

WP 5.1 Scan of Regional Food Clusters

**The Interreg IVB
North Sea Region
Programme**



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1. INTRODUCTION

As part of the Interreg IVB North Sea Region (NSR) Programme, the “Connecting Food Port Regions - Between and Beyond”, or in short “Food Port” project, aims to develop the North Sea Region (NSR) as the best food cluster and hub in Europe for food products delivered via efficient and sustainable transport systems e.g. “green transport corridors”. Food Port brings together local authorities, knowledge organisations, food industries and ports from six countries to find practical solutions to improve the efficiency, effectiveness and sustainability of the food supply chains. These six countries are Norway, Sweden, Scotland/England, Denmark, Germany and Belgium.

The work package 5 (Enhancing market knowledge) under the Interreg IVB NSR Food Port project aims to improve the accessibility between the partner regions and to realise green transport corridors for food products. One of the first activities of work package 5 is 5.1 “Scan of regional food clusters”, which is a market overview or scan of NSR food clusters. This analysis tries, (1) to give a market overview by summarizing the food production and trade in the NSR countries; (2) to describe the food supply chains characteristics and trends in the NSR region by focusing on some partner regions. These partner regions include:

- Yorkshire & Humber, England
- Scotland
- West Flanders, Belgium
- Västra Götaland, Sweden
- Møre & Romsdal County (incl. Nordmøre and KNH¹ region), Norway
- Southern Denmark, Denmark
- Bremerhaven, Germany

The market scan of the above partner regions were conducted for 2010–2012. Data of the market scans are largely collected from existing databases and official statistics. This document is the final report of the market scans, summarizing the analysis conducted at each partner region. The aims of this report include:

1. To identify groups of food produced and manufactures in the North Sea countries
2. To get an overview of the transport demand of food trades in the North Sea Region
3. To get an overview of the transport supply for food trades in the North Sea Region
4. To identify groups of food produced, manufactured, distributed, exported and imported in the partner regions
5. To identify hubs and transportation modes used for the different groups of food in the partner regions
6. To identify the opportunities for modal shift and the use of green corridors in the partner regions
7. To identify the opportunities for the use of identification, location and communication (ILC) technologies in the partner regions

¹ Kristiansund and Nordmøre Port region (KNH)

This report serves as the basis for the remaining work packages of the Food Port Project, which overall aims to improve the efficiency and the effectiveness of food flow and realise green transport corridors for food products in the North Sea Region.

This report is structured as follows: Section 2 defines the areas studied in this report; Section 3 briefly introduces the groups of food that are produced and manufactured in the NSR countries. Section 4 presents the food trade flows between the NSR countries, which generates transport demands; Section 5 briefly analyses the transport service for these food trade, with a focus on the modal split in the NSR countries; Section 6 is a SWOT analysis of the key components of the regional food supply chains; Section 7 identifies the potential benefits of advanced food supply chain technologies; Section 8 draws our the conclusions.

2. GEOGRAPHICAL AREAS AROUND THE NORTH SEA

This section introduces the different levels of geographical regions around the North Sea, which are studied in this report. There are three levels of regions: *NSR countries*, *NSR regions* and *partner regions*, as shown in Figure 1.

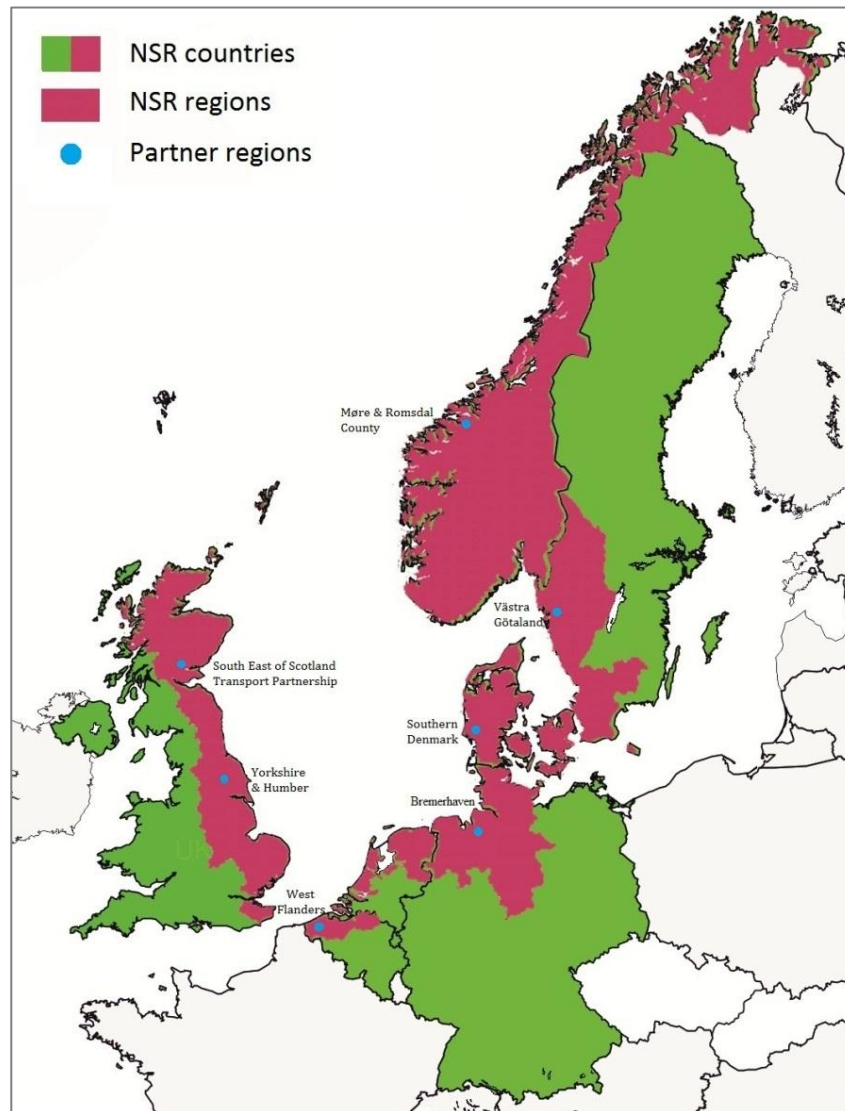


Figure 1. The geographical regions around the North Sea

Why are these levels of regions needed in this report? First, the NSR regions, as shown in red in Figure 1, are the research object defined by the Interreg IVB North Sea Region Programme. Second, the seven NSR countries, as shown in both green and red, have huge amount of food trade between each other, most of which is transported through the NSR regions. Therefore, it is important to analysis all the food trade flows between the NSR countries, rather than only the flows between the NSR regions. This will allow a more comprehensive view on food transportation in the North Sea Region. Third, the partner regions, as shown by the blue dots, are the ones where the project partners come from. These partner regions cover a big part of the transport facilities in the North Sea Region. Comprehensive studies on these partner regions will provide knowledge about food supply chains in the North Sea Region and enable identification of green transport corridors for food products.

2.1 THE NSR COUNTRIES

The seven NSR countries are Sweden, Denmark, Germany, the Netherlands, Belgium, the United Kingdom and Norway. Some general information about these countries can be found in Table 1, including population and area of utilised agriculture land, as well as the gross value added (GVA) of agriculture activities, food manufactures and the sum of all industries. As can be seen, the total population in these seven countries reaches 191 million, and the total agriculture land use is nearly 42 million hectares. All 7 countries have relatively strong agri-food industries, as shown by the high the GVA values of crop production, animal production, hunting and manufacture of food, beverage and tobacco. The GVA of agri-food industries accounts for 1.8% ~ 4.3% of the total GVA of all industries in these seven countries, by the true economic value of the agri-food industries could be much bigger, because the agri-food industries supply the primary raw materials to several other major industrial and service sectors, such as wholesale and retail, hotels and restaurants, transport and storage.

Table 1. Agriculture land, population and the gross value added of agri-food industries

Country	Utilised agricultural area 2007 (hectares)	Population by the end of 2009	Gross Value Added (million euros)		
			Crop and animal production, hunting and related service activities	Manufacture of food, beverages and tobacco	Total of all industries
Belgium	1,374,430	10,839,905	1,907	:	304,441
Denmark	2,662,590	5,534,738	1,443	4,474	192,627
Germany	16,931,900	81,802,257	13,760	37,770	2,117,210
Netherlands	1,914,330	16,574,989	7,795	14,111	509,148
Sweden	3,118,000	9,340,682	1,032	3,527	255,241
United Kingdom	16,043,160	62,026,962	784	28,624	1,020,028
Norway	1,031,990	4,858,199	1,213	3,415	240,074

Note 1: ':' means not available.

Note 2: Data for UK is estimated based on the data from Annual Business Survey (<http://www.ons.gov.uk/ons/>), and the other data is obtained from Eurostat

2.2 THE NSR REGIONS

The NSR regions, as shown in red in Figure 1, cover an area of 664,000 km². It consists of all of Norway and Denmark, the eastern parts of the UK, parts of the Flemish Region of Belgium, the north western regions of Germany, the northern and western parts of the Netherlands and the south western region of Sweden. This region is connected by the North Sea. It includes 49 regions at NUTS-2 level, as shown in Table 2. The food transport in these regions is the research objective of this report.

Table 2. The NUTS-2 regions in the NSR

NUTS-2 code	NUTS-2 region name	NUTS 1 region	Country
BE21	Antwerpen	Vlaams Gewest	Belgium
BE23	Oost-Vlaanderen		
BE25	West-Vlaanderen		
DK01	Hovedstaden	Denmark	Denmark
DK02	Sjælland		
DK03	SydDenmark		
DK04	Midtjylland		
DK05	Nordjylland		
DE50	Bremen	Bremen	Germany
DE60	Hamburg	Hamburg	
DE91	Braunschweig	Niedersachsen	

DE92	Hannover		
DE93	Lüneburg		
DE94	Weser-Ems		
DEF0	Schleswig-Holstein		
NL11	Groningen	Noord-Nederland	Netherlands
NL12	Friesland		
NL13	Drenthe		
NL21	Overijssel	Oost-Nederland	
NL23	Flevoland		
NL32	Noord-Holland	West-Nederland	
NL33	Zuid-Holland		
NL34	Zeeland		
SE21	Småland med öarna	Södra Sverige	Sweden
SE22	Sydsverige		
SE23	Västsverige		
SE31	Norra Mellansverige	Norra Sverige	
UKC1	Tees Valley and Durham	North East (England)	United Kingdom
UKC2	Northumberland, Tyne and Wear		
UKE1	East Yorkshire and North Lincolnshire	Yorkshire and The Humber	
UKE2	North Yorkshire		
UKE3	South Yorkshire		
UKE4	West Yorkshire		
UKF1	Derbyshire and Nottinghamshire	East Midlands (England)	
UKF2	Leicestershire, Rutland and Northamptonshire		
UKF3	Lincolnshire		
UKH1	East Anglia	East of England	
UKH3	Essex		
UKJ4	Kent	South East (England)	
UKM2	Eastern Scotland	Scotland	
UKM5	North Eastern Scotland		
UKM6	Highlands and Islands		
NO01	Oslo og Akershus	Norge	Norway
NO02	Hedmark og Oppland		
NO03	Søtlandet		
NO04	Agder og Rogaland		
NO05	Vestlandet		
NO06	Trøndelag		
NO07	Nord-Norge		

2.3 THE PARTNER REGIONS

The partner regions, as shown by the blue dots in Figure 1, including Yorkshire & Humber (in England), South East of Scotland Transport Partnership² (SEStran in Scotland), West Flanders (in Belgium), Västra Götaland (in Sweden), Møre & Romsdal County (in Norway), Southern Denmark (in Denmark) and Bremerhaven (in Germany). These partner regions have relatively strong agriculture and food industries, and are fairly well equipped with transport facilities.

A brief summary of the features of the partner regions can be found in Table 3. Table 4 summarizes land area, population, employment and economy for the different regions.

