade is traditionally kept out of the Dutch import and export figures, unlike the re-exports. This is because the Dutch economy earns far less per euro of exports on the quasi-transit trade than on re-exports. This has to do with the fact that the goods in transit remain in foreign ownership Eurostat publishes Dutch trade figures including quasi-transit trade.

## 2.5.2 Export value of agricultural products by origin, 2015

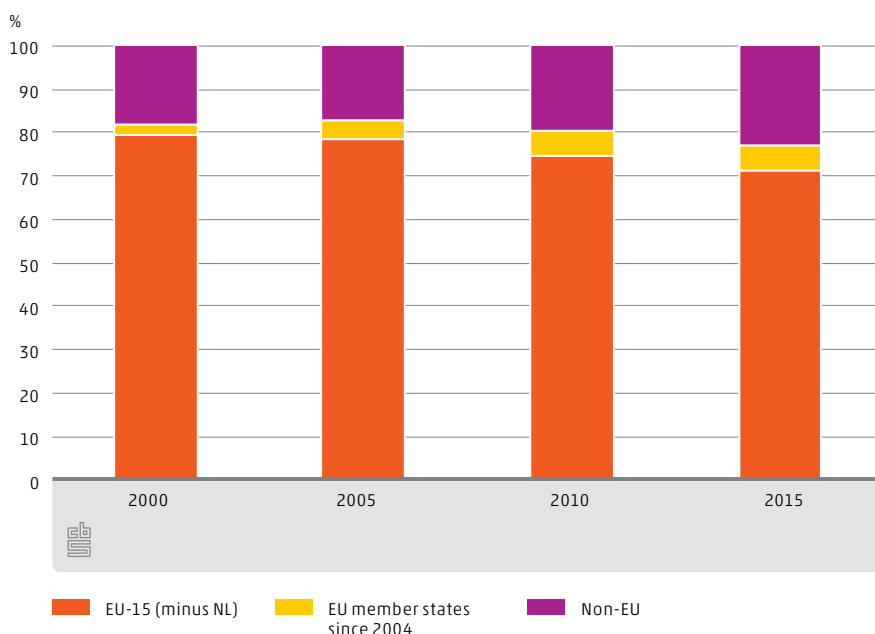
	Exports with quasi transit trade	Quasi transit trade	Exports without quasi transit trade	Re-exports	Exports of Dutch products
	Billion euros				
<b>Agricultural products (goods chapter)</b>					
Live animals (1)	1.9	0.0	1.9	0.3	1.6
Meat (2)	8.0	0.4	7.6	0.8	6.8
Fish and other seafood (3)	3.1	0.7	2.4	0.6	1.8
Milk and dairy (4)	7.2	0.0	7.2	1.2	6.0
Other products of animal origin (5)	0.5	0.0	0.5	0.3	0.2
Flowers and plants (6)	8.4	0.1	8.3	1.0	7.2
Vegetables (7)	6.4	0.1	6.3	0.9	5.4
Fruit (8)	5.3	1.1	4.2	3.2	1.0
Coffee, tea, spices (9)	0.9	0.1	0.9	0.4	0.5
Cereals (10)	0.5	0.0	0.5	0.3	0.2
Flower, malt, starch (11)	0.7	0.0	0.7	0.1	0.6
Oleaginous seeds and fruits (12)	2.6	0.1	2.6	1.5	1.0
Vegetable juices (13)	0.1	0.0	0.1	0.0	0.0
Vegetable plaiting materials (14)	0.0	0.0	0.0	0.0	0.0
Animal or vegetable fats and oils (15)	4.2	0.2	4.0	1.0	3.0
Preparations of meat and fish (16)	1.5	0.1	1.5	0.3	1.1
Sugar and confectionary (17)	1.4	0.0	1.4	0.3	1.1
Cocoa and preparations (18)	4.8	0.2	4.6	1.8	2.8
Preparations of cereal, flour, milk (19)	4.1	0.0	4.0	0.5	3.5
Preparations of vegetables and fruit (20)	4.5	0.4	4.1	1.4	2.8
Other edible preparations (21)	4.3	0.1	4.2	1.0	3.2
Beverages (22)	4.9	0.2	4.7	1.4	3.4
Residues food industry, animal fodder (23)	4.8	0.2	4.7	1.7	3.0
Tobacco and tobacco substitutes (24)	2.1	0.0	2.1	0.7	1.4
Other agriculture	3.2	0.3	2.9	0.8	2.1
<b>Total agriculture</b>	<b>85.5</b>	<b>4.2</b>	<b>81.3</b>	<b>21.5</b>	<b>59.8</b>

## Main countries of destination

The EU is even more important for Dutch exports of agricultural products than it is for their imports. In 2000 no less than 82 percent of the agricultural exports were destined for the current 28 EU member states (minus the Netherlands).

The importance of EU exports decreased more than the imports though, to 77 percent. As was the case with imports, there is an opposite pattern between the pre and the post 2004 EU member states. Here too, the share of the 13 latest EU additions triples between 2000 and 2015 to 6 percent.

### 2.5.3 Export value of agricultural products by destination



Poland is also the only new EU country that is of great importance for Dutch agricultural exports. It ranks eight again, just like with imports. Germany remains by far the dominant destination of agricultural exports. Belgium ranks second. and the United Kingdom has overtaken France in the ranking of top destinations. Italy is the only top 12 country to which the Netherlands exported less in 2015 than 15 years before.

The character of the export trend is different for each country.

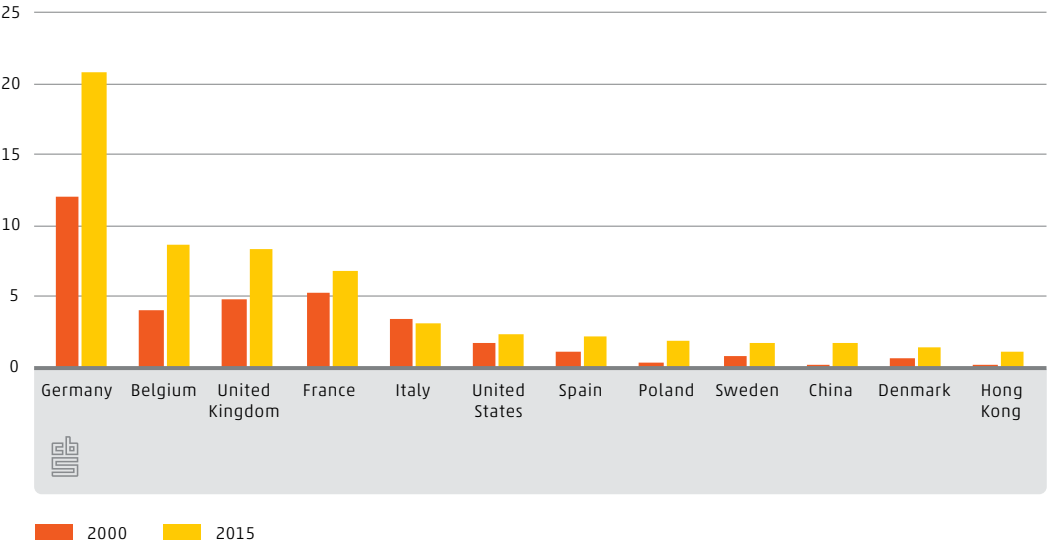
Dutch re-exports of agricultural products to Germany. Belgium. France. Italy and the USA grew particularly fast. In other countries the export growth of Dutch produced goods dominated.

Meat, flowers and plants, milk and dairy and vegetables are the major export products to the twelve main destinations. Fruit is also exported a great deal. but this mainly consists of re-exports of foreign fruit. The exports to China and Hong Kong are dominated by baby milk powder and the exports to the USA by beer.

The agricultural exports to Russia are still hindered by the Russian boycott of Dutch food products that came into power in August 2014. In 2015 the Netherlands exported about 30 percent less in value than in 2014: 861 billion euros instead of 1.232 billion. In 2010 it was even more at 1.355 million euros. However the exports were higher in 2015 than in 2005 (820 million euros). The Russian boycott hit the exports of vegetables, milk and dairy and also flowers and plants hardest.

### 2.5.4 Main countries of destination for agricultural products

Export value (billion euros)



## 2.6 Import and export specialisation

The Balassa index is used to determine the extent to which a country is specialised in the imports or exports of specific goods. Here we calculated the index by dividing the share of agricultural products in the total imports or exports of the Netherlands by their share in the total imports or exports of the other EU countries. If the Balassa index is higher than 1, it means that the Netherlands is specialised more than the rest of the EU in that product's imports or exports. If the index is below 1, the Netherlands is specialised less than the rest of the EU in that product's imports or exports.

For the total imports of agricultural products, the Netherlands is 22 percent more specialised in agricultural imports than the other 27 EU countries put together. The share of the agricultural imports in total imports is higher (13.1 percent) than the share of these products in the total EU imports (10.7 percent). We used the Eurostat figures to make a proper international comparison, including the quasi-transit trade. The regular figures by Statistics Netherlands do not include quasi-transit trade. This is why the Dutch shares here differ slightly from the shares shown earlier in this chapter.

At the product level, the Netherlands is primarily specialised in the imports of oleaginous seeds and fruits (index 2.3). These include soy beans as well as peanuts and sunflower seeds. Likewise the Netherlands is specialised in the imports of flowers and plants (2.2) such as roses, plaiting materials such as bamboo and natural fats and oils such as palm oil (both 2.0) and cocoa (products) such as cocoa beans (1.9). The Netherlands is clearly less specialised than the rest of the EU in the imports of vegetable juices (index 0.6), fish and other seafood, coffee, tea and spices and preparations of cereal, flour en milk (all 0.8).

### 2.6.1 Dutch import specialisation in agricultural products. 2015

	Share in total Dutch imports	Share in total imports in EU-28 minus NL	Balassa index
	%		Ratio columns
<b>Agricultural products (goods chapter)</b>			
Live animals (1)	0.2	0.2	1.4
Meat (2)	0.9	0.8	1.2
Fish and other seafood (3)	0.6	0.7	0.8
Milk and dairy (4)	0.8	0.7	1.1
Other products of animal origin (5)	0.1	0.1	1.3
Flowers and plants (6)	0.5	0.2	2.2
Vegetables (7)	0.5	0.5	0.9
Fruit (8)	1.3	0.9	1.5
Coffee, tea, spices (9)	0.3	0.4	0.8
Cereals (10)	0.6	0.4	1.5
Flower, malt, starch (11)	0.2	0.1	1.8
Oleaginous seeds and fruits (12)	0.9	0.4	2.3
Vegetable juices (13)	0.0	0.0	0.6
Vegetable plaiting materials (14)	0.0	0.0	2.0
Animal or vegetable fats and oils (15)	1.0	0.5	2.0
Preparations of meat and fish (16)	0.3	0.4	0.9
Sugar and confectionary (17)	0.2	0.2	0.9
Cocoa and preparations (18)	0.8	0.4	1.9
Preparations of cereal, flour, milk (19)	0.4	0.5	0.8
Preparations of vegetables and fruit (20)	0.7	0.5	1.4
Other edible preparations (21)	0.4	0.4	1.0
Beverages (22)	0.8	0.8	1.0
Residues food industry, animal fodder (23)	0.8	0.6	1.4
Tobacco and tobacco substitutes (24)	0.3	0.3	0.9
Other agriculture	0.8	0.8	1.0
<b>Total agriculture</b>	<b>13.1</b>	<b>10.7</b>	<b>1.2</b>

Source: Eurostat.

The differences with the EU are a lot greater on the export side than on the import side. The Balassa index is 1.7 with a Dutch agricultural share of 17 percent and a

European share of 10 percent. Here we have to indicate that the Netherlands has more and quasi-transit trade than the other EU countries. However, the exact EU figure without these two flows is not known.

The differences with the EU at the product level are also great. The Netherlands is 20 times more specialised in flower and plant exports than the rest of the EU. This is the agricultural export product in which the Netherlands is by far the most specialised. This is followed by plaiting materials (index 5.1), vegetables (3.5), oleaginous seeds and fruits (2.5), cocoa (preparations) and waste from the food industry (both 2.4).

## 2.6.2 Dutch export specialisation in agricultural products. 2015

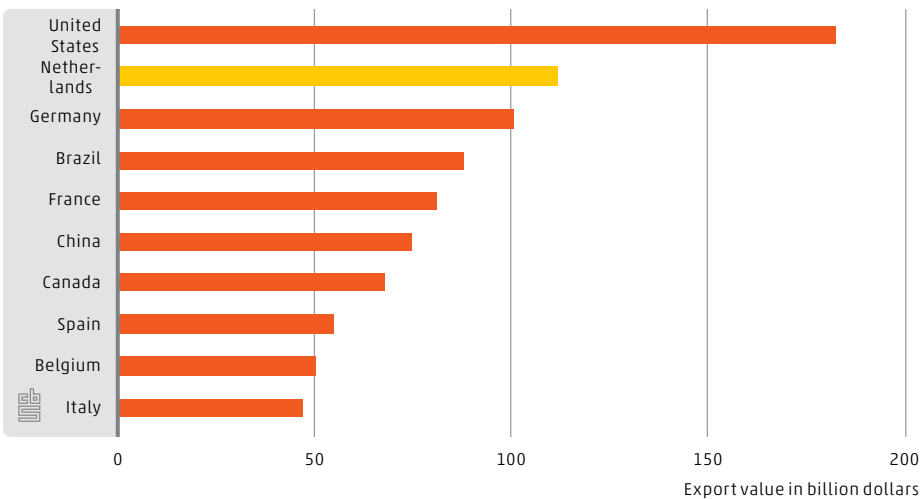
	Share in total Dutch exports	Share in total imports from EU-28 (minus NL)	Balassa index
	%		Ratio columns
<b>Agricultural products (goods chapter)</b>			
Live animals (1)	0.4	0.2	1.9
Meat (2)	1.6	0.8	1.9
Fish and other seafood (3)	0.6	0.4	1.5
Milk and dairy (4)	1.4	0.8	1.7
Other products of animal origin (5)	0.1	0.1	1.8
Flowers and plants (6)	1.6	0.1	19.8
Vegetables (7)	1.2	0.4	3.5
Fruit (8)	1.0	0.5	2.0
Coffee, tea, spices (9)	0.2	0.2	0.9
Cereals (10)	0.1	0.5	0.2
Flower, malt, starch (11)	0.1	0.1	1.0
Oleaginous seeds and fruits (12)	0.5	0.2	2.5
Vegetable juices (13)	0.0	0.1	0.4
Vegetable plaiting materials (14)	0.0	0.0	5.1
Animal or vegetable fats and oils (15)	0.8	0.4	2.1
Preparations of meat and fish (16)	0.3	0.3	1.0
Sugar and confectionary (17)	0.3	0.2	1.3
Cocoa and preparations (18)	0.9	0.4	2.4
Preparations of cereal, flour, milk (19)	0.8	0.7	1.2
Preparations of vegetables and fruit (20)	0.9	0.4	2.1
Other edible preparations (21)	0.8	0.5	1.7
Beverages (22)	1.0	1.3	0.8
Residues food industry, animal fodder (23)	0.9	0.4	2.4
Tobacco and tobacco substitutes (24)	0.4	0.3	1.3
Other agriculture	0.9	0.9	1.0
<b>Total agriculture</b>	<b>17.0</b>	<b>10.1</b>	<b>1.7</b>

Source: Eurostat.

## The Netherlands compared to the rest of the world

If we compare the Netherlands with all other countries it turns out that the Netherlands is the second agricultural exporter in the world (WTO. 2015). The United States exported by far the most agricultural products, worth 182 billion dollars in 2014. The Netherlands follows at a respectable distance (112 billion dollar) followed by Germany (101), Brazil (88), France (81) and China (74), Canada, Spain, Belgium and Italy complete the top ten. Dutch exports in 2014 were good for 6.3 percent of exports worldwide.