² The SEStran partner made a market scan for not only their own region, but the whole Scotland.

Table 3. Brief information of the partner regions

Partner Region	Features of the region
Yorkshire & Humber	<ul style="list-style-type: none"> Yorkshire and Humber is situated at the north east coast of England, and covers four NUTS-2 level regions: (1) East Yorkshire and North Lincolnshire, (2) North Yorkshire, (3) South Yorkshire, (4) West Yorkshire The region has 360 km of coastline, facing the North Sea and Humber Estuary The region is the fifth largest region in England with an area of 15,402 km² The north and east of Yorkshire and the Humber are largely rural, the south and west of Yorkshire are more urban
SEStran	<ul style="list-style-type: none"> SEStran is one of seven Regional Transport Partnerships in Scotland The partnership area belongs to the NUTS-2 region - Eastern Scotland, and includes eight local authorities. It covers an area of 8,236 km² and is home to 28% of Scotland's population
West Flanders	<ul style="list-style-type: none"> West Flanders is a NUTS-2 level region, situated at the westernmost of the Flemish region, also known as Flanders; it has borders with the Netherlands and France and are facing the north sea The region has 3,125 km² land area, mostly consists of flat surface with some small hills to the South About two-thirds of West Flanders' surface is used for agriculture and horticulture (216,000 ha)
Västra Götaland	<ul style="list-style-type: none"> Västra Götaland is a NUTS-3 level region, belongs to the NUTS-2 region - Västsverige, situated at the western coast of Sweden. It is the second largest county in Sweden (in the terms of population) Geographically, Västra Götaland is one of the largest regions in Sweden with an area of 24,000 km² (6% of national territory) The geography is much diversified with cities, rural areas, small communities and medium-sized towns There are the sea, lakes, rolling hills, deep forests, open plains – all the different types of natural environment in Sweden except mountains
Møre & Romsdal	<ul style="list-style-type: none"> Møre & Romsdal County is a NUTS-3 level region, belongs to the NUTS-2 region – Vestlandet. It is made up of three districts – Sunnmøre, Romsdal and Nordmøre It is the 7th largest county in Norway
Southern Denmark	<ul style="list-style-type: none"> Southern Denmark has a population of 1.2 million, making it the third largest region in Denmark in term of population The region is the only region in Denmark that is connected to another country by land (Germany) Southern Denmark is a NUTS-2 level region, covering an area of about 12,000 sq. km
Bremerhaven, Germany	<ul style="list-style-type: none"> Bremerhaven is a NUTS-3 level region, belongs to the NUTS-2 region – Bremen, situated at the mouth of the Weser River exactly 32 nautical miles away from the North Sea. Bremerhaven has a long history as a trade port and today is one of the most important German ports, playing a crucial role in Germany's trade. The key industries in Bremerhaven are: Ports and Logistics, Fish and Food Industry, Maritime Technologies, Tourism and the Offshore Wind Energy Sector. Agriculture plays no important role in the city area.

In Table 4 it can be seen that, Västra Götaland and Yorkshire and Humber are the largest in term of land area, while the Bremerhaven city is comparatively small. Bremerhaven is more populated than other regions, followed by West Flanders and Yorkshire and Humber. Møre & Romsdal has only 41 people per square km. The population in some regions e.g. SEStran are expected to grow significantly higher than the national average, partly due to the effect of urbanisation and employment opportunity. The population of Yorkshire and Humber is also expected to grow faster than the national average. Though unemployment rates in most regions remain high, the lack of workers specialised in specific skills remains a concern. As far as

economy is concern, all the regions contribute significantly to the economy of respective countries. However, in regions such as Yorkshire and Humber and Southern Denmark, the employment in food and drink industry has declined.

Table 4 Background data of the partner regions

Background Data	Yorkshire & Humber	SEStran	West Flanders	Västra Götaland	Møre & Romsdal	Southern Denmark	Bremen-haven
Land area (km ²)	15,402	8,236	3,125	24,000	6,069	12,000	94
Population (million)	5.2	1.5	1.15	1.6	0.249	1.2	0.11
Population profile	19.1% age 65+	17% age 65+	17% age 65+	18% age 65+	N.D. ²	18% age 65+	22% age 65+
Estimated density (population per km ²)	338	182	367	67	41	100	1208
Employment	70.5%	N.D. ²	403,052	772,000 (65%)	N.D. ²	75.6%	46,932
GVA per head	£16,569 ¹	£14,000 - £31,000 ³	N.D. ²	N.D. ²	N.D. ²	€37,975	€29,647
GDP (million €)	113,526	N.D. ²	N.D. ²	€55,500	N.D. ²	N.D. ²	€112.4
GDP (EU-25) average (100)	95 (estimated)	N.D. ²	N.D. ²	134	N.D. ²	N.D. ²	156.9

¹Data for 2009 (http://www.statistics.gov.uk/downloads/theme_economy/RegionalGVA2009.pdf)

²N.D. no data for some regions

³GVA at local authority level e.g. £31,000 for City of Edinburgh, £13,000 for East Lothian & Midlothian.

3. OVERVIEW OF FOOD PRODUCTION IN THE NSR COUNTRIES

This section briefly introduces the groups of food produced in the NSR countries. This information provides the basic background of this report analysis. The detailed data of food production in the NSR countries is generally available from the Eurostat database, although a few food groups are missing in some countries. By aggregating the detailed data, a brief overview of food production is obtained, as shown in Table 5.

In total, the volume of foodstuffs processed in the NSR countries is over 300 million tonnes. When the volume for Europe (specifically EU 27³ countries plus Norway) is estimated with the same method, we can get a number of 893 million tonnes. This means one third of the food products are produced in the NSR countries, if both estimation numbers are close to the real situation (we believe so, even though some data are missing in Eurostat database). Therefore, the NSR countries are a very important food cluster in Europe.

The detailed production volumes of individual food types processed in the NSR countries can be seen in Table 5. Some food products are processed in big volumes, such as 21 million tonnes of meat (incl. poultry meat), 15 million tonnes of oils and fats, 21 million tonnes of dairies and cheese, 18 million tonnes of grain mill products, 10 million tonnes of bread and cakes, 21 million tonnes of beer and 21 billion litres of soft drinks and mineral waters. The single food group with the highest production volume is the prepared feeds for farm animals, which was 109 million tonnes in 2010. Generally, most (80%) of these food products are processed in Germany, the UK and the Netherlands.

The distribution of food production activities in these NSR countries varies between different food groups. Geographically, the production distribution of most food groups does not match with the demographic distribution. Even, some food groups are highly concentrated in one or two countries. For example, Norway produces two thirds of the total volume of fish in these NSR countries; more than half of the total potatoes are produced in Netherlands; more than 80% of spirits, cider and fruit wines are produced in the UK; and nearly 80% of non-distilled fermented beverages are produced in Sweden. Consequently, this mismatch of food production and consumption raises the demand of food trade and transportation between the NSR countries. Moreover, the variety of customer preferences also promotes the requirement for efficient transport and supply chain for food products.

It is noted that some individual data in Table 5 may be smaller than the real ones, because some of the detailed data is not available in the Eurostat database. For example, the data for frozen potatoes, potato flour, meal and crisps processed in Belgium is missing; therefore in Table 5 the total volume of potatoes processed in Belgium actually covers dried potatoes only.

³ a list of EU 27 countries can be found on <http://publications.europa.eu/code/pdf/370000en.htm>

Table 5. The volumes of foodstuffs processed in the North Sea countries in 2010

Processed foodstuff	Unit	Netherlands	Germany	United Kingdom	Denmark	Belgium	Norway	Sweden	EU 27
meat (excluding poultry meat)	tonne	1,191,935	8,800,832	2,024,541	2,039,533	832,790	244,692	377,889	37,135,732
poultry meat	tonne	1,126,519	1,622,628	1,274,119	147,842	564,607	73,116	102,019	12,367,714
Production of meat and poultry meat products	tonne	408,423	4,112,511	2,036,167	205,166	486,841	122,983	110,100	17,310,764
fish, crustaceans and molluscs	tonne	27,000	456,857	628,209	436,266	30,213	2,804,458	30,431	4,549,553
potatoes	tonne	2,382,062	1,085,786	775,191	43,324	64,673	16,532	6,129	8,167,701
fruit and vegetable juice	1000 litre	168,034	2,227,050	819,830	139,272	101,644	60,148	136,817	10,386,700
Other processing and preserving of fruit and vegetables	tonne	341,568	1,815,559	1,732,861	69,522	1,484,570	62,427	93,118	22,441,542
oils and fats	tonne	2,439,431	10,493,603	607,814	887,335	6,874	106,897	:	53,967,207
margarine and similar edible fats	tonne	547,788	906,652	210,894	131,803	408,661	:	76,990	3,334,836
dairies and cheese	tonne	:	9,347,878	9,130,425	1,265,118	:	12,888	1,561,903	78,340,123
ice cream	1000 litre	:	584,101	442,705	14,661	160,126	:	80,313	2,898,000
grain mill products	tonne	174,275	7,615,276	6,715,949	522,888	1,735,442	9,818	772,588	56,663,694
starches and starch products	tonne	724,271	1,783,855	502,148	249,256	217,029	:	79,301	18,086,983
Bread, fresh pastry goods and cakes	tonne	:	4,628,376	3,897,214	280,050	431,118	366,485	67,513	25,154,866
rusks and biscuits; preserved pastry goods and cakes	tonne	423,586	914,438	1,466,078	82,203	297,288	17,033	138,251	7,548,421
macaroni, noodles, couscous and similar farinaceous products	tonne	:	282,283	34,053	3,811	:	:	:	4,685,006
sugar	tonne	:	5,840,186	21,851	453,206	147,889	0	:	30,725,384
cocoa, chocolate and sugar confectionery	tonne	630,154	2,324,868	929,161	92,558	505,828	:	22,430	8,798,353
tea and coffee	tonne	118,412	913,217	158,881	30,940	81,101	31,393	105,483	2,822,971
condiments and seasonings	tonne	597,860	1,047,101	1,081,426	55,528	229,328	9,020	99,899	9,297,277
prepared meals and dishes	tonne	123,327	1,135,780	526,192	224,488	182,070	33,639	94,810	5,829,230
homogenised food preparations and dietetic food	tonne	144,013	192,134	:	11,637	:	3,664	:	1,347,742
other food products	tonne	597,010	1,948,103	685,855	201,626	216,892	34,983	66,651	7,828,190
prepared feeds for farm animals	tonne	27,455,673	26,096,114	29,152,651	4,828,120	13,902,781	5,001,899	2,218,224	267,020,431
prepared pet foods	tonne	667,901	1,431,081	1,650,747	163,995	90,198	:	:	9,925,206
spirits	1000 litre	15,086	114,107	615,536	3,185	7,873	:	2,636	1,718,696
wine from grape	1000 litre	:	198,916	:	954	:	:	:	5,908,664
cider and other fruit wines	1000 litre	:	:	683,087	6,793	:	:	105,748	1,970,692
other non-distilled fermented beverages	1000 litre	:	:	0	860	:	0	3,202	300,000
beer	tonne	2,449,259	8,673,803	6,065,707	684,311	1,966,649	240,363	457,810	42,376,343
malt	tonne	:	1,433,919	1,213,564	229,606	:	0	:	7,367,378
soft drinks; mineral waters and other bottled waters	1000 litre	2,522,470	8,886,097	7,395,195	765,548	:	643,656	863,829	116,467,912
tobacco products	1000 package	:	220,343,128	45,710,000	11,667,353	:	0	:	700,098,458

Note 1. ‘:’ means not available.

Note 2. Above data is obtained by aggregating the detailed data from Eurostat http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database. Note 3. Since some of the detailed data is not available in the Eurostat database, the above data values might be smaller than the real ones.

4. OVERVIEW OF FOOD TRADE BETWEEN THE NSR COUNTRIES

This section presents the trade flows of food products between the NSR countries at the national level. This will provide a general overview of the transport demand of food products in the NSR area. More figures and flow maps related to this topic can be found in Appendix A and B.

As a starting point, the importance of food trade in the NSR area is analysed in Table 6. First, according to the official statistics in Eurostat, the total volume of food products exported from the NSR countries reached 147 million tonnes in 2010. It means the food export ratio in the NSR area is nearly 50%. Such ratio in the other EU countries is only 32% averagely, as shown in Table 6. This comparison once again indicates that, the NSR countries are a very strong food cluster in Europe. Second, when food export destination is concerned, we can see in Table 6 that most of the foods exports are traded within Europe, while only a relatively small amount of food products are exported out of Europe. Third, when the ratio of intra-region food trade to food production is concerned, the ratio in the NSR countries is (70/301=23%) much higher than the one in the other EU countries (only (146-62)/594=14%). Indeed, the NSR area is a thriving region for food production and trade.

Table 6. Production and export of foodstuffs in EU in 2010 (million tonne)

	NSR countries	Non-NSR countries in EU 27	EU 27 plus Norway
Food production	301	594	893
Food export to world (percentage to food production)	147 (49%)	192 (32%)	339 (38%)
Food export to EU 27 and Norway (percentage to food production)	120 (40%)	146 (25%)	266 (30%)
Food export to the NSR countries (percentage to food production)	70 (23%)	62 (10%)	133 (15%)

Note 1: the data source is Eurostat [DS-018995].

To have a close view at the food trade between the NSR countries, we further investigate the food types and trade origin/destination. First, we use SITC Rev.4 (Standard International Trade Classification) to categorise food products, which includes the following 12 major types. Then, we split the total food trade volume according to SITC Rev.4 in Table 7. We can see, the biggest food types for trade in 2010 were cereals (SITC-04), vegetables and fruits (SITC-05) and animal feeding stuff (SITC-08). The trade volume of beverage (SITC-11) was also big, while the trade volume of tobacco (SITC-12) was the smallest.

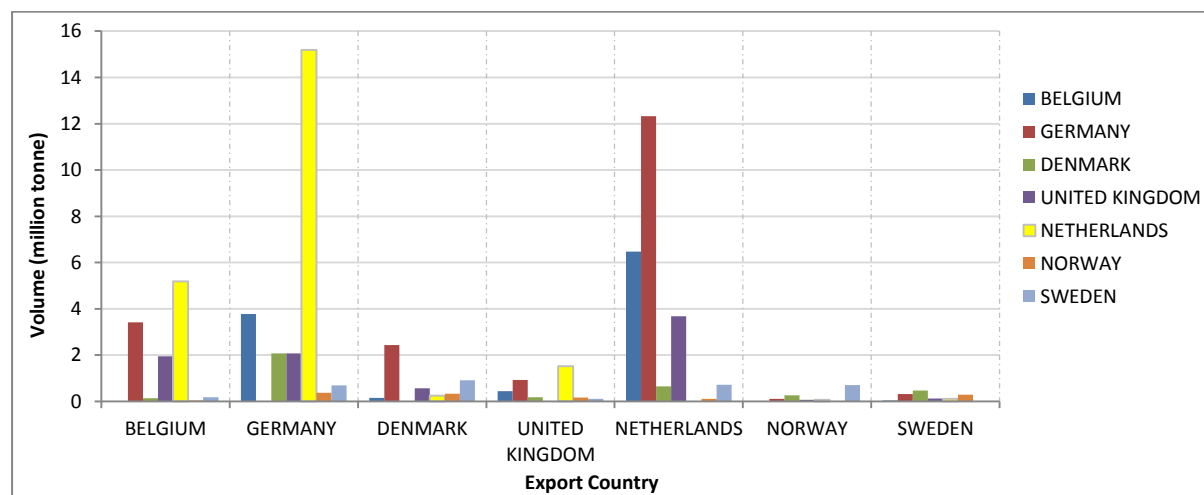
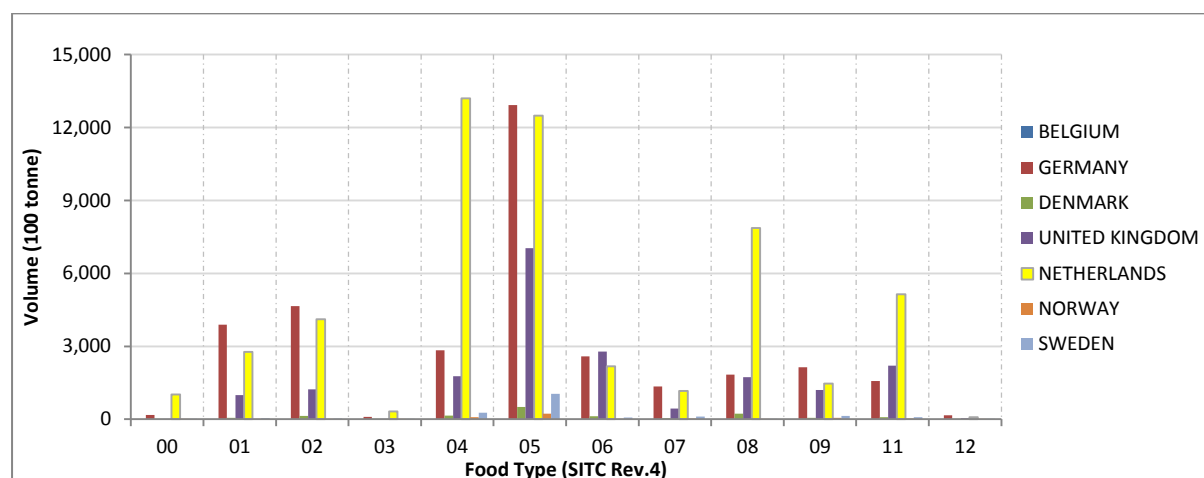
- SITC-00 - Live animals other than animals of division SITC-03
- SITC-01 - Meat and meat preparations
- SITC-02 - Dairy products and birds' eggs
- SITC-03 - Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof
- SITC-04 - Cereals and cereal preparations
- SITC-05 - Vegetables and fruit
- SITC-06 - Sugars, sugar preparations and honey
- SITC-07 - Coffee, tea, cocoa, spices, and manufactures thereof
- SITC-08 - Feeding stuff for animals (not including unmilled cereals)
- SITC-09 - Miscellaneous edible products and preparations
- SITC-11 - Beverages
- SITC-12 - Tobacco and tobacco manufactures

Table 7. Total volumes of food trade between the NSR countries in 2010 (unit: 100KG)

Food type	Trade Volume	Food type	Trade Volume
SITC-00	16,356,836	SITC-06	27,802,631
SITC-01	40,099,599	SITC-07	14,721,664
SITC-02	58,610,219	SITC-08	132,634,065
SITC-03	20,527,039	SITC-09	25,740,330
SITC-04	132,425,790	SITC-11	88,068,343
SITC-05	138,686,236	SITC-12	1,305,704

Note 1: the data source includes Eurostat and the statistic databases of the NSR countries

This food trade volume can also be split according to origin and destination, as shown in Figure 2. For example, the highest yellow bar shows that the food export volume from Germany to the Netherlands was over 15 million tonnes in 2010. From Figure 2, Belgium, Germany and the Netherlands have the largest trade volumes to each other, and each of them has almost balanced trade volumes. Apparently the UK and Sweden import more than they export. Norway has almost the same amount of import and export volumes (here food type is not concerned). Denmark exports slightly more than its import.

**Figure 2. Food trade volumes between the NSR countries (including all types of food)****Figure 3. Food export from Belgium to the other NSR countries**

In the following part of this Section, the total volume of food trade between the NSR countries in 2010 is split according to both the SITC categories and origin/destination, as shown in Figure 3~9. These disaggregated flows are also shown with figures in Appendix A, and with flow maps in Appendix B.

Figure 3 shows the food exports from Belgium to the other NSR countries. For all the food types, most of the foods are delivered to Germany, the Netherlands and the UK. The foods exported to Denmark and Sweden is mainly cereals, vegetables and fruits.

Figure 4 shows the food exports from Germany to the other NSR countries. The percentage of beverages in all food export is higher in Germany then in the other countries. Most of the beverages are exported to the Netherlands, similar to live animals and fish. The Netherlands is also the biggest buyer for the other types of food, except for sugar and honey. The foods exported to Norway are mainly cereals; while the foods exported to Denmark and Belgium include several types, such as cereals, vegetables and fruits, meat, dairy products and animal feeding stuff. Germany exports cereals, vegetables, fruits, animal feeding stuff and beverages to Sweden.

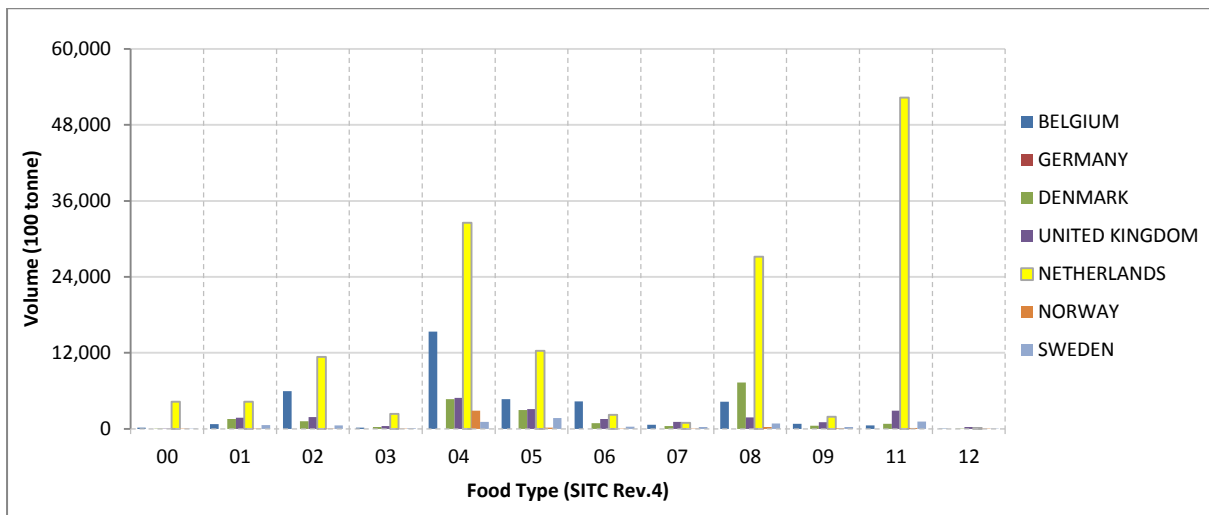


Figure 4. Food export from Germany to the other NSR countries

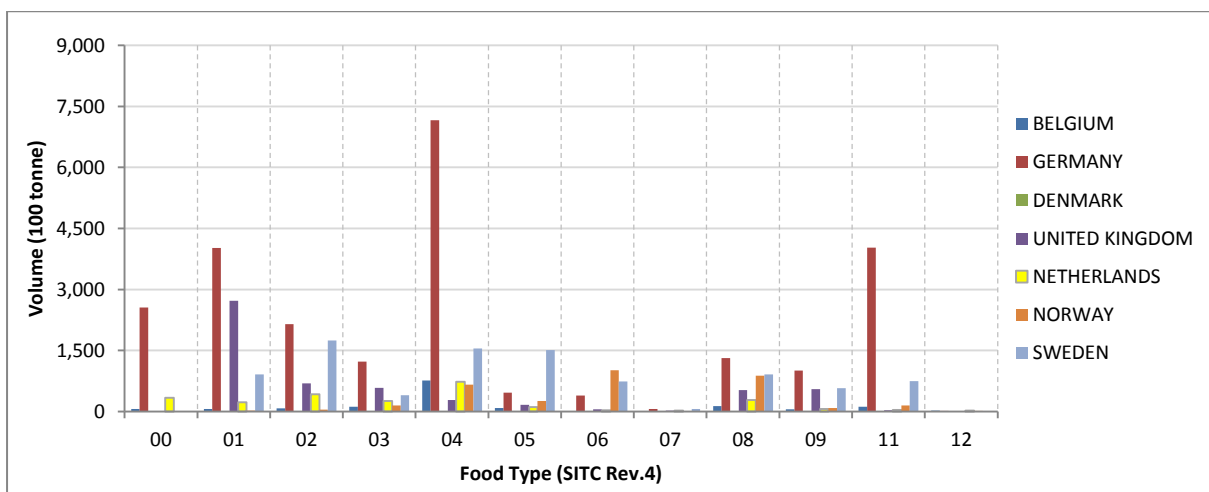


Figure 5. Food export from Denmark to the other NSR countries

Figure 5 shows the food exports from Denmark to the other NSR countries. Norway is the biggest buyer for sugar and honey, and Sweden is the biggest buyer for vegetables and fruits, while Germany is the biggest buyer for the rest types of food. Half of the foods exported to the UK are meat, while the other half includes dairy product, fish, animal feeding stuff and miscellaneous edible products. The foods exported to the Netherlands and Sweden is relatively diverse. The volume of food exported to Belgium is relatively small. Denmark also exports a small volume of coffee, tea and tobacco.