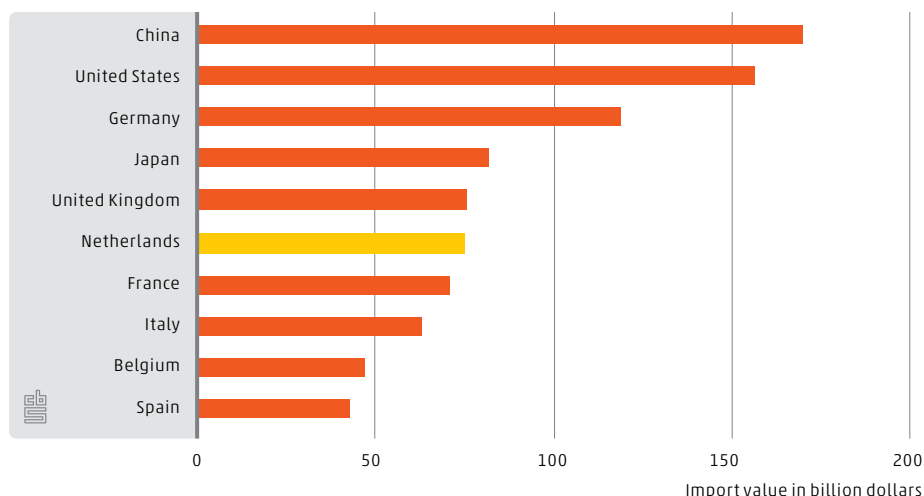
### 2.6.3 Top 10 agricultural exporters, 2014



Worldwide there were five countries importing more agricultural products than the Netherlands, with 75 billion dollars in 2014 (WTO. 2015). These are: China (170 billion dollars), USA (157), Germany (119), Japan (82) and the United Kingdom (76). France, Italy, Belgium and Spain are also in the imports top ten. About 4 percent of the worldwide imports in 2014 were goods destined for the Netherlands.



### 2.6.4 Top 10 agricultural importers, 2014



## 2.7 Primary, secondary and tertiary agricultural goods

In the previous sections we looked at the total trade in agricultural products without distinguishing between untreated agricultural products with a direct link with the primary sector and goods that are considered treatments and preparations of unprocessed agricultural products. In this section we will look at that distinction<sup>7)</sup> by breaking down the main definition into primary' (untreated) agricultural products and secondary (treated) agricultural products. We will also look at agriculture-related goods. These are goods that are important for the production in the agricultural sector. We call these 'tertiary agricultural products'. See the Annex for the list.

<sup>7)</sup> In most cases it was quite simple to break down the main definition into primary and secondary agricultural products. However, in some cases they were not so simple to classify, at which point we opted for the most logical option, in line with the definition. It was also difficult to come up with an all encompassing list of tertiary agricultural products because some products are used within agriculture as well as in other sectors. We opted for only those products that are primarily used in agriculture and to a lesser extent by the other sectors.

## Trends in imports

Dutch imports of agricultural products consist for 53 percent of secondary agriculture such as preparations of meat and dairy products, and for 40 percent of primary agricultural products such as flowers or vegetables. Tertiary agriculture does not play a major role in this. Its share is just under 7 percent, which is exactly the same level as 15 years earlier. Secondary agriculture has become more important in recent years. Its share has increased by 5 percent points between 2000 and 2015. The share of primary agriculture on the other hand fell by 5 percent points from 45 percent in 2000 to 40 percent in 2015. The largest shift in either development took place between 2000 and 2005 though. During this period the imports of secondary products increased faster than the imports of primary products. The imports of cocoa products, prepared oils and fats, cattle feed and meat preparations soared at that time.

### 2.7.1 Import value of agricultural products by type of goods



Relatively speaking, primary agricultural products are imported least and tertiary agricultural products are imported most from the rest of the EU. In 2015 some 51 percent of the imported primary agricultural products originated in the EU. This share stood at 79 percent for tertiary agriculture. In the last decade the imports

of primary and secondary agricultural products have focussed more on countries outside the EU, despite the growing share of the new EU countries. The number of top suppliers from outside the EU has shot up in the last ten years. In 2005 only Brazil and the USA exported for more than a billion euros worth of primary or secondary agricultural products to the Netherlands. In 2015 there were no fewer than five countries: apart from Brazil and the USA there were also Argentina, Indonesia and Malaysia. In contrast, the tertiary agricultural products have increasingly come from within the EU in recent years after a downward trend in the years before.

**2.7.2 Share of EU-28 in the import value of agricultural products**

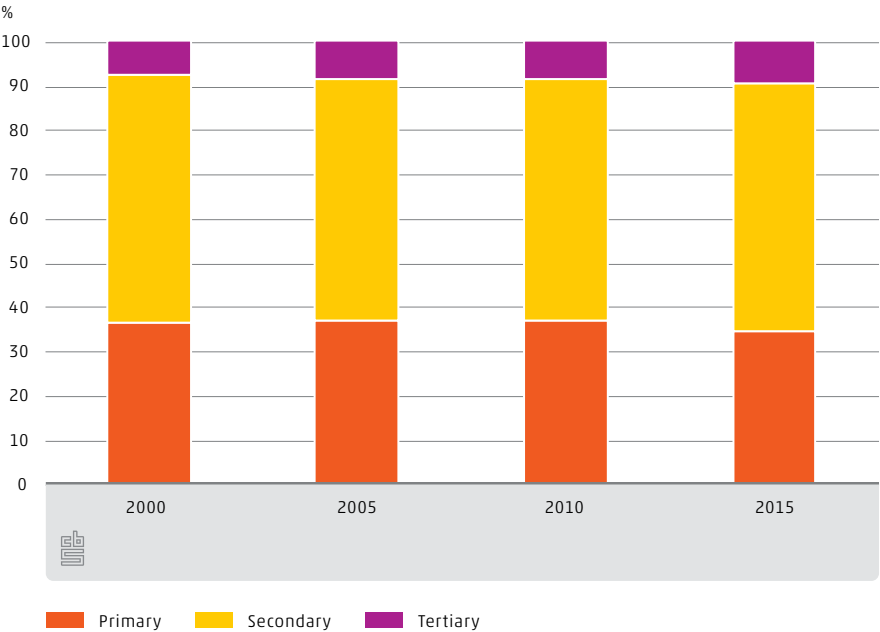


**Trends in exports**

Secondary agricultural products are even more important in the exports than in the imports of Dutch agricultural products. About 56 percent of total exports consist of secondary agricultural products. This share has been fairly consistent over time. The share of primary agricultural products has diminished slightly, just like imports did from 37 percent in 2000 to 35 percent in 2015. The tertiary agricultural products

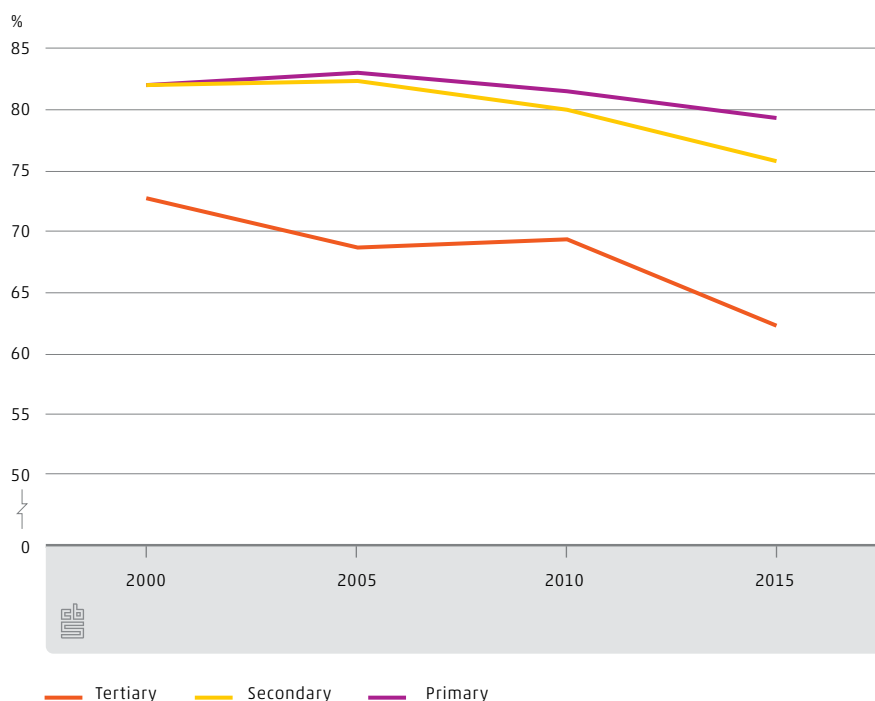
are becoming more and more important for the exports. Their share rose steadily from 7.5 percent in 2000 to 9.6 percent in 2015.

**2.7.3 Export value of agricultural products by type of goods**



The focus on the EU in the exports of primary and secondary agricultural products is nearly identical over time. In 2000, 82 percent of the exports of the two types of agricultural products were directed towards the EU. Despite the increasing share of exports to new EU countries, the total EU share fell. This is particularly true for secondary products. The explosive growth in the exports of baby milk powder to China and Hong Kong plays a role in this. The tertiary agricultural products are directed far less at the EU, and their EU share over time fell fastest, from 73 percent in 2000 to 62 percent in 2015.

## 2.7.4 Share of EU-28 in the export value of agricultural products



## The trade in tertiary agricultural products explained further

The primary and secondary agricultural products together make up the main definition of agricultural products. We did not yet discuss tertiary agricultural products in detail. The export side is especially interesting, because we saw the tertiary share increase over time, because there is a link with the exports of technological knowledge and because the focus has shifted to distant countries. The main tertiary agricultural products in imports are fertilisers, agricultural machinery and pesticides. The exports not only include fertilisers and agricultural machinery but also machinery for the food industry. These goods have a low re-export percentage. This is in fact true for the entire exports of tertiary agricultural products. No less than 81 percent of the export is produced in the Netherlands. Only tractors, trailers and agricultural tools are predominantly made abroad.

## 2.7.5 Trade balance in tertiary agricultural products. 2015

	Import value	Export value	of which re-exports	Trade balance
	Billion euros		%	Billion euros
Pesticides	0.62	0.66	35	0.04
Greenhouse materials	0.51	0.74	15	0.23
Agricultural dryers	0.00	0.01	5	0.01
Agricultural tools	0.06	0.04	55	-0.02
Agricultural machinery	0.91	1.93	17	1.02
Farm tractors, farm trailers	0.42	0.30	52	-0.12
Equipment for food industry	0.36	1.53	9	1.17
Fertilisers	0.86	2.25	25	1.39
Sprinkler systems	0.04	0.17	8	0.13
Stable interiors	0.03	0.29	4	0.26
Animal vaccines	0.14	0.73	8	0.59
Total	3.93	8.64	19	4.71

One look at the trade balance of the tertiary agricultural products shows that the Netherlands has a large surplus for these products. The main export products we mentioned contributed to this, but also the trade animal vaccines and to a lesser extent the trade in greenhouse materials and stable interiors.

The same goods show up when we make the comparison with the year 2000.

The main growth is in fertilisers (+1.4 billion euros), agricultural machinery (+1.2 billion) machinery for the food industry (+0.9 billion), and animal vaccines (0.5 billion).

## 2.7.6 Trends in the export value of tertiary agricultural products

	Export value 2000	Export value 2015	Changes
	Billion euros		
Pesticides	0.39	0.66	0.27
Greenhouse materials	0.47	0.74	0.27
Agricultural dryers	0.00	0.01	0.01
Agricultural tools	0.04	0.04	0.00
Agricultural machinery	0.77	1.93	1.17
Farm tractors, farm trailers	0.09	0.30	0.21
Equipment for food industry	0.61	1.53	0.92
Fertilisers	0.88	2.25	1.37
Sprinkler systems	0.03	0.17	0.14
Stable interiors	0.05	0.29	0.24
Animal vaccines	0.21	0.73	0.51
Total	3.54	8.64	5.10

The fastest growing aspects of agricultural machinery consist of:

- (parts of) equipment to clean or sort eggs, fruit or other agricultural products;
- parts of machinery, equipment and tools for harvesting or threshing agricultural products, parts of lawn movers and other grass mowers;
- (parts of) milking equipment and equipment for dairy companies.

And the fastest growing aspects of machinery for the food industry consist of:

- machinery and equipment for the industrial processing and treatment of meat;
- machinery and equipment for the industrial processing and treatment of food and beverages.

A comparison with the exports by other EU countries shows that the Netherlands is by far the most specialised in animal vaccine exports (Balassa index: 4.8), followed by fertilisers (index 1.8) and machinery for the food industry (index 1.7). The Netherlands is less specialised in agricultural machinery exports than the rest of the EU (index 0.8).

## 2.8 Conclusion

Dutch exports of agricultural products far exceed their imports. This produces a great trade surplus in agricultural products. About 55 percent of the Dutch trade surplus comes from the trade in agricultural products. The contribution by agriculture used to be larger but fell because imports of agricultural products grew faster than exports and the rapid increase in the trade balance of non-agricultural products.

New EU countries and countries outside the EU have become more important buyers and suppliers. Meat, milk, vegetables and flowers remain the main Dutch export products, but baby milk powder has been catching up for years. Not just agricultural but also agriculture-related products such as agricultural machinery and machinery for the food and beverages industry have become increasingly important for Dutch exports. Including agriculture-related export, the exports of agricultural products (81.3 billion euros in 2015) reached almost 90 billion euros, or 21 percent of the total Dutch goods exports. The Netherlands far more specialised in flower and plant exports than the rest of the EU. The Netherlands is the second exporter of agricultural products in the world and the sixth importer.

## 2.9 Annex

In this chapter we primarily used the traditional main definition for agricultural products. This consists of the first 24 chapters of the Combined Nomenclature of the Harmonised System plus several 'other agricultural products from chapters 29 to 53. Below you will find a list of the products that come under the main definition:

### 2.9.1 The main definition of agricultural products

Chapter GN/GS	Detailed description	Description in the main text
01	Live animals	Live animals
02	Meat and edible meat offal	Meat
03	Fish, crustaceans, molluscs and other aquatic invertebrates	Fish and other seafood
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	Milk and dairy
05	Products of animal origin, not elsewhere specified or included	Other products of animal origin
06	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	Flowers and plants
07	Edible vegetables and certain roots and tubers	Vegetables
08	Edible fruit and nuts; peel of citrus fruit or melons	Fruit
09	Coffee, tea, maté and spices	Coffee, tea, spices
10	Cereals	Cereals
11	Products of the milling industry; malt; starches; inulin; wheat gluten	Flour, malt, starch
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	Oleaginous seeds and fruits
13	Lac; gums, resins and other vegetable saps and extracts	Vegetable saps
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	Vegetable plaiting materials
15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	Animal or vegetable fats and oils
16	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	Preparations of meat and fish
17	Sugars and sugar confectionery	Sugar and confectionery



### 2.9.1 The main definition of agricultural products (end)

Chapter GN/GS	Detailed description	Description in the main text
18	Cocoa and cocoa preparations	Cocoa and preparations
19	Preparations of cereals, flour, starch or milk; pastrycooks' products	Preparations of cereals, flour and milk
20	Preparations of vegetables, fruit, nuts or other parts of plants	Preparations of vegetables and fruit
21	Miscellaneous edible preparations	Other edible preparations
22	Beverages, spirits and vinegar	Beverages
23	Residues and waste from the food industries; prepared animal fodder	Residues food industry, animal fodder
24	Tobacco and manufactured tobacco substitutes	Tobacco and tobacco substitutes
29-53	Other agriculture	Other agriculture

'Other agriculture' consists of the following products:

## 2.9.2 Description of 'other agriculture'

### CN/CS classification. first digits Detailed description

29054500	Glycerol
3301	Essential oils (terpeneless or not). including concretes and absolutes; resinoids; extracted oleoresins; etc.
330210	Mixtures of odoriferous substances and mixtures (including alcoholic solutions) with a basis of one or more of these substances of a kind used in the food or drink industries
3501	Casein, caseinates and other casein derivatives; casein glues
3502	Albumins (including concentrates of two or more whey proteins), albuminates and other albumin derivatives
35030010	Gelatin and derivatives thereof
3504	Peptones and their derivatives; other protein substances and their derivatives; hide powder, whether or not chromed
35051010	Dextrins
3823	Industrial monocarboxylic fatty acids; acid oils from refining; industrial fatty alcohols
4001	Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip
4101	Raw hides and skins of bovine (including buffalo) or equine animals (fresh, or salted, dried, limed, pickled or otherwise preserved), whether or not dehaired or split
4102	Raw skins of sheep or lambs (fresh, or salted, dried, limed, pickled or otherwise preserved), whether or not with wool on or split
4103	Other raw hides and skins (fresh, or salted, dried, limed, pickled or otherwise preserved), whether or not dehaired or split
4105	Tanned or crust skins of sheep or lambs, without wool on, whether or not split, but not further prepared
4106	Tanned or crust hides and skins of other animals, without wool or hair on, whether or not split, but not further prepared
4301	Raw furskins (including heads, tails, paws and other pieces or cuttings, suitable for furriers' use)
4302	Tanned or dressed furskins (including heads, tails, paws and other pieces or cuttings), unassembled. or assembled
4401	Fuel wood, in logs, in billets, in twigs, in faggots or in similar forms; wood in chips or particles; etc.
4402	Wood charcoal (including shell or nut charcoal), whether or not agglomerated
4403	Wood in the rough, whether or not stripped of bark or sapwood, or roughly squared
4406	Railway or tramway sleepers (cross-ties) of wood
4407	Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm

## 2.9.2 Description of 'other agriculture'(end)

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### CN/CS classification. first digits Detailed description

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4409	Wood (including strips and friezes for parquet flooring, not assembled) continuously shaped along any of its edges, ends or faces, etc.
4501	Natural cork, raw or simply prepared; waste cork; crushed, granulated or ground cork
4502	Natural cork, debarked or roughly squared, etc.
5002	Raw silk (not thrown)
5101	Wool, not carded or combed
5102	Fine or coarse animal hair, not carded or combed
5103	Waste of wool or of fine or coarse animal hair, including yarn waste but excluding garnetted stock
5105	Wool and fine or coarse animal hair, carded or combed (including combed wool in fragments)
5201	Cotton. not carded or combed
5202	Cotton waste (including yarn waste and garnetted stock)
5203	Cotton. carded or combed
5301	Flax, raw or processed but not spun; flax tow and waste (including yarn waste and garnetted stock)
5302	True hemp ( <i>Cannabis sativa</i> L.), raw or processed but not spun; tow and waste of true hemp (including yarn waste and garnetted stock)
5303	Jute and other textile bast fibres (excluding flax, true hemp and ramie), raw or processed but not spun; etc.
5305	Coconut, abaca (Manila hemp or <i>Musa textilis</i> Nee), ramie and other vegetable textile fibres, etc.

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In section 2.7 the agricultural products mentioned above are broken down into primary (untreated) and secondary (treated) agricultural products. Furthermore the tertiary (related) agricultural products are added.

Primary and secondary agricultural products are broken down as follows based on the CN nomenclature:

*Primary:* chapter 1. 03101. 0302. 0303. 0306. 0307. 0401. 0402. 0407 t/m 0410. chapter 5-10. chapter 12-14. 1701. 1801. 1802. 2308. 2401. 4001. 4101. 4102. 4103. 4401. 4403. 5002. 5101. 5102. 5103. 5201. 5202. 5302.

*Secondary:* chapter 2. 0304. 0305. 0403-0406. chapter 11. chapter 15 and 16. 1702-1704. 1803-1806. chapter 19- 22. chapter 23 except 2308. 2402. 2403. 29054500. 3301. 330210. 3501. 3502. 35030010. 3504. 35051010. 3823. 4105. 4106. 4301. 4302. 4402. 4406. 4407. 4409. 4501. 4502. 5105. 5203. 5301. 5303 and 5305.

The *tertiary* agricultural products are not included in the main definition. They are classified as follows:

- Fertilisers: chapter 31
- Pesticides: 3808
- Agricultural machinery (excl. tractors): 8432. 8433. 8434. 8435. 8436 and 84371000
- Farm tractors, farm trailers: 8701 excl. road tractors and 87162000
- Machinery for the food industry: 84378000. 84379000. 8438 and 84792000
- Animal vaccines: 30023000
- Agricultural dryers: 84193100
- Greenhouse materials: 73089051. 73089059. 73089098 and 73089099
- Stable interiors: 69099000 and 94060031
- Sprinkler systems: 84248110. 84248130. 84248191 and 84248199

**3.**

# **The chain and the importance of Dutch agribusiness**

**Authors**

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**120,000** companies  
are active in agribusiness

**17.2** billion euros earned by  
agriculture sector's own exports





**Agribusiness has traditionally been a very important sector for the Dutch economy and its importance is expected to grow further in the future. As this chapter shows, exports by agribusiness account for 4.4 percent of Dutch GDP. The sector is also closely related to other sectors, with many companies directly and indirectly supplying goods and services to agribusiness or selling or transporting the goods that are ultimately exported.**

## 3.1 Introduction

With 17 million inhabitants and a total surface area of 41,543 km<sup>2</sup>, the Netherlands is one of the smallest and most densely populated countries in the world. Nevertheless, the country is one of the world's most prominent producers of agricultural products. The Netherlands has the highest agricultural output per hectare in the world, and produces far more than its population can consume. At least three-quarters of Dutch agricultural output is intended for exports (Dijksma, 2015). The Dutch food sector is the second-largest exporter of agricultural products in the world (WRR, 2014). The export products range from Dutch cheese exported to Germany to baby milk powder exported to China, sales of which have multiplied fifty-fold in the last ten years (CBS, 2015). Only the United States exports more agricultural products than the Netherlands. In addition, roughly 65 percent of the Dutch trade surplus is attributable to exports of agricultural and agriculture-related goods (see chapter 1).

The Organisation for Economic Cooperation and Development praises the innovative and export-oriented character of Dutch agribusiness (OECD, 2015). The Netherlands also has an excellent international reputation for finding sustainable solutions to the challenge of guaranteeing food security that the world will face in the coming decades (Ministry of Economic Affairs, 2013). Furthermore, research shows that the importance of agriculture and food production to the Dutch economy will only increase further over the next 15 years (Ecorys, 2014).

Nevertheless, the strength of the sector's position is not guaranteed and cannot be taken for granted. International markets could disappear because of armed conflicts or the erection of trade barriers. Trade restrictions might be imposed because of an outbreak of contagious diseases in animals or plants or as a result of political decisions to restrict the imports of particular products. There have been examples of this recently: following the outbreak of the HPAI virus in poultry and with the Russian boycott of agricultural products from the European Union (Ministry

of Economic Affairs, 2015). Naturally, developments of this kind will not only have consequences for exporters of agricultural products, but will affect the entire supply chain.

The Dutch business sector, trade associations and the government are constantly endeavouring to maintain, and where possible enhance, the country's strong international position. The government is making strenuous efforts to strengthen the sector's export position by encouraging the further internationalisation of Dutch agribusiness. For example, a major priority is to improve access to international markets for Dutch agricultural products (Ministry of Economic Affairs, 2015). "Further internationalisation of Dutch agribusiness," said former state secretary Sharon Dijksma, "will deliver benefits for the country in which investments are made and will be good for the Dutch economy" (Ministry of Economic Affairs, 2014).

But what exactly does the Dutch agribusiness entail? When they think of the agricultural sector, almost half of the population of the Netherlands think in terms of farmers and farms, or of livestock and arable farming (TNS-NIPO, 2015). The many arable and livestock farms are indeed an essential component of the renowned Dutch agribusiness sector, but it also encompasses horticulture, hunting and fisheries. And that is only the primary production component of Dutch agribusiness. Agricultural production today is scarcely possible without the support of companies supplying goods and services, including high-tech ones. These companies are closely involved in the primary processes of agribusiness: companies that manufacture machines and specialised instruments for the agro-sector, breed seeds and crops or produce fertiliser all help to increase productivity in the sector. The purchasers of agricultural products are also part of the agribusiness. Products like milk, cocoa and coffee have to be processed before they are fit for consumption, while selling these products to the public would be difficult without the wholesale and retail trade (Berkhout et al., 2015).

Because primary agricultural production is so closely entwined with purchasers and the support and supply companies, this chapter covers the entire agricultural production chain, from the farms and horticultural businesses to the food industry, from the agro-related manufacturing industry to support services, and from the wholesalers to the shops that sell agricultural products to consumers. Together they constitute the Dutch agribusiness.

This chapter describes the Dutch agribusiness and its importance to the Dutch economy, and highlights the connections and relationships between the



components of the agricultural production chain. This study addresses four questions:

1. How many companies were involved in Dutch agribusiness in the 2010-2015 period?
2. What are the general and international characteristics of Dutch agribusiness?
3. What is the importance of agribusiness exports to the Dutch economy?
4. Which sectors are closely linked to Dutch agribusiness?

These questions are answered in this chapter. Section 3.2 first describes the data and the methods that have been used. Section 3.3 explores the number of companies in Dutch agribusiness and their national and international characteristics, for example their main activities, the number of persons employed by them and the volume of their trade with other countries. Section 3.4 investigates the importance of agribusiness exports to the Dutch economy. Section 3.5 is devoted to the participation of Dutch agribusiness in national and international economic activity, highlighting the sector's relationship with other sectors, such as its major suppliers and customers. A number of conclusions are presented at the end of the chapter.

## 3.2 Description of data and research methodology

To answer the first research question (a description of the agribusiness chain, see section 3.3), a micro dataset was compiled for the 2010-2015 period on the basis of Statistics Netherlands's General Business Register (*Algemeen Bedrijven Register, ABR*). The General Business Register contains information about the size and main economic activity of every active company in the Netherlands. Companies are classified by main economic activity in accordance with the Standard Industrial Classification (*Standaard Bedrijfsindeling*) of 2008. Companies belonging to the agribusiness sector were selected on the basis of that classification. Agribusiness comprises companies operating in the primary agriculture and fisheries industries, as well as related sectors such as the food and beverage industry. It also includes companies that conduct research for or provide services to the agro-sector, as well as markets and retailers and wholesalers of food and beverages. The category does not include forestry services or companies whose main activity is tobacco-related. Appendix 3.7 contains a complete list of all Standard Industrial Classifications (SICs) that fall under the heading of agribusiness.

To determine whether a company is an employer – and therefore has one or more employees – data about the number of employees was used. The difference between employees and working persons is that the latter category also includes working partners, owners and family members who are not on a company's payroll. It is particularly common for family members to work in agricultural businesses, and the number of employees can therefore differ from the number of working persons. Companies that have at least one employee on the payroll are classified as employers. The information about the number of employees of companies is taken from the Policy Administration of the Employee Insurance Agency (UWV), which was available up to the end of 2014. To correct for the effect of seasonal employment, the data are based on the average number of employees in a company over the entire year.

Data on international trade in goods from Statistics Netherlands contain details of the annual imports and exports of goods by companies. It should be noted here that some of the international trade in goods (approximately 20 percent) cannot be linked to Dutch companies. Since companies form the basis of the dataset, that part of the trade has been disregarded. On the basis of the statistics for the international trade in goods, companies have been divided into the following categories:

1. companies that only import goods;
2. companies that only export goods;
3. companies that both import and export goods, also known as 'two-way traders'; and
4. companies that neither import nor export goods.

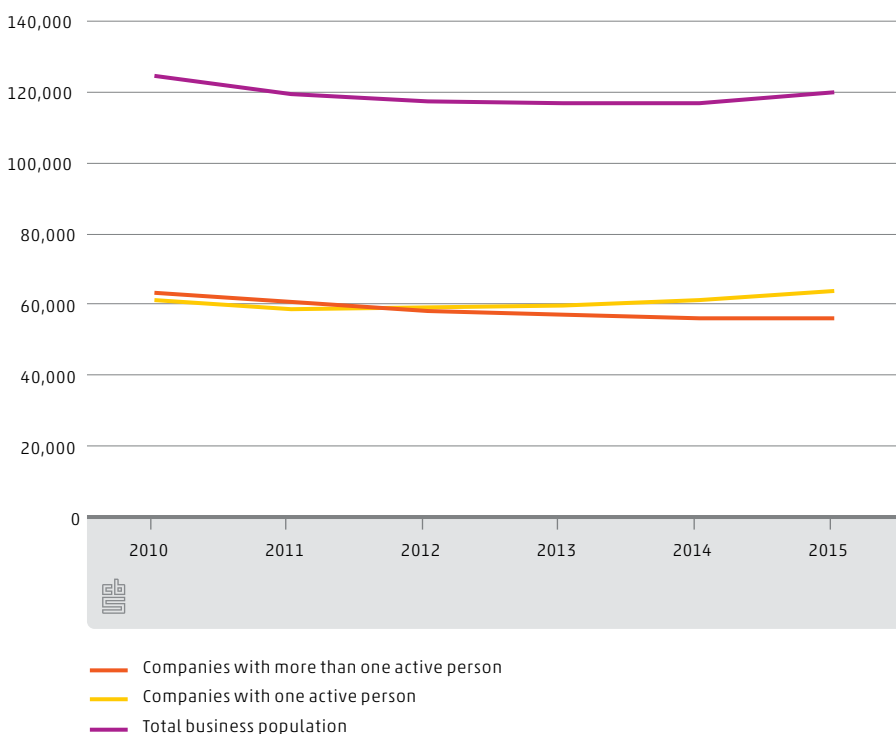
A threshold of five thousand euros was applied. Accordingly, if the value of a company's imports and exports was less than five thousand euros it will have been classified as a 'non-trader'.

Finally, the data about foreign participating interests from the Foreign Affiliate Statistics (FATS) were used to determine how many multinationals are operating in the agribusiness sector. Those statistics are available until 31 December 2013. Using information from the FATS on the location of Ultimate Controlling Institutional Units (UCIs), we also determined in which country the ultimate control of multinationals was exercised. If ultimate control of a company established in the Netherlands was exercised in another country, that company will have been classified as a foreign multinational. Dutch multinationals are companies controlled in the Netherlands with one or more foreign subsidiaries. Another distinct group is 'domestics': Dutch companies without any control relationships with other countries.

## 3.3 Descriptive statistics

In 2015, there were 120 thousand companies operating in Dutch agribusiness. Agribusiness accounted for approximately 8 percent of the just over 1.5 million companies in the Netherlands at the end of 2015. As figure 3.3.1 shows, the number of companies in the agribusiness declined slightly between 2010 and 2013, but has risen again since 2014. In 2015, the number of agribusiness companies actually increased by almost 3 percent compared to 2014. Nevertheless, there are still slightly fewer agribusiness companies in 2015 than in 2010. Agribusiness, like the general business population, is composed mainly of SMEs, with less than 250 employees. In 2015, large companies made up only 0.1 percent of the agribusiness, while medium-sized companies only accounted for around 1 percent of the total. Practically all of the companies (99 percent) were small. Figure 3.3.1 also shows that since 2012 the majority of the agribusiness companies are operated by a single person. In 2015, for example, there was just one working person in over 53 percent of the businesses.