Figure 6 shows the food exports from the UK to the other NSR countries. The percentage of cereals export is very high in the UK, most of which are exported to the Netherlands, Germany and Belgium. The Netherlands is the biggest buyer for most of the food types, followed by Germany and Belgium. The foods exported to Norway are mainly fish, vegetables, fruits, sugar, honey, animal feeding stuff and cereals. The foods exported to Denmark and Sweden include several types, such as cereals, vegetables and fruits, meat, dairy products, beverages and animal feeding stuff, but the volumes are relatively low.

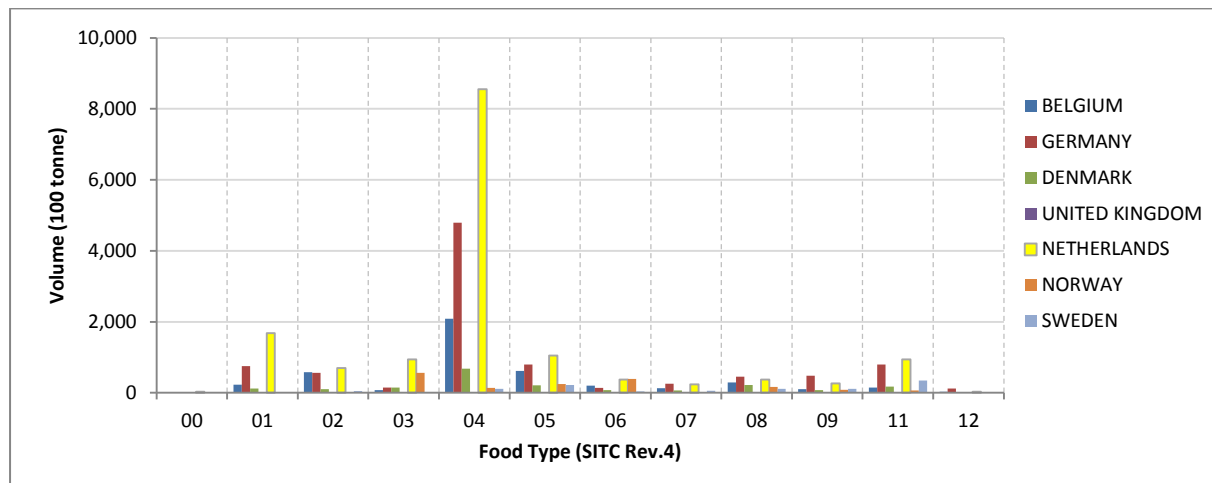


Figure 6. Food export from the UK to the other NSR countries

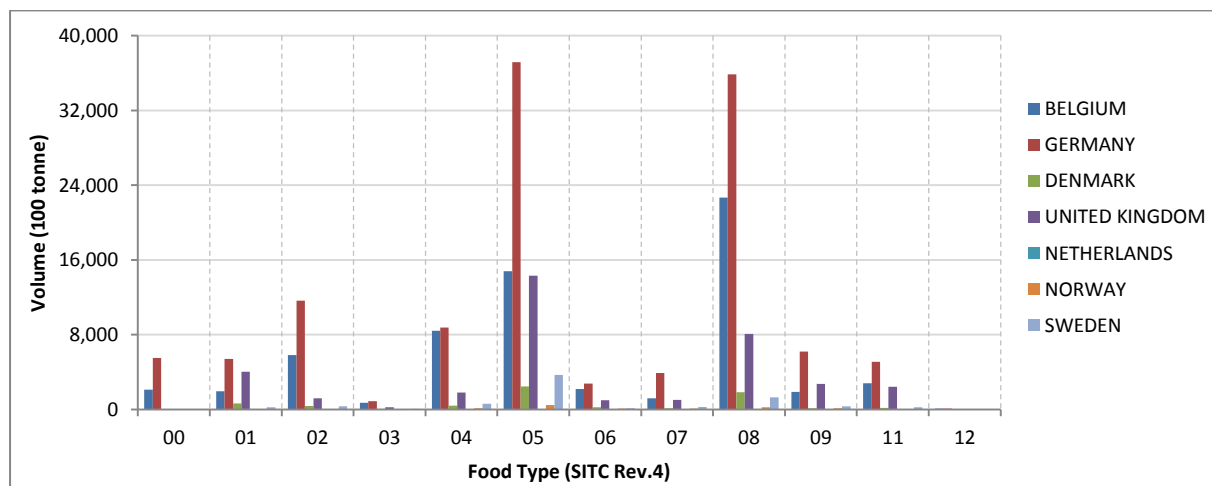


Figure 7. Food export from Netherlands to the other NSR countries

Figure 7 shows the food exports from the Netherlands to the other NSR countries. The percentages of vegetables, fruits and animal feeding stuff are relatively high in the Netherlands. Germany is the biggest buyer for all the food types, followed by Belgium and the UK. The foods

exported to Norway are mainly vegetables and fruits. The foods exported to Sweden and Denmark is mainly vegetables, fruits and animal feeding stuff.

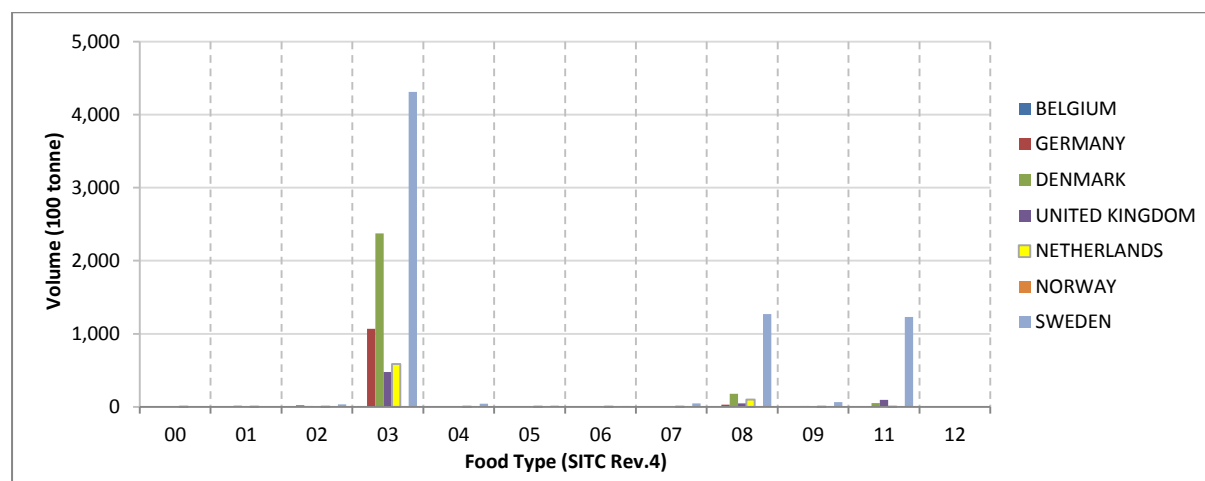


Figure 8. Food export from Norway to the other NSR countries

Figure 8 shows the food exports from Norway to the other NSR countries. The percentage of fish export is extremely high, followed by animal feeding stuff and beverage. The other food types are only exported in very low volumes. Norwegian fish are exported to all the other countries, except Belgium buys a small volume. Most of animal feeding stuff and beverage are exported to Sweden.

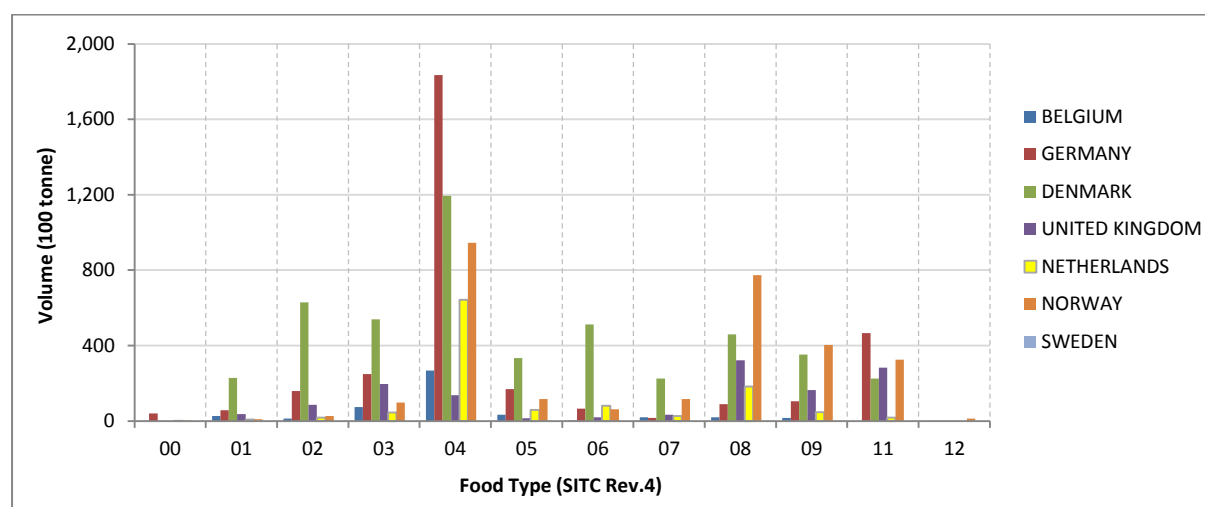


Figure 9. Food export from Sweden to the other NSR countries

Figure 9 shows the food exports from Sweden to the other NSR countries. The percentage of cereals export is relatively high in Sweden. Norway is the biggest buyer for animal feeding stuff and miscellaneous edible products, and Germany is the biggest buyer for cereals and beverages, while Denmark is the biggest buyer for rest of the types of food. The foods exported to the Netherlands are mainly cereals and animal feeding stuff. The foods exported to Belgium are mainly cereals and fish.

Figure 3~9 shows the volumes of each food type traded between the NSR countries. Table 8 presents the food trades from another perspective – the balance of food trade, using the ratio of export volume and import volume for each food type. Basically, a value bigger than 1 means that

the country exports more to the other NSR countries than it imports from those countries. Looking through Table 8 we can see that, Belgium has generally balanced food trades, as its values are between 0.4 and 2.5. Germany also has balanced food trades, except for beverages because its export volume is nearly 4 times higher than its import volume. In contrast, the Netherlands imports beverages 4 times more than its export volume, while the other food trades are more or less balanced. Denmark exports much more live animals, meat, beverages and tobaccos than its imports. Norway, Sweden and the UK import more than export for most of the food types, except the cereal trade in the UK, the live animal trade in Sweden and the fish trade in Norway.