### 3.3.1 Business population in agribusiness, 2010-2015

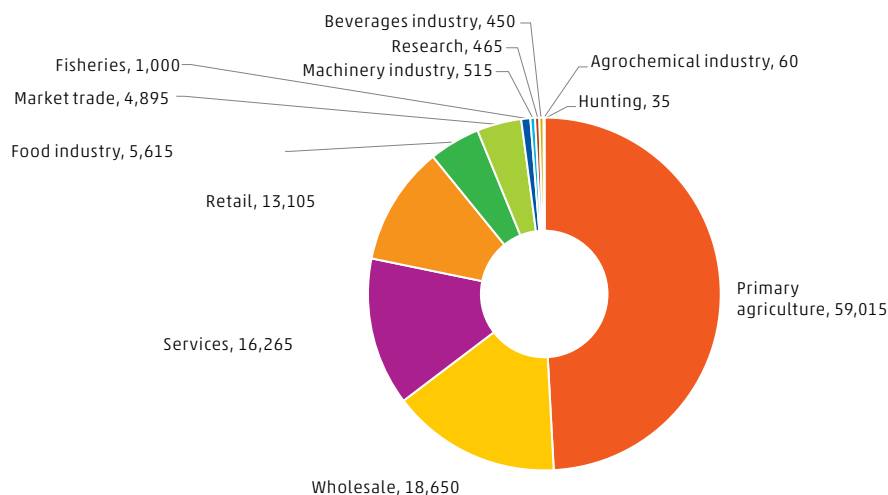


Primary agriculture is the main activity of almost half of the companies in the agribusiness sector (see figure 3.3.2). In 2015, there were 59 thousand companies operating in this sector, the vast majority of whom bred and kept animals (33,750) or grew annual crops (15,980). A further 2,180 businesses were engaged in the cultivation of perennial crops, and 1,935 businesses cultivated crops in combination with the breeding and keeping of animals. In the primary agriculture sector, there were 5,170 businesses whose main activity was the cultivation of ornamental plants, trees and flowers.

A quarter of the companies in the agribusiness sector are engaged in the wholesale and retail trade, a segment that includes many supermarkets and shops selling a range of foodstuffs (3,320) and wholesalers of flowers and plants (2,800). The services sector is also well represented in agribusiness with more than 16,000 companies, 65 percent of which provide services to the arable farming and/or horticulture sectors. The food industry and market trade both account for roughly 5 percent of the agribusinesses. There were also approximately a thousand companies operating in the fisheries sector in 2015. Finally, in 2015 only 1 percent of the agribusiness sector consisted of companies whose main activity was research, hunting or industry relating to beverages, agrochemicals or machinery.

Although the number of companies in the agribusiness sectors remained reasonably stable between 2010 and 2015, there was a sharp increase or decline in the number of certain types of companies. For example, the number of companies engaged in primary agriculture has fallen sharply, while the number of companies in the services sector and the food and beverage industry has grown. Since 2010, for example, the number of holdings keeping and breeding dairy cattle has declined by 3,360 (16 percent) to 17,935 farms in 2015. By 2015, there were also 1,055 (17 percent) fewer growers of decorative plants and 1,030 (21 percent) fewer companies breeding and keeping pigs. The largest increase in absolute terms occurred among companies providing services for the breeding and keeping of animals. Their number grew by a third: from 2,150 in 2010 to 2,860 in 2015. The number of companies providing services to arable farmers and/or the horticulture sector also grew, by 565. Moreover, there was an upsurge in the market trade in food, with the number of companies increasing by 26 percent between 2010 and 2015.

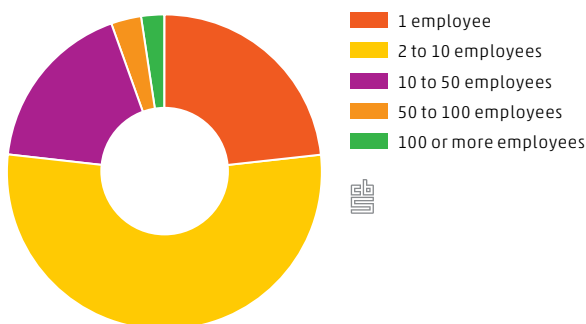
### 3.3.2 Agribusiness by main activity, 2015



Thirty percent of agribusiness companies have at least one employee. In 2014, this represented almost 35 thousand employers with a total of approximately 671 thousand persons on their payroll. This number corresponds to an increase of 5 percent with respect to 2010, when there were 638 thousand persons employed in agribusiness. The total number of employees in the Netherlands in 2014 was approximately 6.86 million, which means that one in ten employees was working in the agribusiness sector in 2014.

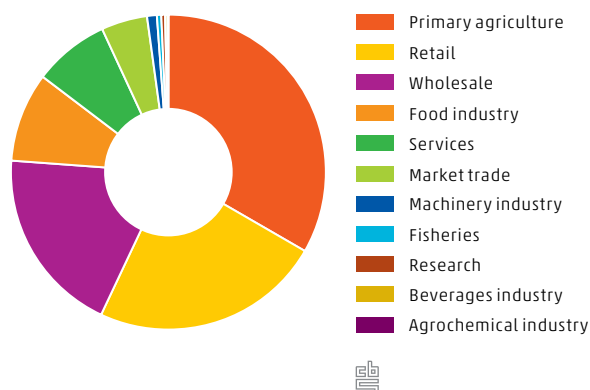
Figure 3.3.3 also shows that approximately a quarter of the employers had only one employee and just over half employed between two and ten people. Only 3 percent of the employers had between 50 and 100 employees, and 2 percent had 100 or more employees.

### 3.3.3 Employers by company size, 2014



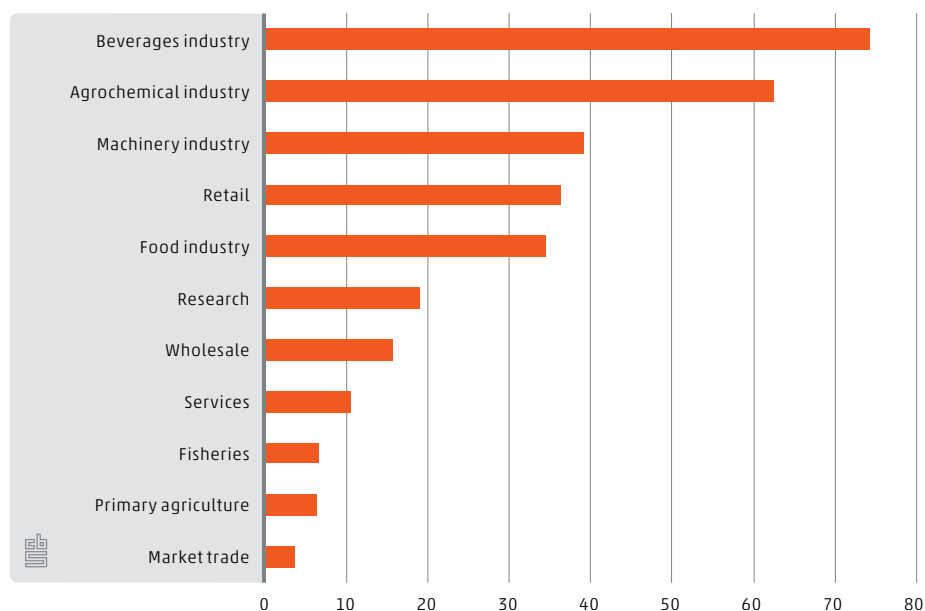
Most agribusiness employers are active in agriculture (33 percent). Figure 3.3.4 also shows that a relatively large number of employers operate in the wholesale and retail trade. In contrast, the industrial sector accounts for only a small number of employers, while there were no employers at all engaged in hunting in 2014. These results are not surprising and can be explained in part by the number of companies operating in a particular sector. In relation to the total number of companies in a sector, the number of employers in the retail trade is relatively large. In the retail trade, 62 percent of the companies had one or more employees in 2014. For wholesalers this share was 37 percent. A relatively large proportion of the industrial companies are also employers: 64 percent in machinery manufacturing, 60 percent in the food industry and 55 percent in the agrochemical industry. In contrast, the proportion of employers in the services sector and primary agriculture is relatively small, at 17 percent and 20 percent, respectively.

### 3.3.4 Employers by main activity, 2014



As figure 3.3.5 shows, the largest employers in agribusiness are industrial companies. In 2014, employers in the beverages industry employed an average of 74 employees, compared with an average of 62 in the agrochemical industry and 39 in the manufacture of machinery. On average, employers in the retail trade and the food industry also have more than 30 persons on their payroll. In contrast, employers in fisheries, primary agriculture and market trade are relatively small.

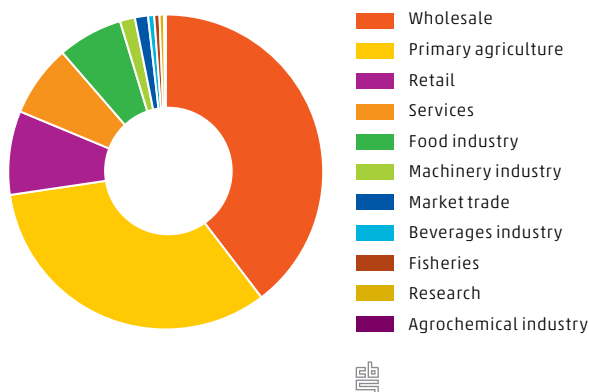
### 3.3.5 Average number of employees of employers by main activity, 2014



The level of internationalisation of agribusiness can be seen from the number of companies engaged in the international trade in goods. In 2015, around 19 percent of agribusiness companies imported or exported goods, which represents 22,245 companies. This is a higher percentage than in the Dutch business sector as a whole, where 12 to 13 percent engage in international trade (CBS, 2016). The share of non-trading companies in the agribusiness sector declined by 4 percentage points in the 2010-2015 period, from 85 percent in 2010 to 81 percent in 2015. In 2015, almost 7 percent of agribusiness companies were two-way traders, 8 percent only imported goods and 4 percent only exported goods.

The wholesale sector contains the largest number of companies engaged in the international goods trade (see figure 3.3.6). There are also a large number of trading companies in primary agriculture, most of whom breed and keep livestock (2,875) or cultivate annual crops (2,215). The businesses that cultivate ornamental plants include 1,675 trading companies. Retailers (9 percent), the services sector (7 percent) and the food industry (7 percent) also account for part of agribusiness sector trade. The research and fisheries sectors and the beverages and agrochemical industries all have fewer than 200 trading companies, and not a single hunting company trades goods internationally.

### 3.3.6 Trading companies by main activity, 2015\*



The number of traders in the wholesale sector is not only large in absolute terms, but also in relative terms. More than 47 percent of the companies in this sector imported and/or exported goods in 2015. This percentage is substantially smaller in the other sectors with a large number of trading companies: 15 percent in the retail trade, 13 percent in primary agriculture and 10 percent in the services sector. Wholesale also generates the largest share of the import and export value of agribusiness (see table 3.3.9). Figure 3.3.7 shows that a relatively large number of companies in the agrochemical (55 percent) and machinery (66 percent) industries are traders, but their absolute number is small.

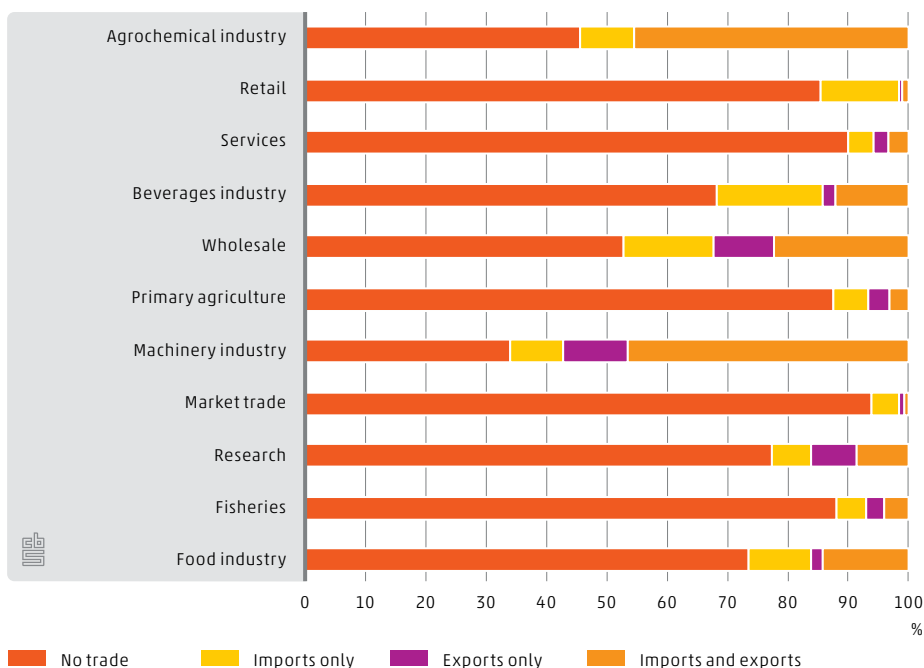
In figure 3.3.8, the trading companies are broken down according to the total value of their trade (the sum of imports and exports). The figure shows that the value of imports and/or exports of most companies was 50 thousand euros or less in 2015. For a quarter of the traders the value of the trade was between 100 thousand and 1 million euros, while 4,635 companies imported and/or exported more than 1 million euros worth of goods. A further one in ten companies conducted trade worth between 50 thousand and 100 thousand euros.



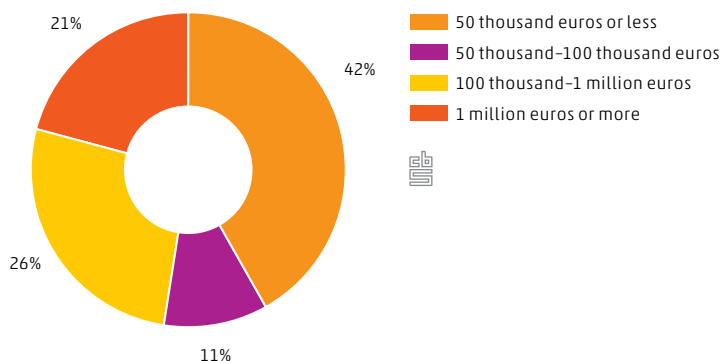
**1 in 5** agribusiness companies trades internationally



### 3.3.7 Type of trader by main activity, 2015\*



### 3.3.8 Trading companies by total trade value, 2015\*



Wholesalers in agricultural products and food and the food industry are by far the largest traders in goods. They account for more than 80 percent of total agribusiness imports and exports. Table 3.3.9 also shows that the retail and market trade are the only sectors that import more than they export.

Compared with 2010, total agribusiness imports and exports increased sharply among market traders (211 percent) and research companies (147 percent).

Exports increased particularly strongly in the retail trade (106 percent) and the services sector (168 percent). Imports by the latter sector also rose significantly (64 percent). Fisheries is the only sector to show a decline in their trade volume: imports fell by almost 17 percent between 2010 and 2015.

### 3.3.9 Total imports and exports in million euros per sector, 2015\*<sup>1)</sup>

Sector	Total exports	Total imports
	Million euros	
Agrochemical industry	1,919.9	625.3
Retail	293.2	3,214.2
Services	1,874.1	1,588.1
Beverages industry	1,343.2	970.8
Wholesale	32,084.0	23,64.0
Primary agriculture	3,218.4	1,390.6
Machinery industry	2,997.2	987.5
Market trade	20.2	22.6
Research	85.5	54.3
Fisheries	394.3	108.0
Food industry	25,463.8	13,429.5
Total	69,691.0	46,023.0

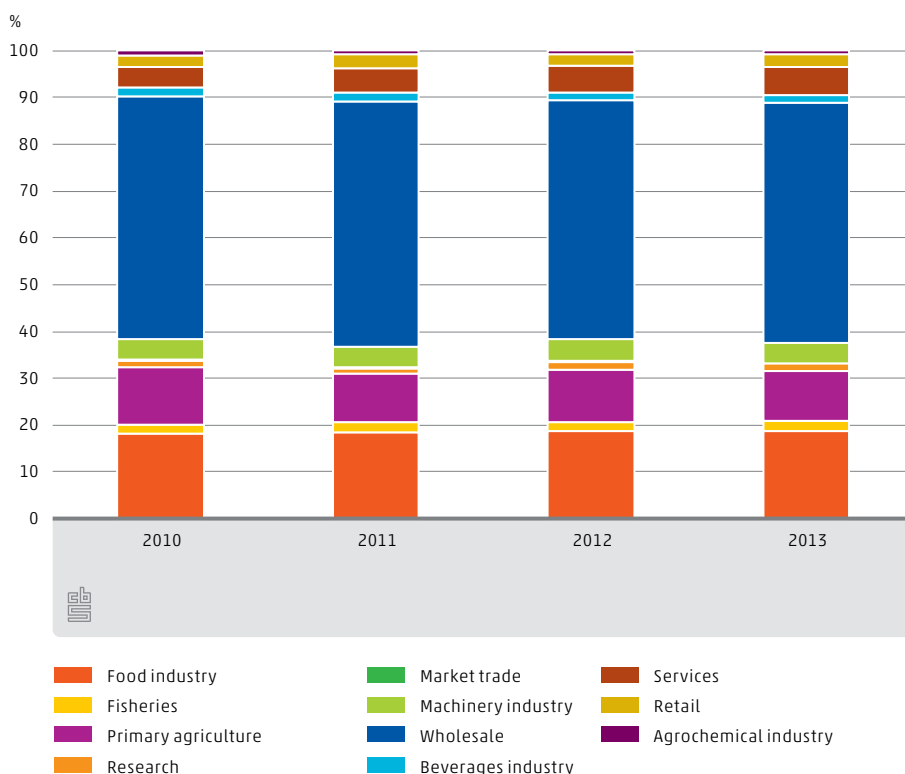
<sup>1)</sup> The total values of imports and exports differ from the values presented in chapter 2.

In chapter 2, the international trade in was goods measured on the basis of types of goods, while the figures in this chapter are based on the SIC (companies).

We also found that few multinationals are active in agribusiness. In the 2010–2013 period, multinationals accounted for around 1.5 percent of the total number of agribusiness companies each year. In 2013, for example, there were 1,800, slightly more than half of which (53 percent) were Dutch controlled.

As in the case of trading companies, wholesale is again the most international sector in terms of the number of multinationals. In 2013, slightly more than half of the multinationals operated in that sector. In that year a relatively large number of multinationals were active in the food industry (340) and in primary agriculture (195). Fisheries, the beverages industry, research and the agrochemical industry all included fewer than 50 multinationals.

### 3.3.10 Multinationals by main activity, 2010-2013



Although there are not many multinationals engaged in agribusiness, those companies do account for a large share of the total imports and exports. Eight out of ten multinationals in agribusiness trade goods internationally, and together they account for roughly 70 percent of the total trade in the sector. The median imports and exports of multinationals are therefore far higher than those of domestics. Table 3.3.11 also shows that the median imports are highest among multinationals that are controlled from other countries. The median exports of Dutch multinationals are roughly 1.5 million euros greater than those of foreign multinationals.

### 3.3.11 Total imports and exports in thousand euros by control structure, 2013

	Median exports	Median imports
	<b>x 1,000</b>	
Domestics	122.9	43.8
Dutch multinationals	6,060.3	2,538.9
Foreign multinationals	4,544.2	3,061.5

## 3.4 The importance of agribusiness to the Dutch economy

The previous section has shown that there are many companies involved in agribusiness, the sector employs many people, and it accounts for a substantial share of Dutch exports. Logically, the next question is how important the exports of the agribusiness sector are for the Dutch economy: what do those exports contribute to Dutch GDP?

This question can be answered by means of an input-output analysis. The analysis starts with input-output tables from the National Accounts, which show for each sector how much they supply to other sectors, where the sector procures the goods and services it requires, and how much the sector exports. These data can be used to calculate how much value added is generated in each sector, and the employment involved, both directly within the sector itself and indirectly by the suppliers (and by the suppliers of those suppliers etc. etc.).

The input-output analysis is a generally accepted method in scientific circles. The outcome of this exercise has to be regarded as a minimum value for the contribution of agribusiness exports to Dutch GDP. Some smaller industries (or parts of industries) that fall within the definition of agribusiness cannot be included in this input-output analysis because the input-output tables on which these calculations are based are not sufficiently detailed. Examples are the manufacture of machinery and equipment for agriculture, and research and development relating to agricultural products and processes. The omission of these sectors in the analysis probably only has a limited effect on the calculation of the value added

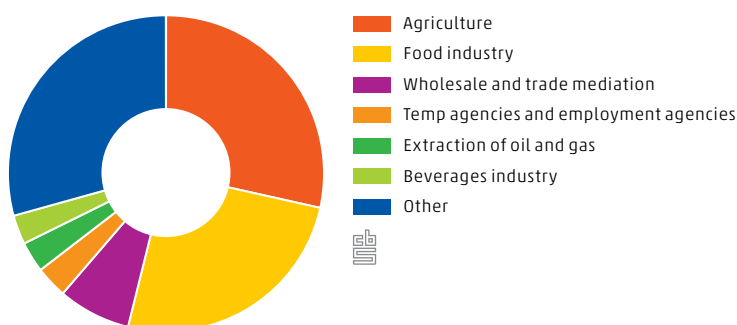
of these exports for Dutch GDP. In this section, we therefore investigate, a slightly more limited variant of agribusiness is investigated, the 'agricultural sector'.

The total value added generated by exports by companies in the agricultural sector came to 28.9 billion euros in 2014. From a total export value of just over 45 billion euros, the Netherlands earned 64 eurocents for each exported euro. The value added from these exports therefore represents 4.4 percent of Dutch GDP. That contribution was 4 percent in 2010, so the contribution of agricultural exports to the Dutch economy is relatively stable. The value added of almost 29 billion euros is generated by a total of just over 296 thousand full-time jobs. Accordingly, the exports of the agricultural sectors account for 4.4 percent of employment in the Netherlands.

Figure 3.4.1 shows that agriculture (29 percent) and the food industry (25 percent) make the largest contributions to the value added created by the exports of the agricultural sector. Together they account for more than half of the total value added of exports by the agribusiness sector, at 15.6 billion euros.

Agriculture is a relatively labour-intensive sector: with 38 percent of the total employment, the sector creates 29 percent of the value added created by agricultural sector's exports. The opposite applies in the food industry: with 18 percent of the employment, the industry creates 25 percent of the export-generated value added. The wholesale trade is an important supplier, since it creates 8 percent of the added value. Finally, there are two other, smaller sectors that can be assigned (as least in part) to the agricultural sector. The beverages industry accounts for 3 percent (865 million euros) of the total value added of the sector. The chemical industry can also be partially classified as agricultural (the production of fertilisers, for example). It generates 644 million euros, or just over 2 percent, of the value added of the exports of the agricultural sector.

### 3.4.1 Value added of exports by the agricultural sector, 2014



**4.4%** of Dutch GDP is attributable to the value added generated by agricultural sector exports



## 3.5 The agricultural business chain

Figure 3.5.1 shows which sectors play a major role in the direct and indirect exports of the agricultural sector. The sectors shown above the agricultural sector (in green) are the ten most important supplier industries. The accompanying arrows indicate the relationships between the companies that supply to and buy. For example, wholesalers are direct suppliers to the agricultural sector, but the banks usually provide their services via an intermediary (for example, the wholesale trade).

As already mentioned, the total value added of direct exports in 2014 was almost 28.9 billion euros. Roughly 60 percent of the value added created by the agricultural sector's export is earned by the agricultural sector itself and around 40 percent is earned by suppliers.

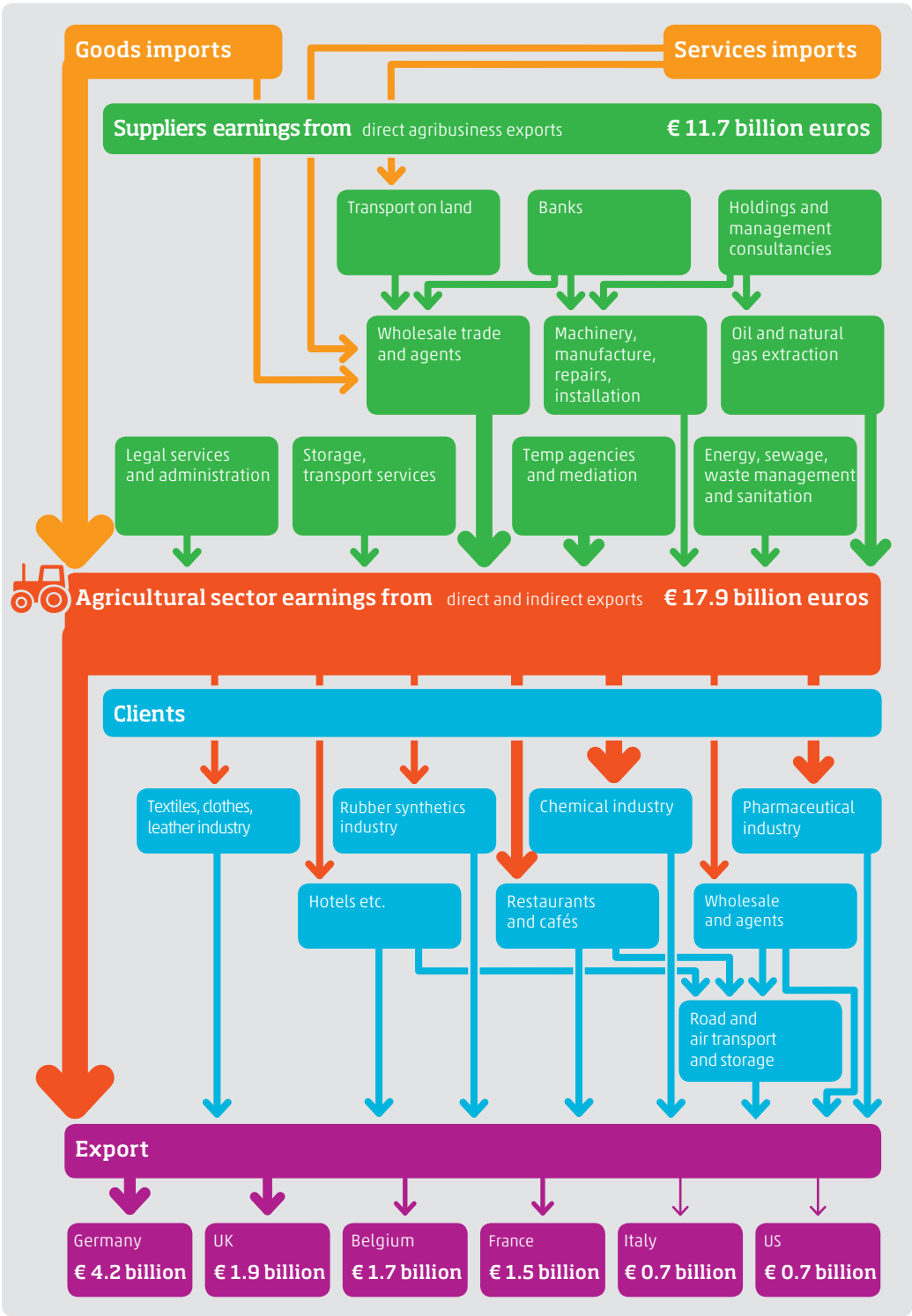
The wholesale trade earns some of those revenues as a supplier to those sectors and creates 8 percent of the value added. It includes importers of tropical products such as coffee beans, cocoa and fruit, which supply the food industry and are therefore part of the agricultural value chain. Other industries that make a significant indirect contribution to the exports of the key agricultural sectors are employment agencies and companies extracting oil and natural gas. A large part of the work in the traditional agricultural sectors is seasonal work and these businesses therefore rely quite heavily on the supply of flexible workers from employment agencies. Sectors such as horticulture are relatively energy-intensive and this is reflected in the relatively high proportion of the value added earned by the energy sector.

The exports of the agricultural sector also depend on imports. Figure 3.5.1 shows that the sectors generally import goods themselves or via wholesalers. The main services needed in connection with exports are the wholesale trade and transport by land. For example, services in other countries to deliver the imported goods to wholesalers.

The sectors from which the agricultural sector mainly profits abroad are shown below in blue in figure 3.5.1. The agricultural sector earns a total of 17.9 billion euros through direct and indirect exports. More than 96 percent or 17.2 billion euros of this total is attributable to direct exports, and only 4 percent from indirect exports via other sectors, primarily the chemical (192 million), pharmaceutical (97 million) industries.

Finally, the value chain shows the principal export markets in which the agricultural sector earns its revenues. Germany is by far the most important market, accounting for almost a quarter of the Dutch agricultural sector's total export revenues. The United States is the most important export market outside Europe, with a share of 4 percent.

3.5.1 Chain of the Dutch agricultural sector





## 3.6 Conclusion

Dutch agribusiness is a global leader and is praised for its innovative and export-oriented character (OECD, 2015). This chapter has described the number and types of companies that make up this sector. It has also explored how much the Netherlands earns from exports by the agribusiness sector and identified the sector's most important customers and suppliers.

The agribusiness in the Netherlands consists not only of agriculture and horticulture companies, but also fisheries and relevant suppliers and customers, including wholesalers and companies that produce agricultural machinery. As we have shown in this chapter, Dutch agribusiness consists of 120 thousand companies. One in ten employees in the Netherlands works in the agribusiness. Within the sector, there has been an evident decline in the number of companies engaged in primary agriculture, while the number of companies active in providing agriculture-related services or in the food and beverage industry has risen steadily.

Our research also confirms the image that agribusiness is a more internationally oriented sector than other sectors in the Netherlands. Almost 20 percent of the companies in the sector engage in international trade in goods. The percentage for the Dutch business sector as a whole is around 12 percent (CBS, 2016). The wholesale trade and the food industry are the sectors with the largest import and export volumes, and together they account for over 80 percent of the total agribusiness trade.

In other words, not only are there many companies in the agribusiness, it is also very internationally oriented. It is assumed that there is a lot to be gained for the Netherlands from further internationalisation, particularly more exports (Ministry of Economic Affairs, 2014). This chapter has shown that agricultural sector is indeed important to the Dutch economy and makes an important contribution to Dutch GDP.

In 2014, the total value added from exports by the agricultural sector came to 28.9 billion euros, or 4.4 percent of Dutch GDP. Agriculture and the food industry account for the largest share of the value added created. Furthermore, the contribution of agribusiness exports is probably even greater because some smaller industries (or parts of industries) that fall under agribusiness were not included in the analyses because there was insufficient detail available.

In addition to agricultural sector itself, many related sectors, such as supply industries and customers, also profit from its exports. Of the 28.9 billion euros value added created by exports by the agricultural sector, the sector itself earns around 60 percent and other companies earn around 40 percent. The major beneficiaries are suppliers such as wholesalers, employment agencies and companies engaged in extracting oil and gas.

The agricultural sector itself earns approximately 18 billion euros from exports. The sector itself earns by far the most from its own exports (96 percent). The other 4 percent is generated by indirect exports (via purchasers). Companies in the chemical and pharmaceutical industries earn most from the indirect exports of the agricultural sector.