Table 8. Food trade balance of the NSR countries (export volume/import volume)

SITC	Belgium	Germany	Denmark	United Kingdom	Netherlands	Norway	Sweden
00	0.51	0.54	<u>66.34</u>	1.09	1.35	<u>0.31</u>	<u>6.18</u>
01	2.59	0.63	<u>3.06</u>	<u>0.29</u>	1.37	0.52	<u>0.20</u>
02	0.82	1.09	2.12	0.39	1.16	0.67	<u>0.34</u>
03	0.39	0.93	0.79	0.96	0.44	<u>10.78</u>	<u>0.25</u>
04	0.68	2.42	1.57	1.85	0.36	<u>0.01</u>	1.36
05	1.69	0.49	0.40	<u>0.13</u>	2.80	<u>0.02</u>	<u>0.09</u>
06	1.16	1.58	1.22	<u>0.22</u>	1.31	<u>0.01</u>	0.56
07	1.60	0.62	<u>0.23</u>	<u>0.30</u>	2.77	<u>0.14</u>	0.51
08	0.43	1.06	0.39	<u>0.13</u>	1.94	0.69	0.41
09	1.76	0.47	2.03	<u>0.20</u>	<u>3.02</u>	<u>0.11</u>	0.73
11	2.49	<u>4.85</u>	<u>3.36</u>	<u>0.31</u>	<u>0.18</u>	1.78	<u>0.35</u>
12	1.49	1.18	<u>4.22</u>	0.50	0.97	<u>0.01</u>	0.52

In brief, Table 8 indicates that the trade volumes of individual food type are generally unbalanced in most of the NSR countries. This may require different inbound and outbound capacities for transporting food, especially for fresh and frozen foods that need special transport equipment. Please note that, Table 8 covers only the trade with the NSR countries, rather than the total trade with all countries.

5. TRANSPORT SERVICE FOR FOOD TRADE IN THE NSR COUNTRIES

In the previous section, the food trade flows between the NSR countries are presented. In this section, the modal split for transporting these food products are investigated. There are generally four transport modes for international trades, i.e. road, rail, air and water (including sea shipping and inland waterway). Their advantages and limitations are listed in Table 9. As far as food trade is concerned, the most economical modal is water transport, followed by rail transport, road transport and air transport.

Table 9. The advantages and limitations of different transport modes

Mode of transport	Advantages	Limitations
Rail	Not affected by congestion in the road transport system. Suitable for carrying heavy goods in large quantities over long distances. Its operation is less affected by adverse weather conditions like rain, floods, fog, etc.	Relatively expensive for carrying goods over short distances. Not available in remote areas. Not flexible for loading or unloading of goods at any place. Involves heavy losses of life as well as goods in case of accident.
Road	Relatively cheaper compared to other modes. Perishable goods can be transported at a faster speed by road carriers over a short distance. Flexible as loading and unloading is possible at any destination. Provides door-to-door service. Available in almost all areas	Not economical for long distance transportation of goods, due to limited carrying capacity. Transportation of heavy goods or goods in bulk involves high cost. Affected by adverse weather conditions, floods, rain, landslide, etc., Affected by congestion in the road transport system.
Air	The fastest mode of transport. Very useful in transporting goods to areas, not accessible by any other means (airdrop).	More expensive than the others. Not suitable for heavy and bulky goods. Affected by adverse weather conditions. Not suitable for short distance travel. Accidents result in heavy losses of goods, property and life.
Water	More economical for bulky and heavy goods than the others. Safe with respect to occurrence of accidents. Low cost of maintaining and constructing routes, as most of them are naturally made. Promotes international trade.	The depth and navigability of rivers and canals vary and thus, affect vessel operations. Slow moving and therefore not suitable for transport of perishable goods. Affected by weather conditions. Requires large investment on ships and their maintenance.

5.1 TRANSPORT MODAL SPLIT FOR FOOD TRADE BETWEEN THE NSR COUNTRIES

Utilizing statistics data, this section tries to calculate the transport modal split for the food trades between the NSR countries. However, the available statistical data is not enough to conduct such a calculation. Only the volume of road transport is available in the Eurostat database for the food trades, and such data for 2007 is shown in Table 10. Although this data is recorded in a different categorize standard (rather than the SITC) and may cause data mismatch with the above presented food trade volumes, Table 10 provides a rough estimation for road transport share.

Summing up the volumes of road transport between all the NSR countries in Table 10, it can be seen that road transport accounts for app. 80% of the total food trade volume between the NSR countries, which was around 70 million tonnes in 2007. This means, that the remaining 20% volume was shared by water, rail and air modes. One reason of the dominance of road transport is flexibility: it is a flexible mode for loading and unloading at any location and provides door-to-door service, although it is not economical for long distance transportation. Both water and rail transports are more energy efficient than road transport, so there is a huge potential for switching international food transport from road to water and rail in the NSR countries.

Table 10. Food trade transported by road between the NSR countries (1000 tonnes)

Goods	Origin / Destination	Belgium	Denmark	Germany	Netherlands	Sweden	United Kingdom	Norway
Agricultural products and live animals	Belgium	0	:	1,392	2,329	20	245	:
	Denmark	:	0	986	105	167	:	49
	Germany	1,527	645	0	3,711	167	182	:
	Netherlands	3,439	298	5,607	0	441	929	63
	Sweden	:	480	227	131	0	:	680
	United Kingdom	121	:	59	73	:	0	:
	Norway	:	97	:	:	235	:	0
Foodstuffs and animal fodder	Belgium	0	74	2,110	3,777	30	703	:
	Denmark	57	0	1,187	281	421	79	91
	Germany	1,722	1,684	0	5,122	159	587	:
	Netherlands	3,923	272	7,284	0	127	530	:
	Sweden	:	222	81	58	0	:	115
	United Kingdom	159	:	269	229	:	0	:
	Norway	:	120	:	38	91	:	0

Note 1: data source is Eurostat.

Note 2: ':' means not available.

Table 11. Transport modal split for Norway's food trade in 2007 (in 100 KG)

Flow	Partner country	Mode of transport					
		Sea	Rail	Air	Unknown	Road	Post
Norway's food export to	Belgium	7,966	0	99	0	10,716	3
	Germany	547,228	50,065	65	129	42,145	0
	Denmark	4,731,302	0	117	21	566,500	79
	UK	640,772	0	14,701	3,872	0	0
	Netherlands	267,485	0	13	193,392	217,849	0
	Sweden	1,070,170	43,629	87	0	4,934,719	0
Norway's food import from	Belgium	411,006	439	35	0	359,860	0
	Germany	1,653,655	10,575	1,841	103,994	846,999	430
	Denmark	3,692,804	201	20	16,599	1,141,071	432
	UK	1,259,774	699	364	0	50	0
	Netherlands	509,878	31	1,262	0	1,627,888	0
	Sweden	730,686	35,264	23,142	0	2,590,165	0
Mode split		54.7%	0.5%	0.1%	1.1%	43.5%	0%

Note: data source is Eurostat.

5.2 ANALYSIS OF FOOD TRANSPORT MODAL SPLIT FOR INDIVIDUAL COUNTRY

This section tries to analyse the transport modal split for individual NSR countries. Due to the limited data availability, it is only possible to analyse the case of Norway. The modal split for Norway's food import and export is shown in Table 11. As it can be seen, road transport accounts for more than 40% of the transport of Norway's food trade, and water transport accounts for more than 50%, while the share of air and rail transports is very small. Apparently, the water transport mode is more popular in Norway than the other NSR countries. This is mainly because of Norway's hilly geographical characteristics.

In summary, this section tries to investigate the transport modal split for the food trade between the NSR countries. Due to the limitation of data availability, this investigate can't be finalized completely. Although it is impossible to obtain the expected detailed result, it has been managed to get an approximate result - the road transport delivers 80% of the total food trade volume between the NSR countries. So there is a huge potential for switching international food transport from road to water and rail transport in the NSR countries. Regarding individual countries, Norway has more economical transport for food trades than the other countries, since 50% of its food import and export is transported by water mode.

6. THE FOOD SUPPLY CHAIN IN THE PARTNER REGIONS

In order to get a close view of the food supply chain in the North Sea Region, this section focus on some partner regions, which are introduced in Section 2.3. All the regions have good logistics infrastructure and important agriculture and/or food manufacturing industries. The food supply chains in these partner regions has been investigated by three steps: first, identify the economic importance of food produce to the regional economy; second, identify the existing key cities and logistic infrastructures; third, conduct SWOT analysis for the food supply chain components. The steps are presented below.

6.1 IMPORTANCE OF FOOD PRODUCE TO THE REGIONAL ECONOMIES

Food products are a very important part of the economies of all the partner regions. Table 12 highlights the importance of food clusters and summarises the key food clusters for each region. The data in Table 12 is mainly collected from existing databases and official statistics. In the next stage of Food Port project – WP 5.2, this analysis will be further elaborated by interviewing local food clusters.

Overall, major food productions in the partner regions include crops, cereals, vegetables, pigs, cattle, sheep, poultry, fish and other seafood. The production and secondary processing of these foods play a significant role in the employment and economies of the regions. Fishing and fish farming are particularly important for Nordmøre & Romsdal, Bremerhaven and Scotland. The fish caught from the above regions are processed not only at the local regions, but also in Västra Götaland and Yorkshire and Humber (Grimsby). Food production activities in Scotland are closely related to the distilling (whiskey) industry, and the drink industry is a very important contributor of Scottish GVA and export. Västra Götaland, West Flanders, Southern Denmark, and Yorkshire and Humber regions rely heavily on the production of crops, cereals, pigs, cattle, sheep, poultry and dairy products. Some food products are traded across these partner regions and also to other parts of the world. Still, some regions (e.g. Yorkshire & Humber) import relative more food than they export.

Table 12. The importance of the food industry for the regions

Partner Region	Importance of food produce to the regional economy
Yorkshire & Humber	<ul style="list-style-type: none"> For food and drinks sector in the UK, the biggest employers are caterers (1.3m people) followed by retailers (1.1m people) and manufacturing (0.4m people). Food and drink manufacturing sector contributes to GVA of around £22.8bn in UK and accounts for 261,392 employees. The amount UK spent on food and drink imports (£32.4bn) is more than twice as much sold on exports (£14.0bn). Four prominent agricultural segments are: <ul style="list-style-type: none"> All types of crops and cereals (Barley, wheat, oat, oilseed rape), Beef (for meat) and dairy (for milk and cheese etc.), Pigs, Poultry (including eggs).
West Flanders	<ul style="list-style-type: none"> About two-thirds of West Flanders' surface is used for agriculture and horticulture (216,000 ha). West Flanders accounts for one-third of all Flemish farmland and 37% of Flanders' production value, representing €1,700 million. The sector employs some 21,000 people. West Flanders grows 52% of Flemish potatoes and 63% of Flemish open-air vegetables. The delivery and processing of frozen vegetables is an important sector. Pig breeding has a strong presence (55% Flemish), accounting for one-third of all cattle