The conclusion that can be drawn from this chapter is that agribusiness represents an important share of the Dutch economy. Agribusiness in the Netherlands consists of 120 thousand companies, which employ a great many people. An above-average number of the companies in the sector are also engaged in international trade in goods and the added value created by agricultural sector's exports comes to 4.4 percent of GDP.

## 3.7 Appendix

Table 3.7.1 contains a list of the SICs that make up the agribusiness sector.

### 3.7.1 Standard industrial classification chapters constituting agribusiness

SBI	English description
01xx	Crop and animal production, hunting and related service activities
03xx	Fishing and aquaculture
10xx	Manufacture of food products
11xx	Manufacture of beverages
2015	Manufacture of fertilisers and nitrogen compounds
2020	Manufacture of pesticides and other agrochemical products
2830	Manufacture of agricultural and forestry machinery
2893	Manufacture of machinery for food, beverage and tobacco processing
4611	Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods
4617	Agents involved in the sale of food, beverages and tobacco
46211	Wholesale of grain*
46212	Wholesale of seeds and legumes*
46213	Wholesale of hay, straw and forage*
46214	Wholesale of compound feed and concentrates*

### 3.7.1 Standard industrial classification chapters constituting agribusiness (end)

SBI	English description
46215	Wholesale of animal feed (no forage, compound feed and concentrates)*
46216	Wholesale of raw vegetable and animal oils and fats and oil resources*
46218	Wholesale of agricultural products and animal feed (generally assortment)
46219	Wholesale of other arable farming products*
4622	Wholesale of flowers and plants
46231	Wholesale of cattle*
46232	Wholesale of pets, ornamental fish, ornamental birds and wildlife*
46311	Wholesale of fruit and vegetables*
46312	Wholesale of potatoes for consumption*
4632	Wholesale of meat and meat products
46331	Wholesale of dairy products and edible oils and fats*
46332	Wholesale of eggs*
4634	Wholesale of beverages
4636	Wholesale of sugar and chocolate and sugar confectionery
4637	Wholesale of coffee, tea, cocoa and spices
46381	Wholesale of snacks*
46382	Wholesale of fish, crustaceans and molluscs*
46383	Specialized wholesale of other food and beverage*
46384	Wholesale of bakery ingredients*
46389	Specialized wholesale of other raw materials and semi-finished products for the food industry*
4639	Non-specialised wholesale of food, beverages and tobacco
4661	Wholesale of agricultural machinery, equipment and supplies
46682	Wholesale of machinery for the food and beverage industry*
4711	Retail sale in non-specialised stores with food, beverages or tobacco predominating
4721	Retail sale of fruit and vegetables in specialised stores
47221	Retail sale of meat and meat products*
47222	Retail sale in poultry and wild*
4723	Retail sale of fish, crustaceans and molluscs in specialised stores
47241	Retail sale in bread and pastry*
47242	Retail sale in chocolate and sugar confectionery*
4725	Retail sale of beverages in specialised stores
47291	Retail sale in cheese*
47292	Retail sale in natural food and health food products*
47293	Retail sale in foreign foods*
47299	Specialized retail sale in other food and beverage*
47811	Market trade in potatoes, fruit and vegetables*
47819	Market trade in other food and beverage products*
47891	Market trade in flowers, plants, seeds and garden supplies*
71201	Inspection and control of agricultural products and food products*
72111	Biotechnological research and development in the field of agricultural products and processes*
72191	Research and development in the field of agriculture and fisheries (non-biotech)*
7731	Rental and leasing of agricultural machinery and equipment
82991	Auctions of agricultural, horticultural and fisheries products *

\* 5 digit NACE codes are a more detailed subdivision of the 4 digit NACE codes. These codes are only valid for the Netherlands.



**4.**

# **Innovation, trade and productivity in the Dutch food and beverages industry**

Authors

Mark Vancauteren  
Michel Walthouwer



**26.8** billion euros worth of exports by  
the food and beverages industry in 2015

**1/3<sup>rd</sup>** of the turnover of the food  
and beverages industry due to exports

The food and beverages industry accounts for roughly a fifth of the total turnover, employment, exports and value added of the Dutch industry. In this chapter we discuss the innovation and internationalisation activities in this sector and assess the extent to which it differs from the rest of industry in those respects. We also investigate whether companies with international activities, such as exporting goods, have an advantage over companies that focus solely on the domestic market. Are exporters more productive and do aspects such as market concentration, innovation and R&D play an important role in that context? And what factors influence export growth?

## 4.1 Introduction

The food and beverages industry plays an important role in the Dutch agribusiness and the economy. The industry processes large quantities of agricultural products and raw materials into food and drinks. Products such as milk, coffee, chocolate, beer, preserved foods, meat and numerous other food and beverages produced by this sector are bought and consumed every day by consumers in the Netherlands and abroad. In 2014, there were around 5,600 companies active in the food and beverages industry. It employed a total of 126 thousand people, which represents 16 percent of the entire industrial workforce. The sector accounted for roughly a fifth of industry's total turnover, exports and value added in 2014 (see 4.1.1). The Dutch food and beverages industry is also very export-oriented, with foreign sales generating a third of its turnover.

### 4.1.1 The importance of the food and beverages industry for the Dutch economy, 2014

	Number	Share in total industry
		%
Companies	5,640	9
Employed persons	126,000	16
Turnover	68.4 billion	21
Exports	24.6 billion	20
Value added	13.6 billion	20

Companies that sell goods abroad generally perform better than non-exporters. They are bigger, their turnover is higher, they engage more in R&D and innovation and are more productive (Bernard and Jensen, 1997; Wagner, 2007; Vancauteren,



2015). The academic literature suggests a number of reasons why exporting companies are more productive than non-exporters. There are costs and risks associated with international trade and doing business in other countries. For example, a company has to investigate the regulations and guidelines that apply in export markets, look for suitable partners, and research the tastes and preferences in the local market (Smeets et al, 2010). Only the most efficient and productive companies are able to bear these export market entry costs. A form of self-selection therefore occurs, as it is mainly high performance companies that can and will start exporting. This is a phenomenon known as the 'export premium'. Studies based on business data from many countries have shown this export premium to range from 9 percent (Haidar, 2015) to 15 percent (Vancauteren, 2015) or even 20 percent (Bernard and Jensen, 1997; Wagner, 2007). This is not, however, the only explanation of the productivity advantage of exporters. The sector in which a company operates, its size, turnover, competitiveness, ownership characteristics and whether or not it is involved in R&D and innovation, all turn out to be important explanatory variables (Altomonte et al., 2013; Vancauteren, 2015).

In this chapter we investigate whether, in line with these findings, there is indeed a discrepancy and if so to what extent, between the productivity of exporters and that of non-exporters (export premium), both in the food and beverages industry and in other industries. We also investigate whether any differences found can be explained by the variables referred to above, such as the levels of innovation and internationalisation of companies.



**126,000** people work in  
the food and beverages industry

Given the importance of exports in stimulating the economy, this chapter also investigates factors that drive export growth. The Dutch government strongly promotes the further internationalisation of the food and beverages industry. Measures have also been taken at the European level to promote exports in this



sector, for example by abolishing trade barriers and harmonising EU directives for agribusiness.

Broadly speaking, exports can grow in two ways. First, when companies expand their trade with existing trade relations, leading to an increase in the volume and intensity of exports. This is also known as export growth along the 'intensive margin'. Research shows that export growth generally occurs along this intensive margin (Besedeš and Prusa, 2010; Creusen et al., 2011; Jaarsma, 2012; Smeets et al., 2010). On the other hand, exports will also grow if companies start exporting and establish international trade relations. This is known as export growth along the 'extensive margin'. We know that companies in the industrial sector are more likely to start exporting than companies in service sectors, but not much research has been done as to whether there are differences within the industry. In this context, the role of R&D and innovation can also differ from one industrial sector to another.

To summarise, this chapter investigates the two following questions:

1. To what extent are there differences in productivity between exporters and non-exporters in the food and beverages industry and how do these differences compare to the rest of industry?
2. What factors influence the volume of exports (intensive margin) and the probability that a company will export (extensive margin)? Do these factors differ between the food and beverages industry and other sectors of industry?

To answer these questions, a micro dataset of business data was compiled.

The exact data and the methods used for the analysis are described in section 4.2. The next section (4.3) presents an overview of some characteristics of the food and beverages industry and the rest of industry, such as labour productivity, export intensity, the level of competition and innovation. The following section explores the relationship between exporting and engaging in R&D and innovation in more depth (section 4.4). In section 4.5, we investigate whether exporting companies perform better than non-exporters (export premium). Sections 4.6 and 4.7 describe the factors that affect export volume (intensive margin) and the probability that a company will start exporting (extensive margin). The conclusions are presented in section 4.8.

## 4.2 Description of data and method

### Description of data

#### General Business Register

To answer the research questions, a dataset was compiled at the company level for the 2007–2014 period. This dataset is based on the General Business Register (in Dutch *Algemeen Bedrijven Register*). The information in the General Business Register includes details of the main economic activity of companies, on the basis of which the research population was defined. Only companies falling into the category of the manufacturing industry were included, and they were divided into companies in the food and beverages industry (SICs 10 and 11) and the rest of industry (SICs 12–33).

#### Ultimate control of a company

The Foreign Affiliate Statistics (FATS) were used to determine the country in which ultimate control of a company is exercised, and thus make a distinction between companies with a foreign and companies with a Dutch locus of control.

#### Employees

Information about the number of employees in a company was taken from the UWV's Policy Administration. To correct for seasonal fluctuations in employment, the number of employees in a company is the average number over an entire year. Only companies with at least ten employees were included in the analyses in this chapter.

#### Turnover and labour productivity

Information about the turnover of companies, as reported in VAT returns, is also used in the analyses. As a benchmark for labour productivity, the turnover per employee of each company was calculated by dividing the turnover by the number of employees.

#### International trade in goods

A link to the statistics on the international trade in goods made it possible to determine whether a company imported and/or exported goods in a particular year. A minimum threshold of 5,000 euros was adopted, meaning that a company is only regarded as an exporter if it exported goods worth at least 5,000 euros in a single year. On the basis of the trade value, the export and import intensity of each company was also calculated by dividing the exports or the imports by the total

value of trade (the sum of imports and exports). An export intensity greater than 0.5 (50 percent) means that a company imported more than it exported.

### **Innovation and R&D**

For this study, data about the amount that companies spent on R&D and innovation was also used (see glossary). Statistics Netherlands's data on innovation are based on the EU's biannual Community Innovation Survey (CIS), which was available for the years 2008, 2010, 2012 and 2014. The CIS survey is based on a sample survey and distinguishes between two types of expenditure on innovation: spending on product innovation and spending on process innovation. Product innovation relates to whether companies have introduced one or more new or greatly improved products. These can be goods or services that are new to the market or only new to the company. Process innovation occurs when a company has invested in the implementation of one or more new or greatly improved processes or methods.

R&D is defined as activities carried on in pursuit of originality and novelty. R&D expenditures are investments in research and development carried out by a company's own staff or outsources elsewhere in the Netherlands. R&D spending per employee was calculated for each company. The R&D statistics are also based on a sample. Data about R&D was available for the years 2007, 2009, 2011 and 2013. Because expenditure on R&D and innovation was collected from a sample, this information is only known for a limited number of companies.

### **Level of competition within an industry**

Finally, the Herfindahl index was calculated for each company. This index is a measure of the level of competition within an industry and is calculated using the following formula:

$$H_{k,t} = \sum_{j \in S_{k,t}} \left( \frac{employees_{j,t}}{employees_{k,t}} \right)^2$$

In this formula,  $s$  stands for all companies belonging to the sector in time ( $t$ ) and  $k$  refers to the sector to which a company ( $j$ ) belongs. If the Herfindahl index is low (close to 0), there is much competition and there are not many monopolies, in which case market shares will be balanced. The higher the Herfindahl index, the less competition there is and the more monopolistic competition the market has.

## Description of the analysis

To start with, the degree of internationalisation and innovation of companies in the food and beverages industry and the rest of industry were described on the basis of the combined data. This description can be found in sections 4.3 and 4.4.

It was then investigated whether exporters are indeed more productive than non-exporters (export premium) and what factors influence export growth (the extensive and intensive margin). To investigate this, various regression models were developed and analysed. The data-analysis procedure is described in the rest of this section and the results are presented in sections 4.5 to 4.7. It should be noted here that the results are presented in simplified form. The exact results of the regression analysis are presented in the appendix (section 4.9).

Section 4.5 investigates whether exporters perform better than non-exporters, in other words: whether the so-called export premium exists. It was also investigated whether the sector to which a company belongs (the food and beverages industry or the rest of industry) is a related factor. The following regression model was studied:

$$\text{Productivity} = \beta_0 + \beta_1 \text{Exporter} + \beta_2 \text{Exporter} * \text{Food and beverages industry} + \beta_3 \text{Employees} + \beta_4 \text{Sector} + \beta_5 \text{Year} + \epsilon$$

This regression model contains five independent variables. Three of them (number of employees, sector and year) are only included for the purposes of control. The following two independent variables are essential to this first analysis:  $\beta_1$  exporter (1 = exporter, 0 = non-exporter) and  $\beta_2$  food and beverages industry (1 = food and beverages industry, 0 = other industry). The analysis investigated whether, and if so to what extent, there is a correlation between these two variables and either labour productivity, the number of employees, R&D per employee and the Herfindahl index. In that context, turnover and R&D are expressed in real values with the help of adjusted deflators (corrected for inflation). Because the differences between companies with respect to the dependent variables (for example, turnover) are very great, a log transformation was applied to these variables.

We then investigated which factors relate to the probability that a company will export (the extensive margin); see section 4.6. This was done on the basis of two regression models: one model without product and process innovation and one model including these innovation characteristics. Two regression models were developed because the data on innovation expenditure were collected from a sample. Including these variables therefore leads to a small research population. In its totality (models 1 and 2 together) the following regression model was analysed:

$$\text{Exporter} = \beta_0 + \beta_1 \text{Employees} + \beta_2 \text{Control} + \beta_3 \text{R\&D per employee} + \beta_4 \text{Product innovation} + \beta_5 \text{Process innovation} + \beta_6 \text{Herfindahl index} + \beta_7 \text{Sector} + \beta_8 \text{Year} + \varepsilon$$

The dependent variable 'exporter' is a dummy that makes a distinction between companies that do (= 1) and do not export (= 0). Once again, a log transformation was applied to all independent continuous variables to correct for the right-skewed distribution ('employees', 'R&D per employee' and 'Herfindahl index'). Other dummies in the model are 'foreign control' (foreign = 1, Dutch = 0), 'product innovation' (yes = 1, no = 0) and 'process innovation' (yes = 1, no = 0). The variables 'sector' and 'year' are included to control for this in the analyses. The relationship between all these variables and the chance of export was investigated on the basis of probit analyses.

Finally, we investigated which variables show a correlation with the size of exports in euros (the intensive margin). To do so, we developed and analysed the same two regression models as for the analyses of the extensive margin. To correct for the skewed distribution of exports (the dependent variable), a log transformation was applied. The regression models were analysed using linear regression analyses. The result of those analyses are described in section 4.7.

## 4.3 Descriptive statistics

This section describes the comparison between companies that trade goods internationally and companies that do not trade with other countries, for the food and beverages industry and for the rest of industry separately. The differences and similarities are explained on the basis of various business characteristics (see table 4.3.1).