	<p>and poultry. Cattle fodder businesses, slaughterhouses and dairy products processing are vital to employment and the economy as well.</p> <ul style="list-style-type: none"> • Offshore fishing sector is of paramount importance, both locally and regionally.
Scotland	<ul style="list-style-type: none"> • Food and drink sector in Scotland employs 367,713 employees and contributes to £10.126 billion GVA, which is 9.8% of the GVA. • Majority of GVA is contributed by manufacturing, warehouse, retail, and catering. • Major products are <ul style="list-style-type: none"> ○ Drink - £3.057 billion of export (distilled portable alcohol beverage accounted for £2.98 billion) ○ Meat - 6% exported outside the UK ○ Fish - 23% exported outside the UK ○ Dairy - supply to mainly Scotland and the UK. • Major imports of food from outside of the UK are animal feedstuff, seafood, vegetable and fruits.
Västra Götaland	<ul style="list-style-type: none"> • Overall, food industry stands for 7% of total industrial Swedish GVA (approximately 35 billion SEK in 2006); it is also the fourth largest industry in Sweden in terms of turnover. • Västra Götaland is a leading industrial region where food processing, IT, paper and automotive industries play important parts in the regional GDP. • Food industry at Västra Götaland contributes to 20% of the total employment in Swedish food industry (11,094 employees in 2009): <ul style="list-style-type: none"> ○ 25 % of Sweden's food production takes place at Västra Götaland ○ 50% of Sweden's fishing industry and 75% of Sweden's fish preparation industry located at Västra Götaland, ○ For the fish industry, employment in Västra Götaland represents 58% of the whole country, ○ 7 of the 15 largest food production companies are located at Västra Götaland.
Møre & Romsdal	<ul style="list-style-type: none"> • 4% of the country workforce is directly employed in the fishing industry; • Møre & Romsdal contributes to more than 20% of the Norwegian total seafood for landings from wild-capture fisheries and production from aquaculture • The total annual seafood catch by Møre & Romsdal fishing fleet is worth NOK 3.2 billion, which is 25% of Norwegian catches both by weight and value. • The county is one of the three counties in Norway for aquaculture (after Nordland and Hordaland), which produces 13% of the total farmed fish (mainly salmon and trout) in the country, equivalent to NOK 2.5 billion or 100,000 tonnes of fish. • In addition to aquaculture, other sectors include pelagic (NOK 1.8 billion), whitefish (NOK 1.8 billion) and biomarine (NOK 1.5 billion). • Biomarine sector is a unique cluster called Omegaland (produce omega-3 oil) – the core companies produce 40% of the world's omega-3 marketed for human consumption. • Fish processing -produce more than 90% clip fish of the country - clip fish contributes to 30% of the fish exports of the county; further processing increases whitefish export to more than NOK 4 billion. • Export more than 500 thousand tonnes; more than 120 companies involved in seafood exports. • Road freight is the most common way of transporting seafood for export; there is almost no sea transport for the export of agriculture produces and manufactured food because of the centralisation of food transportation at Oslo Fjord area and the use of road freight.
Southern Denmark	<ul style="list-style-type: none"> • Food industries contribute to roughly 28% of the employment of the region. • Agri-food supply chain accounts for 12.6% of the region's total GVA for the private sector. • Europe's largest dairy cooperative is highly present in the region. • Europe's largest and the world's second largest pork slaughterhouse has six processing facilities in the region. • Food products besides meats and dairy produced in the region include bread, bakery products, poultry products, processed foods, sweets, beer, coffee, fish and fish products,

	frozen potato and vegetable products. <ul style="list-style-type: none"> • Cattle (both for slaughtering and for dairy) with almost 40% of the nations' cattle in the region. • The region accounts for almost 30% of pigs, 60% of slaughter chickens, over 50% of all poultry of the nation. 28% of all cereals and 30% of potatoes (in terms of land area) are farmed in the region. • This region is well connected to the rest of the country as well as to continental Europe (road, rail, and sea routes).
Bremerhaven	<ul style="list-style-type: none"> • In Germany, agriculture (incl. fisheries) contributed roughly 0.8% to the gross value of the national economy in the year 2009. The food industry is very important for the labour market, employing approximately 5 million people. • Food is inexpensive in Germany. The German food industry makes every fourth euro on foreign markets. • The city of Bremerhaven is the most important fish processing and fish trading centre in Germany. 30% of Germany's employees in the fish and food processing industry work in Bremerhaven. Traditionally, the fisheries sector is very closely integrated into the local economy and way of living in Bremerhaven. • Conversely, this industry is extremely important for Bremerhaven's economy: over 40 % of Bremerhaven's employees work for it. • The Bremerhaven University of Applied Sciences cooperates with the different companies of the fish industry, and offers courses in Food Technology/ Food Economics.

6.2 KEY CITIES AND EXISTING LOGISTICS INFRASTRUCTURES

The main cities and the logistics infrastructure in each partner region are depicted in Appendix C. Appendix D summarises the major cities, seaports, airports, inland ports, dry ports, motorways, railways and intermodal facilities related to food supply chains for each partner region.

In summary, most of the regions have good road infrastructure and motorways, seaports and inland logistics hubs. However, the lack of frequent and price-competitive sea freight or feeder connections between the regions is one of the reasons for the preference of road freight or the channel tunnel between the UK and the Continental Europe. Most regions have already plans for improving intermodal infrastructure, some specifically for food supply chain. Information about key transport and logistics infrastructure presented in this section can be used as the basis for further research on the modal shift and green corridor possibilities.

6.3 SWOT ANALYSIS OF KEY REGIONAL FOOD SUPPLY CHAIN COMPONENTS

This section aims at analysing each supply chain component of different industrial sectors, including agriculture/horticulture, manufacture, transport and storage, wholesale, retail, food and beverage services and import/export. A SWOT analysis for each supply chain component is presented.

6.3.1 AGRICULTURE AND HORTICULTURE

Appendix E summarises characteristics of key agricultural and horticultural sectors for each partner region. It summarises key information of the agriculture and horticulture activities of each region and then conducts a SWOT analysis for agriculture, horticulture and fisheries and farming sectors for all regions. On the basis of this information, the following SWOT analysis is concluded.

Table 13. SWOT analysis for agricultural and horticultural sectors for the regions

Food including crops, cereals, vegetable, cattle, pig, poultry, fish, seafood and aquaculture for all regions	Strengths	Opportunities
	<ul style="list-style-type: none"> • Diverse range of food products • Strong R&D support & technology • Knowledge, experience & reputation • Strategic location and close proximity to processing facilities • Access to large fish stock • Technology and knowledge for fish farming 	<ul style="list-style-type: none"> • Building of processing facilities close to ports, logistics hubs & farms • Further integration between supply chain links • Use of sea and rail freight to reduce carbon footprint & energy consumption • Use of carbon labelling & ILC technologies • Logistics & supply chain education
	Weaknesses	Threats
	<ul style="list-style-type: none"> • Lack of intermodal infrastructure • Lack of logistics & supply chain skills • Heavy reliance on road freight - high carbon footprint • Lack of visibility of food flows - leading to inefficiency • High cost & import of animal feed • Industrial concentration leads to high transport cost 	<ul style="list-style-type: none"> • High cost of material, transport, energy & environment • High cost of land • Economic recession • Low profitability - close down farms • Compete with cheaper import products • Changes in agriculture (EU) policies

Overall, the main strengths of most of the regions are the wide range of food produces, access to R&D, knowledge, technology, and processing facilities. Most regions indicate the lack of intermodal infrastructure, logistics and supply chain skills, visibility as the main weaknesses of the regions. High costs of input, land and logistics and competitions from low-cost producers are the main concern. The above SWOT analyses of agriculture, horticulture, fishery and aquaculture point to the potential benefits of modal shift and intermodal solutions. The potential value of such intermodal solutions can be examined once the whole supply chain, including primary and secondary manufacturing, distribution and import and export activities are understood. Greater visibility and integration along the supply chain is required in order to facilitate or create a collaborative supply chain for each food supply chain.

6.3.2 MANUFACTURE

This section aims at providing a greater understanding of the food and drink manufacturing in the regions. Appendix F summarises characteristics of key food and drinks manufacturing sectors for each region. Table 14 summarises a SWOT analysis for all regions. In general, the manufacturing or processing of food and drinks in all the regions are a very important component of the food supply chain, mainly because a large proportion of food produced by the agriculture, horticulture, fishery and aquaculture activities need to be further processed. This brings a lot of opportunities to create added values and new jobs, especially when secondary processing factories are built to further strengthen the competitiveness of the food clusters. It is also noted that most of the manufacturing enterprises are located close to the major motorways and ports, providing a great opportunity for modal shift from road to rail and sea freight. Since there is a trend for wholesalers and retailers to use factory gate pricing when sourcing from manufacturers, manufacturers are usually not in the position to influence modal choice. The long-term survival of such manufacturing activities can be a problem, due to the competition from the low cost economies. In the recent years, agriculture and fishery produces from the developed countries are sent to low-cost economies for secondary processing.

Table 14. SWOT analysis for food and drink manufacturing for the regions

Food and drinks Manufacturing sectors for the regions	Strengths	Opportunities
	<ul style="list-style-type: none"> Proximity to (local) supply and logistics hubs Diverse range of products Well connected road transport system R&D and technology Optimising logistics by large cooperative (Southern Denmark) Modern facilities (Southern Denmark) Cooperative strategies of companies (Bremerhaven) 	<ul style="list-style-type: none"> Use of intermodal infrastructure Improve communication in supply chains Improve collaboration with suppliers and customers (retailers) Secondary processing industry Restructure of the processing industry will need higher skills and technologies (Bremerhaven)
	Weaknesses	Threats
	<ul style="list-style-type: none"> Lack of intermodal infrastructure Old facilities not for modern demand Heavy reliance on road Lack of secondary processing industry Company decisions are not made locally (Bremerhaven) 	<ul style="list-style-type: none"> Competition from low cost economies Increase cost of materials, transport and energy Declining fish stock in some areas New legislation forces large investment (Bremerhaven)

It is evident that many primary and secondary manufacturing activities in a region are the extensions of the local agriculture, horticulture, fishery and aquaculture activities. For example the fish processing industries in all the regions increase economy value added to the regions significantly as well as provide employment to the local community. More importantly, such cluster effects further demand for a more efficient logistics, storage and transport facilities and service sectors. It is clear that whilst manufacturers are good at what they are making, the biggest opportunity for improving efficiency and reducing carbon footprint is left for logistics and supply chain management. It is thus very important to identify the key locations of each industry clusters and the respective storage facilities, logistics hubs and networks, ports for import and exports and intermodal infrastructure.

Table 15. SWOT analysis for transport and storage sectors for the regions

Transport and storage sectors for the regions	Strengths	Opportunities
	<ul style="list-style-type: none"> Modern port facilities and well-connected motorways Growing industry with significant potential for value added activities Close to European economy conglomerates Existing facilities and specialised firms for storing food – chilled and frozen 	<ul style="list-style-type: none"> Consolidation of service providers across the regions for food supply chain Extension of logistics service to door-to-door services including intermodal solutions e.g. rail and sea freight Building of intermodal solutions with multi-temperature infrastructure
	Weaknesses	Threats
	<ul style="list-style-type: none"> Service providers consists of many small and medium size enterprises Mainly using road transport to meet cost and speed requirement Perceived as not a very attractive industry Shortage of space at ports Short distance not ideal for intermodal transport 	<ul style="list-style-type: none"> Internal and external competition when it comes to the construction of intermodal facilities High investment low profitability for intermodal service High cost of fuel and low profit threaten survival of SMEs Slow political decision process

6.3.3 TRANSPORT AND STORAGE

Appendix G identifies key food transport and storage sectors for each region. Transport and storage sectors are very critical for the use and development of intermodal transport, because they are users, service providers and potential investors of such facilities. Table 15 summarises the SWOT analysis for transport and storage sectors in all the regions.

Overall, transport and storage is a growing industry in all regions, especially driven by the expanding import and export activities and the needs to transport semi-finished products for further processing, packaging and distribution. The food supply chain in the NSR is still largely facilitated by road transport. Moreover, the transport and storage sectors are presently made up of many small and medium size companies (SMEs), which may not be able to offer door-to-door complete supply chain services or invest in intermodal infrastructure. There is a trend of consolidation, so in the future larger multinational logistics service providers will emerge to offer more integrated logistics solutions. The building of intermodal infrastructure and the use of intermodal solutions depend greatly on economic advantage and political decisions, which are perhaps the most significant obstacles of modal shift.

6.3.4 WHOLESALE AND RETAIL

The other food supply chain components such as wholesale, retail, food service are basically the customers of the food and drinks manufacturers and farmers. Understanding of these components is essential, because they are the far end of the food supply chain which dictates how food flows are managed.

This section provides some information about the food service and retail businesses, which are the major customers of the food and drinks manufacturers and wholesalers. Appendix H summaries a brief analysis for the wholesale and retail sector. The wholesale and retail sector can be divided into two – one for local consumption e.g. grocery supermarkets and the other for export or distribution of agriculture, horticulture, fishery and aquaculture. Some wholesalers also act as secondary processors and they do source their produce globally.

There is an increasing trend for the use of factory gate pricing and the control of inbound logistics, meaning that the decision power on multimodal solutions is shifted to those large retailers. There is also a general trend of retailer consolidation, meaning most regions will end up being served by a few large retailers, who have a lot powers to influence and shape the food supply chains. In Denmark, two retailers account for 59% of the grocery market of the nation.

6.3.5 IMPORT & EXPORT

Appendix I summaries the SWOT analysis of the import and export sector. The exports of food produced in the regions are significant contributors to the regional economy and employment. Export and import of food for further processing is a common phenomenon in today's globalised world. In reality all the regions are not able to produce all the food consumed in their respective regions, so imports of food has to be considered. With detailed knowledge of the import and export flows, one can discover more opportunities for efficiency improvement, modal shift and the use of ILC technologies.

From the above analyses it is clear that there are a lot of food import and export activities across the regions and to the other parts of the world as well. However, rail and short-sea feeder is clearly underused. There are thus a lot of opportunities for modal shift. To examine the feasibility of modal shift, more detail analysis of the import and export flows are required.

Table 16. SWOT analysis for import and export of food for the regions

Import and export of food for the regions	Strengths	Opportunities
	<ul style="list-style-type: none"> • Increase in demand for import and export • Variety of products from strong agriculture, horticulture, fishery and aquaculture industry 	<ul style="list-style-type: none"> • Use of rail and sea freight • Use of intermodal infrastructure • BIP to be built in strategic ports e.g. Immingham
	Weaknesses	Threats
	<ul style="list-style-type: none"> • Heavy reliance on road transport • Low usage of rail and coastal feeders • Lack of specialist equipment's and facilities • Lack of government investment or support • Imbalance of trade 	<ul style="list-style-type: none"> • Competition from other low-cost countries • Economic recession

7 POTENTIAL BENEFITS OF ADVANCED FOOD SUPPLY CHAIN

7.1 FOOD SUPPLY CHAIN COMPONENTS WITH MODAL SHIFT POTENTIAL

In this Section, a preliminary analysis on the modal shift potential for food transportation in the North Sea Region is conducted. Figure 10 summarises the modal shift opportunities identified in this analysis. Each modal shift opportunity is label [x] in the following text. These modal shift opportunities will be further addressed in another package of the Food Port project – WP 3.1.



Figure 10. Modal shift opportunities

Modal shift potential for Yorkshire and Humber

In Yorkshire and Humber, the modal shift potential may not exist for agriculture food products or food manufacturing. This because (1) the farmers may not produce enough volume to justify modal shift, so there is little opportunity for modal shift; (2) the manufacturers often have little opportunity or influence on modal shift, due to the use of factory gate pricing and the lack of volume and the need to meet cost and lead time requirements.

But some modal shift potentials exist for food import and fish processing. Some examples are, (1) more short-sea services could be used for transporting fish from Norway, Iceland and Scotland to Grimsby; (2) regarding the food imports, the use of Immingham port (instead of southern ports) with BIP and temperature controlled facilities will remove thousands of truck on UK motorways; (3) the majority of food imports from EU to the North UK can be consolidated in e.g. Zeebrugge and then transhipped to Immingham or Grangemouth, labelled model shift [2]; (4) large retailers are in the position to consolidate cargo and use more rail freight for their own distribution activities; several examples presented in this report demonstrating that there is already some facilities for such modal shift initiatives.

Modal shift potential for Scotland

First, bottling in Central Scotland and Fife shows great modal-shift potential by rail and coastal shipping services to South East England instead of extensive use of road transportation, taking into account the increasing demand for Scottish food and drink products on the international market. Long distance transport (to South East England ports) will be more attractive for rail and coastal shipping services, labelled model shift **[1]**;

Second, modal shift opportunities also exist for fishery industry and meat industry:

- A secondary processing and storage centre of fish and meat products around Grangemouth (with both sea and rail access) would offer easy access to RDC of supermarkets and global connections;
- The use of ferry services would allow Scottish fish products to reach EU market directly and may also be used of retail imports to ensure capacity utilisation in both directions, labelled model shift **[3]**. It is suggested to explore the benefits of coordinating with a DC in the port of Zeebrugge;

Third, there is a high potential to develop integrated intermodal platform with both rail and sea access (e.g. easy connection between Grangemouth and Coatbridge).

- The development of port centric logistics of Grangemouth offers not only more opportunities of cargo in- or outward distribution by integrated rail and sea access, but also other value adding logistics services at the port;
- Farms, manufacturers and RDCs are highly concentrated in a central belt area and closely located around rail freight terminal and gateway port

Modal shift potential for West Flanders

Perhaps the highest modal shift potential is in the sectors of potatoes and vegetables, both fresh and frozen, labelled model shift **[4]**. However, these products have a limited shelf-life and require special transport conditions (reefer equipment). Further investigation will be needed to analyse these opportunities.

Further investigation is needed on company level to analyse the import and export flows of the companies, in order to detect concrete potential for modal shift. It is suggested to analyse the potential for modal shift in the top 10 of food manufacturing companies in West-Flanders; since they are no doubt the biggest exporters of food products in the region.

Modal shift potential for Västra Götaland

In Västra Götaland, the dry port system opens up opportunities to move goods to intermodal systems, labelled model shift **[5]**. Therefore, import and export goods passing the Port of Gothenburg have a high modal shift potential. Further on in the project, it will be elaborated on which products groups these can be.

Modal shift potential for Nordmøre & Romsdal

The Nordmøre/KNH region is planning a new port for food exports at Justen Island in Hitra municipality, especially for fresh fish and seafood, labelled model shift **[6]**. However, the project

is facing some scepticism, especially the introduction of sea freight as an alternative or supplement to road transport.

Some major weaknesses of the food transportation system are: (1) road freight is the major route to exports; (2) demand varies over the year; and (3) bottleneck of infrastructure. There are thus opportunities for transport cooperation, research (e.g. fish farming technology) and the use of alternate transportation modes.

Modal shift potential for Southern Denmark

Potential for modal shifts appear to be present especially with regards to food exports (and imports). An example of intermodal opportunity is the goods transport route from Esbjerg to the UK, labelled model shift [7]. There could be potential for sea transport (DFDS: Esbjerg-Immingham and Esbjerg-Harwich), but this would require land facilities if food produce is temperature sensitive, perishable or otherwise condition dependent. Denmark transports 24,000 tons of agricultural products to the UK by truck every year and 3,000 tons of food, drink, tobacco and feed products. The DFDS routes between the Immingham and Vlaardingen and Immingham and Cuxhaven might provide opportunities to shift part of the truck transport from Denmark to Holland (24,000 tons agri-products and 73,000 tons food-products from Denmark to Holland in 2009 and 69,000 tons agri-products and 52,000 tons food-products from Holland to Denmark all by truck in 2009).

Another example is the transport centres in Taulov and Vejle, which have a focus on intermodal opportunities incorporating rail and truck transport. All road and rail transport coming from the eastern parts of Denmark and Sweden/Norway etc. and all road and rail transport from the rest of the country and continental Europe with a destination to the east have to go through Taulov, therefore creating a massive potential intermodal hub.

Within the region, most manufacturers are located in close proximity to major infrastructure installations (motorways, ports, rail net) but short distances might decrease the potential for modal shifts for intraregional transport. The Danish Ministry of Transport currently supports green transport initiatives but so far no projects with a focus on intermodal transport are underway. There have been recent efforts to consolidate manufacturing facilities, so transport distances will inevitably increase, putting a further strain on the environment.

Modal shift potential for Bremerhaven

Bremerhaven is well connected to the world, through good hinterland connections and the location on coast with deep water ocean-going ships. With trucks the city can be reached from the south via the A27 motorway (journey time from A1/Bremer Kreuz about 45 minutes). Since the opening of the Weser tunnel at Dedesdorf the region west of the Weser is directly connected to the city. Bremerhaven is also connected by rail to Bremen. There is a direct route to Hamburg-Neugraben for container and passenger traffic.

With the lower and outer Weser, Bremerhaven is both connected to the European inland waterway system and to the global container lines. The main liner services operate to the Far East and the U.S. East Coast. Bremerhaven is also connected by feeder services with almost all North Sea and Baltic ports.

7.2 FOOD PRODUCE GROUPS WHICH COULD BENEFIT FROM ILC TECHNOLOGIES

In this section, a list of food produce groups that could benefit from ILC technologies is summarised.

Yorkshire and Humber

- There is some opportunity for the use of ILC technologies to facilitate the control of product deliveries from farm to various clients. ILC technologies would provide supply-chain flexibility, cost reduction, and service improvement
- There is some but limited opportunity for the use of ILC technologies for the transportation of imports and exports to manufacturers, retailers and wholesalers because the control of imports and exports is already in existence
- There is no opportunity for the use of ILC technologies for the distribution of food from manufacturers to retailer or national distribution centres due to the extensive use of ICL for delivery to RDCs
- There is some opportunity for the use of ILC technologies for distribution of small volumes from manufacturers (SMEs) to regional (or even local) outlets of small SMEs. Coordination using ILC may help manufacturers to share deliveries.
- There is no opportunity for the use of ILC technologies for the distribution of food from retail regional distribution centres or national distribution centres to retail stores due to extensive use of ILC for delivery to retail stores.

Scotland

- Fishery catching and farms to primary and secondary processors (fresh and frozen seafood products)
- Slaughterhouse to manufacturers (mainly fresh meat)
- Manufacturers to RDC of supermarkets (chilled and frozen food)

West Flanders

- So far, no specific research has been undertaken to investigate which food produce groups can benefit from ILC technologies.
- It is estimated that every food produce group can benefit from ILC technologies when realising a modal shift, but as said; further research on this topic is required.

Västra Götaland

- Fish is one of the largest food industries in Västra Götaland. It is also a food group which requires to be transported either chilled or frozen and can therefore benefit from the usage of ILC-technologies.
- At Chalmers University of Technology, there is on-going research within effects of using smart goods on traceability information and carried out activities in supply chains of fresh food.

Møre & Romsdal

- Catch certificates mandated by the EU to demonstrate sustainable fishing practices
 - In 2010, all imported seafood must have catch certificates
 - There is a need to prove the fish is originated from sustainable fishery

- Norway is better prepared with a comprehensive system for documenting catches via fish-seller's union
- The documentation and identification of fish can be supported by ILC technologies
- Eco-labelling
 - There is an increasing demand for eco-labelling
 - Organic fish farming certified by e.g.
 - Debio and Naturland in Norway
 - Marine Stewardship Council
 - The tracking of such labelling and organic fish products can be supported by ILC technologies

Bremerhaven

- Deep-frozen food and frozen fish:
 - ILC –technologies might be useful particularly in relation to the monitoring of the condition (temperature) of the product.
- Fruit and Vegetables:
 - Fruit from fruit terminals in Bremerhaven to Germany and other European countries could profit from ILC technologies.

8. CONCLUSION

This WP 5.1 report summarises a market scan as the first step to enhance market knowledge of the food supply chain at the North Sea Region (NSR) (activity 5.1) under the work package 5 (Enhancing market knowledge) of the Interreg IVB NSR Food Port project. The market scan consists two parts. In the first part a general overview of food trade in the NSR area is given. The second part describes the food supply chains characteristics and trends in the NSR region. The main results of the first part are briefly introduced in the following four paragraphs.