### 4.3.1 Characteristics of the food and beverages industry and other industry, 2007-2014

	Food and beverages industry		Other industry	
	imports and/or exports	no trade	imports and/or exports	no trade
Number of employees <sup>1)</sup>	39 (1,315)	16 (1,180)	26 (21,620)	17 (159,620)
Turnover <sup>1), 4)</sup>	3,542,000 (1,215)	468,000 (2,470)	222,000 (44,470)	41,000 (258,395)
Labour productivity <sup>1)</sup>	182,000 (1,000)	47,000 (1,045)	145,000 (16,395)	58,000 (11,505)
Export intensity <sup>1), 2)</sup>	53% (1,765)	–	37% (58,205)	–
Import intensity <sup>1), 2)</sup>	46% (1,765)	–	62% (58,205)	–
Herfindahl index <sup>1)</sup>	2.01 (1,840)	1.85 (4,200)	2.07 (62,910)	2.06 (441,200)
R&D per employee <sup>1)</sup>	1,200 (445)	0 (50)	1,500 (5,055)	0 (275)
Product innovation <sup>3)</sup>	46% (485)	13% (165)	36% (5,880)	6% (915)
Process innovation <sup>3)</sup>	22% (485)	6% (165)	22% (5,880)	11% (915)

Note: The number of companies included in the analysis is shown between parentheses.

<sup>1)</sup> The median is shown for these variables. The average is not sufficiently indicative because of the skewness and using it would distort the picture.

<sup>2)</sup> The import and export intensity are expressed as a ratio of total trade (sum of imports and exports).

<sup>3)</sup> We show a percentage of the total for these dummy variables.

## Employees and labour productivity

As table 4.3.1 shows, companies that engage in international trade in goods are larger than non-traders. The median number of employees of trading companies in the food and beverages industry is 39, more than twice as many as in non-trading companies. That discrepancy is smaller in the other industries, but there too trading companies have the largest numbers of people on the payroll.

## Turnover and labour productivity

In the food and beverages industry, the median turnover of international trading companies is more than 3 million euros higher than the turnover of companies that do not trade with other countries. Once again, this discrepancy is also apparent – and smaller – in the other industries (181 thousand).

The labour productivity (turnover per employee) of companies that trade internationally in goods also is higher than that of non-traders. The difference is larger in the food and beverages industry (135 thousand) than in the other industries (87 thousand).

## Import and export intensity

Import and export intensity are indicators of the relative importance of imports or exports for a trading company. In the food and beverages industry, the median export intensity is 53 percent and the median import intensity 46 percent. Traders in this sector therefore export more than they import. The opposite situation applies in the other industries, where export intensity is 37 percent and import intensity 62 percent – a 25 percent gap, so in general they import more than they export.

## Level of competition within an industry

The Herfindahl index is a measure of the level of competition within an industry. Table 4.3.1 shows that the Herfindahl index is low for both the food and beverages industry and other industries. This means that the level of competition is relatively high. In the food and beverages industry, the Herfindahl index is slightly higher for traders (2.01) than for non-traders (1.85). This minimal difference is also apparent in the other industries, but even smaller. Nevertheless, it does seem as though there is slightly less competition among trading companies.

## R&D and innovation

Trading companies in the food and beverages industry spend slightly less on R&D per employee (1,200 euros) than trading companies in the rest of industry (1,500 euros). What stands out is that the median R&D expenditure of non-traders is 0, which implies that these companies conduct little or no R&D.

Goods traders also seem to be more innovative than non-traders. In the food and beverages industry, 46 percent of traders engage in product innovation, compared with 13 percent of non-traders. In addition, 22 percent of the traders in this industry (as in the rest of industry) have invested in process innovation. That percentage is a lot lower among non-traders.



**46%** of the traders in the food and beverages industry are active in product innovation

## 4.4 Innovation and R&D

Dutch agriculture and the food, beverage and tobacco industry is leading in Europe, also in terms of innovation. The food and beverages industry, for example, produces many innovative healthy nutritional concepts (reformulation of recipes, healthy ingredients and avoidance of allergens). This section describes the analysis of the relationship between R&D and innovation activities on the one hand, and goods exports on the other (see table 4.4.1). The data used covers the 2007-2014 period. A company that invested in innovation in at least one of these years is regarded as an innovator for the entire period. A company that exported goods worth at least 5,000 euros (in combination with imports or otherwise) is classified as an exporter.

It was found that 55 percent of companies in the food and beverages industry that did not invest in innovation did export goods. The export intensity of these companies was 59 percent. This means that these non-innovators are more export-oriented than the rest of industry, where most companies that did not spend on innovation also did not export.

Next, we analysed the companies that invested in process and product innovation. Of the food and beverages companies that invested in process innovation, 57 percent were found to export, versus just 36 percent for investors in product innovation. This 21 percent difference leads to the conclusion that process innovators in particular are involved in exporting goods. Other industries are in a similar situation, although the difference is slightly smaller (44 versus 31 percent).

Finally, we investigated whether there is a difference in the number of exporters between companies that do invest in R&D and those that don't. In both the



food and beverages industry and the rest of industry, approximately eight in ten companies involved in R&D also exported goods. For companies that did not invest in R&D it was only one third. So companies investing in R&D are also more likely to engage in the international trade in goods.

Briefly, these results show that investors in R&D export more often than non-investors. This conclusion applies to both the food and beverages industry and to other industries. Process innovation was also found to be linked with exporting in the food and beverages industry. Another noteworthy finding was the small proportion of exporters among companies involved in product innovation.

#### 4.4.1 Exporters investing in innovation and R&D in the food and beverages industry and other industry, 2007–2014

	Food and beverages industry		Other industry	
	exporter	export intensity <sup>1), 2)</sup>	exporter	export intensity <sup>1), 2)</sup>
	%			
Companies without spending on innovation	55	59	49	49
Companies with spending on process innovation <sup>3)</sup>	57	57	44	60
Companies with spending on product innovation <sup>3)</sup>	36	59	31	59
Companies without spending on R&D	30	62	32	52
Companies with spending on R&D	82	60	77	59

<sup>1)</sup> The median is shown for these variables.

<sup>2)</sup> The import and export intensity are expressed as a ratio of total trade (sum of imports and exports).

<sup>3)</sup> These figures show the share of the total number of companies with process and/or product innovation expenditure.

## 4.5 Export premium

In this section we describe whether, and if so to what extent, exporters do indeed perform better than non-exporters (export premium). After all, it has often been reported in the academic literature that only the most efficient and productive companies start exporting. This phenomenon was investigated on the basis of a number of regression analyses (see the explanation in section 4.2.2). The result of these analyses are presented in simplified form in table 4.5.1. Here (+) means that there is a significant positive relationship, while (–) indicates a significant negative relationship. The appendix (table 4.9.1) contains a detailed overview of these results, including regression coefficients and standard errors.

In line with the literature, our analyses show that there is indeed a difference between exporters and non-exporters in terms of labour productivity. The labour

productivity of exporting companies is as much as 62 percent higher than that of non-exporters. It is particularly high among exporters in the food and beverages industry.

Exporting companies were also found to be larger than non-exporters, with 49 percent more employees. This difference is even greater for exporters active in the food and beverages industry. These companies have a particularly large workforce.

There is also a significant positive relationship between exporting and R&D expenditure. The R&D spending per employee by exporting companies is 18 percent higher than among non-exporters. The difference is even greater when the exporters are active in the food and beverages industry.

Finally, there seems to be a minimal correlation between whether or not a company exports and the level of competition in the sector as measured by the Herfindahl index. The Herfindahl index of companies that export is 0.5 lower than that of non-exporters. This negative relationship is stronger when these companies are active in the food and beverages industry.

In short, as we expected, exporting companies do indeed seem to be more productive than non-exporters. The labour productivity of exporters is higher, they are larger and they conduct more R&D, particularly when they operate in the food and beverages industry.

#### 4.5.1 Exporter characteristics

	Export	Food and beverages industry
Labour productivity	+	+
Employees	+	+
R&D per employee	+	+
Herfindahl index	-	+

+ = Positive significant correlations.

- = negative significant correlations.

## 4.6 Extensive margin

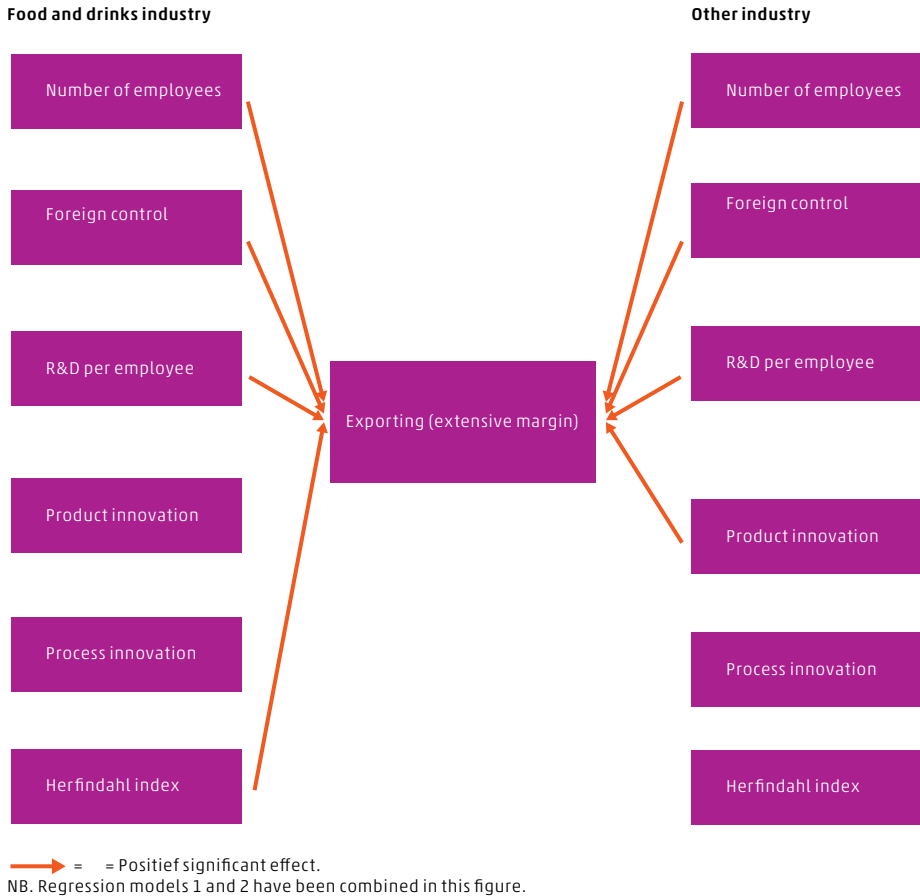
In this section we describe the factors that explain the probability that a company will export (extensive margin), both for the food and beverages industry and for other industries. The findings are important because Dutch exports will grow if more companies start exporting. The results of the analyses are presented

schematically in figure 4.6.1. An orange line indicates a significant positive relationship and a yellow line a significant negative relationship. If there is no line, there is no significant relationship between the variables. Regression models 1 and 2 are combined in this figure and are also discussed together because the analyses produced similar results. The appendix (table 4.9.2) contains a table of the actual results for each regression model, including regression coefficients and standard errors.

Our analyses show that there is a significant relationship between the probability that a company will export and company size, foreign control and R&D per employee, both in the food and beverages industry and elsewhere. Controlled for relevant factors, companies in the food and beverages industry under foreign control are more than twice as likely to export goods as companies under Dutch ownership. Companies with many employees and high R&D spending are also more likely to export goods. What stands out, however, is that – controlled for other factors – there is no significant relationship between either product or process innovation and the probability that a food and beverages company will export. As table 4.4.1 showed, many innovative companies in the food and beverages industry do not export (in contrast to companies that invest in R&D), and now that we corrected for other business characteristics, the relationship between innovation and exports turns out to be diffuse for companies in the food and beverages industry. In the rest of industry, product innovation only seems to increase the export probability by 47 percent. Finally, a significant relationship between the Herfindahl index and exporting was only found for the food and beverages industry. The higher the index for the level of competition within a sector, the greater the probability of a company being an exporter.

To summarise, the analyses show that there is a higher probability of a company in the food and beverages industry exporting when it has more employees, is under foreign ownership, spends a lot on R&D, and has little competition. A similar picture emerges for the rest of industry, although there it is investment in product innovation rather than the level of competition that corresponds to a higher export probability.

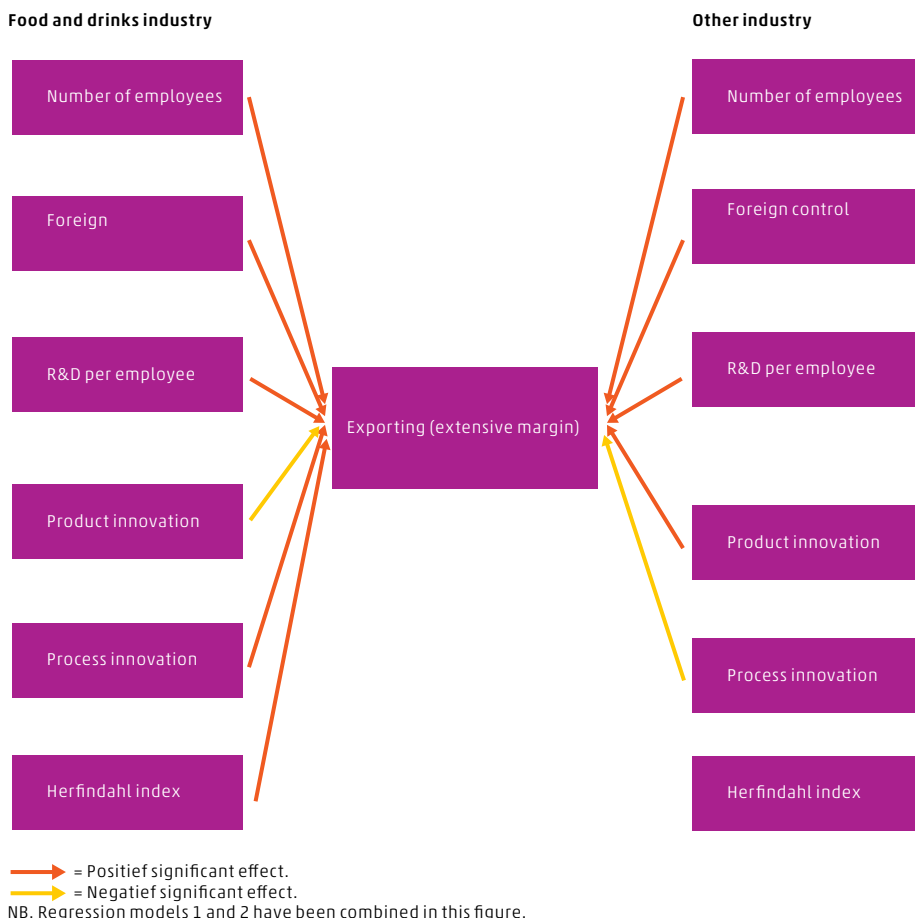
#### 4.6.1 Determinants of the likelihood of exporting (extensive margin)



## 4.7 Intensive margin

Finally, the factors explaining export volumes of companies were investigated. These findings can be used to achieve export growth via the intensive margin, which, like the extensive margin, is a form of export growth. The results of these analyses are presented in figure 4.7.1. As in the previous section, the result of the analyses of regression models 1 and 2 are combined in this figure and its description. A more detailed overview of the results can be found in the appendix (table 4.9.3).

### 4.7.1 Determinants influencing exporting size (extensive margin)



The analyses show that there is a positive relationship between company size, foreign ownership and high R&D spending and the export volume in both the food and beverages industry and in the rest of industry. In the food and beverages industry there seems to be a particularly strong correlation between having many employees and major exports. In other industries, it is foreign control that has the strongest correlation with export volume. There are also a number of striking relationships in the innovation-related variables. For example, engaging in product innovation is linked to lower exports in the food and beverages industry, while it is actually associated with substantially higher exports in other industries. The situation is precisely the opposite for process innovation. Investing in process innovation is linked to higher exports in the food and beverages industry, but negative linked to export volume in other industries. The Herfindahl index

shows a significant correlation with export volume in the food and beverages industry. Exports are higher in this sector if there is less competition.

To summarise, it turns out that the export volume is larger if companies have many employees, are under foreign control and conduct a lot of R&D. In the food and beverages industry, companies that engage in process innovation and have a higher Herfindahl index also have a larger export volume. On the other hand, investing in product innovation is linked with lower exports. The opposite situation applies in to other industries.

## 4.8 Conclusion

In addition to a detailed description of the extent of innovation and internationalisation in the food and beverages industry, this chapter also explored three phenomena relating to the international trade in goods. First, we investigated whether there are differences in productivity between exporters and non-exporters (export premium), both in the food and beverages industry and elsewhere. We also investigated what factors are linked to export volume (intensive margin) and the probability that a company will export (extensive margin).

First and foremost, the results show that companies in the food and beverages industry engage heavily and frequently in innovation and R&D, especially compared to companies in the rest of industry. The Dutch food and beverages industry can therefore be described as an innovative sector. This impression corresponds with the conclusion from earlier research that the Netherlands is one of the leading countries in Europe in terms of innovation in this sector (TNO, 2011). There is, for example, considerable innovation in the area of new concepts for healthy nutrition.

As expected, exporting companies were found to be more productive than non-exporters. The labour productivity (turnover per employee) of these companies is higher, they have more employees and they spend more on R&D. Furthermore, exporters in the food and beverages industry are more productive than exporters in the rest of industry. The export premium (higher productivity of exporters) can be explained in part by the fact that only the most efficient and productive companies tend to be capable of bearing the entry costs to international markets. After all, to do business in another country a company has to study the regulations and

guidelines that apply there, look for suitable partners and conduct research into the tastes and preferences in the local market (Smeets et al., 2010). There are costs and risks at every stage. Another possible explanation for the identified export premium is that trading with other countries creates a larger market. With some products, more is produced in the Netherlands than the country itself needs. By tapping into foreign markets these products can still be sold, with the possible result that exporting companies could become even more productive than companies that focus entirely on the Dutch market.

Dutch exports will grow if companies export more (intensive margin), but also if new companies start exporting (extensive margin). Our research has shown that the probability of a company exporting is greater the more employees it has, if it is under foreign control and/or is deeply involved in R&D. These factors also correlate with larger exports. In the food and beverages industry, companies also export more if they engage in process innovation and have less competition. The latter indicates that there is a correlation between increased competition and lower exports. This is perhaps due to the fact that more intensive competition can force companies to focus on the local market initially before they are able to start exporting. In the food and beverages industry, companies that engage in product innovation also have lower exports.

The conclusion to be drawn from this is that in order to create export growth in this sector it is better to encourage process innovation than product innovation. Trade with other countries will probably be easier if plenty of attention is devoted to innovation and optimising business processes (Roper & Love, 2002). Product innovation is also important, but investment in it seems to come at the expense of export volume. Earlier research also found a similar relationship and suggested that there is possibly a threshold at which more product innovation can lead to fewer exports (Roper & Love, 2002). This may be because the actual product innovation generally takes place in the importing country rather than in the Netherlands. In addition to innovative products, the Netherlands also exports many standard products that are processed further in the importing country. This explanation is reinforced by our finding that only a third of the exporters in the food and beverages industry engage in product innovation.

The conclusion to be drawn from this chapter is that export premium does exist: companies that export are more productive than non-exporters. Export growth has also been found to be connected to several factors. The export probability and export volume is likely to be greater among foreign companies, large companies (many employees) and companies that involved in a great deal of R&D. In the food and beverages industry, companies that engage in process innovation also export more, while investment in product innovation initially seems to have a negative

effect. In addition to these factors, there are probably others that influence exports that have not been investigated. These factors, such as entrepreneurial skills, spending on investment and the export destination, could be explored in a future analysis.

## 4.9 Appendix

This section contains three tables containing the results of the regression analyses that were discussed in this chapter.

### 4.9.1 Results of linear regression analyses: impact of exporting ( $\beta_1$ ) and food and beverages industry ( $\beta_2$ )

	$\beta_1$	SE( $\beta_1$ )	$\beta_2$	SE( $\beta_2$ )	R <sup>2</sup>
<b>Productivity</b>					
Labour productivity	0.481 <sup>1)</sup>	0.020	0.876 <sup>1)</sup>	0.081	0.06
Employees	0.402 <sup>1)</sup>	0.012	0.482 <sup>1)</sup>	0.052	0.07
R&D per employee	0.163 <sup>1)</sup>	0.035	0.395 <sup>1)</sup>	0.140	0.18
Herfindahl index	-0.005 <sup>1)</sup>	0.000	0.036 <sup>1)</sup>	0.002	0.41

Note: The coefficients of the independent variables can be converted into percentages through the following formula: ((Exponent van  $\beta$ ) - 1) \* 100%.

Note: Robust standard errors are adjusted for clustering at the company level.

<sup>1)</sup> Significant at the 1% level.



#### 4.9.2 Results of probit analyses: determinants of exporting or not (extensive margin), for the food and beverages industry and the rest of industry separately

Exporter (yes = 1, no = 0)				
	food and beverages industry		other industry	
	model 1 $\beta$ (SE)	model 2 $\beta$ (SE)	model 1 $\beta$ (SE)	model 2 $\beta$ (SE)
Number of employees	0.326 (0.141) <sup>1)</sup>	0.410 (0.137) <sup>1)</sup>	0.132 (0.022) <sup>1)</sup>	0.190 (0.026) <sup>1)</sup>
Foreign control	1.104 (0.373) <sup>1)</sup>	–	0.445 (0.065) <sup>1)</sup>	–
R&D per eemployee	0.453 (0.166) <sup>1)</sup>	0.322 (0.119) <sup>1)</sup>	0.098 (0.028) <sup>1)</sup>	0.060 (0.026) <sup>1)</sup>
Product innovation	–	-0.147 (0.207)	–	0.469 (0.055) <sup>1)</sup>
Process innovation	–	0.099 (0.215)	–	-0.086 (0.055)
Herfindahl index	1.590 (1.011)	2.733 (1.503) <sup>2)</sup>	-0.080 (0.173)	0.238 (0.207)
N	851	628	8,248	5,850
R <sup>2</sup>	0.22	0.18	0.22	0.19

Note: No value has been presented for foreign control in model 2 because all companies in model 2 are foreign controlled.

Note: Robust standard errors are adjusted for clustering at the company level.

<sup>1)</sup> Significant at the 1% level.

<sup>2)</sup> Significant at the 10% level.

#### 4.9.3 Linear regression analyses: determinants of export volume (intensive margin), for the food and beverages industry and the rest of industry separately

Food and beverages industry				
	food and beverages industry		other industry	
	model 1 $\beta$ (SE)	model 2 $\beta$ (SE)	model 1 $\beta$ (SE)	model 2 $\beta$ (SE)
Number of employees	1.445 (0.214) <sup>1)</sup>	1.937 (0.223) <sup>1)</sup>	0.986 (0.068) <sup>1)</sup>	1.281 (0.066) <sup>1)</sup>
Foreign control	1.380 (0.374) <sup>1)</sup>	–	1.909 (0.149) <sup>1)</sup>	–
R&D per eemployee	0.807 (0.164) <sup>1)</sup>	0.758 (0.175) <sup>1)</sup>	0.561 (0.070) <sup>1)</sup>	0.379 (0.064) <sup>1)</sup>
Product innovation	–	-0.728 (0.415) <sup>2)</sup>	–	1.558 (0.146) <sup>1)</sup>
Process innovation	–	0.130 (0.458) <sup>1)</sup>	–	-0.361 (0.136) <sup>1)</sup>
Herfindahl index	3.024 (2.328)	4.497 (2.406) <sup>2)</sup>	-0.201 (0.333)	0.554 (0.381)
Constante	3.559 (3.513)	0.025 (3.049)	6.736 (0.529)	3.898 (0.576)
N	851	628	8,248	5,929
R <sup>2</sup>	0.211	0.231	0.335	0.193

Note: The coefficients of the independent variables can be converted into percentages through the following formula: ((Exponent van  $\beta$ ) - 1) \* 100%.

Note: Robust standard errors are adjusted for clustering at the company level.

Note: No value has been presented for foreign control in model 2 because all companies in model 2 are foreign controlled.

<sup>1)</sup> Significant at the 1% level.

<sup>2)</sup> Significant at the 10% level.

# Glossary

## **Agribusiness**

Agribusiness consists of enterprises active in agriculture, fishing and hunting as well as related sectors such as the food and beverages industry. Agribusiness also includes enterprises that conduct research or provide services for the primary agriculture sector. Market trade, retail and wholesale focused on food and beverages also belong to agribusiness. The appendix of chapter 3 contains a comprehensive overview of all SIC's (Standard Industrial Classifications, similar to the European NACE) belonging to agribusiness.

## **Agricultural sector**

The agricultural sector, or agro-sector, is part of the agribusiness. It includes agriculture, horticulture and fisheries, the food and beverages industry and agricultural manufacturing.

## **Balance of trade**

The balance of trade is the difference between the monetary value of a country's exports and imports over a certain period. A higher export value than import value results in a trade surplus, conversely one speaks of a trade deficit.

## **Balassa index**

The Balassa index measures the degree of specialisation of a country's export and import products. A Balassa index higher than 1 indicates that there is specialisation in this product. If the index is below 1, there is no specialisation in this product.

## **Domestic**

An enterprise whose locus of control is in the Netherlands and that does not control enterprises abroad. Control is defined as the ability to determine the general and strategic policy of an enterprise by appointing appropriate directors. The locus of control is in the resident country of the Ultimate Controlling Institutional Unit (UCI). The UCI is the institutional unit, proceeding up a foreign affiliate's chain of control, which is not controlled by another institutional unit.

## **Employee**

A person who has a contract with an economic unit to carry out work in return for financial remuneration.

**EU and 'new EU countries'**

In Chapter 2, a comparison is made between the EU-15 ('old EU countries', without the Netherlands), EU members since 2004 ('new EU countries') and non-EU countries. For a correct comparison the same number of countries is compared in all years between 2000 and 2015, irrespective of the year in which countries joined the EU. All years thus refer to the current 28 EU members (without the Netherlands) with a breakdown into the 15 'old EU countries' (Belgium, Germany, Luxembourg, United Kingdom, France, Denmark, Sweden, Austria, Spain, Italy, Portugal, Ireland, Greece and Finland) and the 13 'new EU countries' (Estonia, Latvia, Lithuania, Poland, Hungary, Slovakia, Slovenia, Cyprus, Malta, Czech Republic, Romania, Bulgaria and Croatia).

**Exports of Dutch produced goods**

The supply of goods by residents from the economic territory of the Netherlands to a foreign country. It concerns goods produced or manufactured in the Netherlands. Re-exports and exports of Dutch produced goods together constitute the total Dutch export figures.

**Export premium**

Export premium refers to the phenomenon that exporting enterprises are, in general, more productive than enterprises without export of goods.

**Extensive margin**

The extensive margin refers to changes in the export due to an increase of the amount of exporting enterprises, exported goods or export destinations.

**Foreign-controlled enterprises**

An enterprise whose locus of control is in a country outside the Netherlands. Control is defined as the ability to determine the general and strategic policy of an enterprise by appointing appropriate directors. The locus of control is in the resident country of the Ultimate Controlling Institutional Unit (UCI). The UCI is the institutional unit, proceeding up a foreign affiliate's chain of control, which is not controlled by another institutional unit.

**GDP (Gross Domestic Product)**

Gross Domestic Product is a quantity that expresses the size of an economy. The volume change of GDP during a reference period expresses the growth or shrinkage of the economy. Gross domestic product at market prices is the final result of the production activity of resident producer units.

## **Innovation**

An innovation is the implementation of a new or significantly improved product (goods or services) or process. An innovation can also be a new marketing method or a new organisational method in business practices, workplace organisations or external relations. Hence, innovation can be subdivided into two main categories: technological and non-technological innovation. Technological innovation encompasses both product innovations and process innovations, while non-technological innovation concerns organisational innovations and marketing innovations. The Oslo Manual published by the OECD distinguishes five types of innovation:

1. Product innovations: the enterprise has introduced one or more new or significantly improved products. Such products can be goods or services that are either new to the market or new to the enterprise itself.
2. Process innovations: the enterprise has implemented one or more new or significantly improved processes or methods. Such processes or methods involve:
  - production of goods or services,
  - logistics (delivery or distribution) of inputs (goods or services),
  - supporting activities for processes, such as maintenance systems or methods of purchase, accounting or calculation. Such processes or methods can be either new to the market or new to the enterprise itself.
3. Ongoing or abandoned product innovations or process innovations: the enterprise was involved in product or process innovations as discussed above, but has abandoned and/or has not finished the innovation.
4. Organisational innovations: the enterprise has introduced one or more of the following innovations:
  - new business policies,
  - new methods to organise professional responsibilities and make decisions,
  - new methods to organise external relationships with other enterprises or institutions.
5. Marketing innovations: the enterprise has introduced innovations in:
  - the esthetical design or packaging of products,
  - the way in which the enterprise uses the media to promote their products,
  - the way in which the enterprise positions products in the market or uses new sales channels,
  - the way in which the enterprise determines the price of their products.

Innovations can be new to an enterprise, but this does not necessarily mean that an innovation is also new to its branche or market. Furthermore, it could be the case that an innovation was prepared by the enterprise itself or by other enterprises.

**Intensive margin**

The intensive margin refers to changes in the exports due to an increase of the average export value for an enterprise, product or export destination.

**Multinational**

A multinational has ultimate control over enterprises active in two or more countries. In the Netherlands a distinction can be made between Dutch and foreign multinationals. A Dutch multinational is an enterprise of which the locus of control is in the Netherlands and that has subsidiaries abroad. A foreign multinational is an enterprise of which the locus of control is in a country outside the Netherlands.

**Persons employed**

The number of persons employed is defined as the total number of persons who work in the observation unit (inclusive of working proprietors, partners working regularly in the unit and unpaid family workers), as well as persons who work outside the unit who belong to it and are paid by it (e.g. sales representatives, delivery personnel, repair and maintenance teams). It excludes manpower supplied to the unit by other enterprises, persons carrying out repair and maintenance work in the enquiry unit on behalf of other enterprises, as well as those on compulsory military service.

**Primary, secondary and tertiary agricultural goods**

Primary agricultural goods are unprocessed goods originating from nature or the primary sector of the economy. Secondary agricultural goods include processed and prepared primary agricultural goods. Together, the primary and secondary agricultural goods constitute the main definition of agricultural goods. Tertiary agricultural goods refer to supporting goods for the agricultural sector. The tertiary goods are not part of the main definition. See the annex of chapter 2 for a comprehensive overview.

**Quasi-transit trade**

Goods entering and leaving the Netherlands without having undergone any significant industrial processing. At no stage in the process, a Dutch resident becomes owner of the goods. In addition, one of the following administrative actions must take place in the Netherlands:

- at arrival in the Netherlands, goods from outside the EU are cleared through customs,
- the goods leave the Netherlands and the EU and an export document is drawn up by customs,
- the international goods are stored in the Netherlands for at least one day. This makes the owner liable to VAT and therefore the owner has to register for VAT.

Quasi-transit trade is not included in the Dutch trade statistics.

**Re-exports**

Goods entering the Netherlands which are (temporarily) owned by a resident of the Netherlands and subsequently leave the Netherlands without having undergone any significant industrial processing.

**Research & Development (R&D)**

A characteristic of R&D is that it is original and innovative. R&D is the creative, systematic and planned search for solutions to practical problems. It also includes strategic and fundamental research aimed at gaining background knowledge and increasing the (pure) scientific knowledge rather than generating a direct economic benefit; and the development of ideas and prototypes into useful processes and production-ready products.

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