The seven NSR countries form a thriving region for food production and trade. According to the official statistics in Eurostat, the yearly food production in this area reaches 300 million tonnes, accounting for one third of the total food production in Europe. High volumes of food production give raise to impressive food trade records, for example in 2010 nearly 50% of the foods processed in the NSR region were exported to the whole world. Among these foodstuffs, 70 million tonnes were exported between the NSR countries. Compared with the other regions of Europe, the NSR region has stronger food trade, in terms of both inter-region and intra-region trade volumes.

The market structure of food trade in the NSR region is analysed in Section 4, focusing on the major food types, trade partner relations, trade balances and so on. First, the biggest food types, in terms of trade volume, are cereals, vegetables/fruits and animal feeding stuffs. These three types account for more than half of the total food trade volume between the NSR countries. Second, regarding the trade partner relations, Belgium, Germany and the Netherlands have the largest trade volumes to each other. The UK is also a big food buyer for the above three countries, but not a big seller. Germany has high trade volumes with Denmark. Norway, Sweden and Denmark have strong trade relations with each other, although the total trade volumes are not as high as between the other NSR countries. Third, different countries export different major foodstuffs. For example, Sweden and UK mainly export cereals; Norway mainly exports fish; the Netherlands mainly export vegetables/fruits and animal feeding stuffs; cereal is a common for food export in Denmark, Germany and Belgium. Besides, Denmark also exports lots of meat; Germany exports large amount of beer; and Belgium exports many vegetables/fruits. Forth, trade imbalance can be observed in Norway, Sweden and the UK, because these countries import much more than export for most food types. Comparatively, Germany, Belgium and the Netherlands, have good trade balances for individual food types. We note that the above analysis is based on trade volume rather than on commodity value, because volume is more important for investigating in and optimizing food transportation.

The food trade between the NSR countries requires huge amounts of transportation services. In Section 5, the transport modal split is investigated, showing that road transport is dominant for the food trade between the NSR countries, accounting up to 80% in terms of volume (whereas for all trade flows road haulage has a market share of 75%). Therefore, there is a huge potential for switching food transportation from road to water or rail in the NSR countries. It is worth to mention, that Norway has already achieved a high market share of water transportation, up to 55% for food transportation. Due to data unavailability, it is not clear how much is the water transportation market share in the other NSR countries.

Since the above analysis is conducted based on the data collected from existing database and official statistics, data availability is an important issue in this report. Various international and regional organizations – such as the individual national statistic departments, the OECD, and Eurostat – have long-established programs for collecting food trade data. However, the unavailability of detailed data is still an obstacle for conducting a complete analysis on food

trade in the NSR region. For example, the analysis on food production and related transportation services could be further elaborated, if more data were available.

The second part of this report is a close investigation of the food supply chains in the involved NSR regions. The main results are introduced in the following paragraphs, focusing on the economic importance of food production, food manufacture, transport/storage, wholesale/retail, food import/export, potential transport modal shift and potential benefits of ILC technologies.

In all partner regions, food products are very important for the local economies. Major food sectors include crops, cereals, vegetables, pigs, cattle, sheep, poultry, fish and other seafood. The production and secondary processing of the above products play a significant role in the employment and economies of the regions, especially when foods are exported. Fishing and fish farming are particularly important for Nordmøre & Romsdal, Bremerhaven and Scotland.

Since a large proportion of food products need to be further processed in the regions, the manufacturing or processing of food and drinks becomes a very important part of the local economies. This provides opportunities to create added value and new jobs. However, the long-term survival of such manufacturing activities can be a problem, due to the competition from the low cost economies. In order to keep such food clusters, we need more efficient logistics, storage and transport facilities.

Most of the regions have good road infrastructure, seaports and multimodal logistics hubs. However, frequent and price-competitive sea freight or feeder connections between the regions are missing. Therefore road transport largely predominates the food supply chain. Most regions have already plans for improving intermodal infrastructure, some specifically for food supply chains. In the regions, the transport and storage sectors are made up of many small and medium size companies. There is a trend of consolidation of volumes. This makes the step towards multimodality easier. In the future larger multinational logistics companies will emerge to offer more integrated logistics solutions.

Regarding the food wholesale and retail in the partner regions, there is an increasing trend of using factory gate pricing and controlling inbound logistics, which means that the decision power on logistic solutions is shifted to large retailers. Another trend is the consolidation of retailers, and most regions will probably end up being served by a few large retailers. For example, the top two retailers in Denmark account for 59% of the grocery market.

In the partner regions, rail and short-sea feeder is clearly underused. There are a lot of opportunities for modal shift. For example, (1) the food imports from EU to the north UK can be consolidated in e.g. Zeebrugge and then transhipped to Immingham or Grangemouth; (2) rail and coastal shipping could be used instead of road transportation for the transportation from the Central Scotland and Fife to South East England, especially for the increasing demand for Scottish food and drink products on the international market; (3) the use of ferry services would allow Scottish fish products to reach EU market directly, and retail imports on the opposite direction as well; (4) in West Flanders the sector of potatoes and vegetables (both fresh and frozen) can be shifted to rail and (shortsea) shipping; (5) in Västra Götaland, the dry port system opens up opportunities to move goods to intermodal systems; (6) the Nordmøre/KNH region is planning a new port for food exports at Justen Island in Hitra municipality, especially for fresh fish and seafood; (7) shipping could be used for transportation between Esbjerg and the UK.

Regarding the ILC technologies, its application would provide supply-chain visibility, flexibility, agility and cost reduction, and service improvement for food production, transportation and logistics in the partner regions. Some options for applications are fresh seafood, fresh meat, fruits, frozen seafood and general chilled/frozen food.

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- Collinson, A. (2011), A market scan of Yorkshire and Humber food clusters and hubs, Interreg IVB North Sea Region Food Port Project, Yorkshire Forward, pp. 1-36.
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An early version of this final report was written by Professor Chee Wong and his colleagues at the Logistics Institute in the University of Hull.

APPENDIX A: FOOD TRADE VOLUMES BETWEEN THE NSR COUNTRIES (UNIT: 100 KG)

Destination Origin	Product code (SITC)	Belgium	Germany	Denmark	United Kingdom	Netherlands	Norway	Sweden
Belgium	00		171,825	261	609	1,025,138	80	18
	01		3,895,989	54,347	988,450	2,770,096	260	51,714
	02		4,648,415	135,915	1,232,358	4,111,789	890	35,890
	03		104,503	20,059	17,243	318,274	630	4,157
	04		2,837,412	147,664	1,765,628	13,200,722	83,120	265,339
	05		12,919,626	507,169	7,037,997	12,485,897	227,290	1,043,116
	06		2,593,142	128,111	2,788,952	2,181,096	25,690	69,762
	07		1,346,330	39,773	446,893	1,166,239	38,990	118,347
	08		1,833,177	236,834	1,728,083	7,873,283	20,750	7,676
	09		2,139,988	56,518	1,200,070	1,472,888	55,790	132,030
	11		1,569,073	83,885	2,199,395	5,142,671	38,630	79,284
	12		165,433	1,391	45,965	82,489	140	386
Germany	00	167,395		31,589	5,312	4,270,358	360	443
	01	733,156		1,532,074	1,752,986	4,274,932	5,010	610,125
	02	5,970,943		1,180,171	1,859,238	11,364,661	41,200	538,062
	03	194,215		315,946	459,153	2,367,100	2,540	105,829
	04	15,366,959		4,674,765	4,865,927	32,532,477	2,853,590	1,085,648
	05	4,697,872		2,979,725	3,142,537	12,324,912	175,530	1,693,063
	06	4,333,083		898,195	1,576,591	2,226,241	17,640	348,346
	07	624,109		435,421	1,106,594	933,894	55,980	300,589
	08	4,297,819		7,338,433	1,792,404	27,205,367	294,750	846,537
	09	800,153		515,147	1,068,329	1,916,323	73,390	282,110
	11	568,816		815,005	2,874,695	52,318,406	158,680	1,153,510
	12	38,753		10,722	280,206	123,318	6,790	14,912
Denmark	00	63,150	2,560,605		2,465	338,520	2,580	2,462
	01	67,453	4,017,385		2,723,907	228,466	24,140	913,801
	02	77,001	2,151,318		693,527	424,738	50,810	1,745,181
	03	116,319	1,231,188		580,544	260,039	148,970	404,313
	04	766,577	7,162,112		281,795	731,830	659,770	1,553,011
	05	85,602	468,792		162,696	113,740	263,930	1,512,398
	06	7,347	397,327		59,629	32,508	1,016,370	738,582
	07	6,550	66,774		24,464	27,343	11,490	67,799
	08	134,367	1,314,866		526,064	285,880	882,280	913,896
	09	59,453	1,007,961		552,701	64,588	84,530	573,833
	11	122,493	4,026,779		29,146	38,955	147,250	749,156
	12	24,540	16,046		1,874	21,965	17,260	10,964
United Kingdom	00	567	844	267		32,219	320	70
	01	229,819	752,457	120,149		1,680,272	380	10,608
	02	576,291	562,932	100,784		698,837	5,840	49,443
	03	73,091	143,969	143,317		944,019	566,260	15,006
	04	2,088,016	4,794,123	677,931		8,555,850	139,400	112,809
	05	619,430	792,337	207,787		1,052,907	242,760	222,410
	06	196,822	135,763	75,509		373,202	390,760	39,081
	07	126,655	256,193	69,401		241,202	25,240	56,845
	08	287,543	451,575	220,327		375,537	169,390	110,802
	09	102,178	479,761	78,121		268,294	81,730	111,469
	11	151,228	793,234	174,239		942,970	68,340	344,567
	12	30,742	117,157	5,069		25,703	240	863
Netherlands	00	2,101,708	5,495,502	10,742	22,938		500	2,642
	01	1,940,376	5,412,201	651,965	4,042,878		2,040	225,947

	02	5,805,410	11,638,409	365,365	1,182,316		7,460	334,485
	03	715,888	886,747	77,828	230,094		1,710	56,800
	04	8,427,506	8,761,236	396,881	1,808,614		124,800	625,574
	05	14,813,431	37,174,420	2,465,227	14,325,287		465,850	3,706,679
	06	2,195,922	2,773,605	227,448	1,001,153		81,130	119,386
	07	1,200,904	3,915,004	127,485	1,017,146		101,210	277,000
	08	22,668,313	35,873,223	1,856,491	8,065,739		236,160	1,309,960
	09	1,887,703	6,189,154	136,345	2,720,159		121,360	328,978
	11	2,815,955	5,082,789	172,432	2,422,563		40,970	243,349
	12	104,968	100,680	4,155	34,583		330	2,387
Norway	00	45	34	283	30	141		1,393
	01	4	560	16,921	464	219		3,528
	02	7,376	21,937	11,297	10,171	5,369		32,256
	03	4,715	1,069,357	2,373,845	475,512	587,045		4,309,766
	04	85	313	9,544	1,570	715		44,712
	05	140	553	9,403	4,305	631		15,098
	06	1	315	1,046	3	23		11,107
	07	1	1,310	2,624	390	240		45,895
	08	3,800	31,625	180,719	45,784	98,162		1,269,456
	09	3,549	4,869	13,430	5,592	892		63,565
	11	828	6,874	50,026	94,688	459		1,230,404
	12	:	0	116	:	0		85
Sweden	00	5	39,228	1,622	17	119	2,430	
	01	25,633	56,187	228,377	36,124	8,429	9,770	
	02	12,400	159,152	629,996	85,897	18,029	26,660	
	03	74,639	248,597	539,521	195,522	44,619	98,150	
	04	266,726	1,834,560	1,195,262	136,502	643,225	945,490	
	05	32,773	169,405	333,489	14,908	58,504	116,610	
	06	3,013	65,683	511,840	19,326	79,971	61,910	
	07	20,388	16,983	225,516	32,989	26,764	116,700	
	08	19,627	90,005	459,324	321,737	182,300	774,000	
	09	16,621	104,373	351,972	164,027	46,626	403,760	
	11	0	465,348	224,839	282,831	18,231	325,350	
	12	5	1,644	516	47	0	13,260	

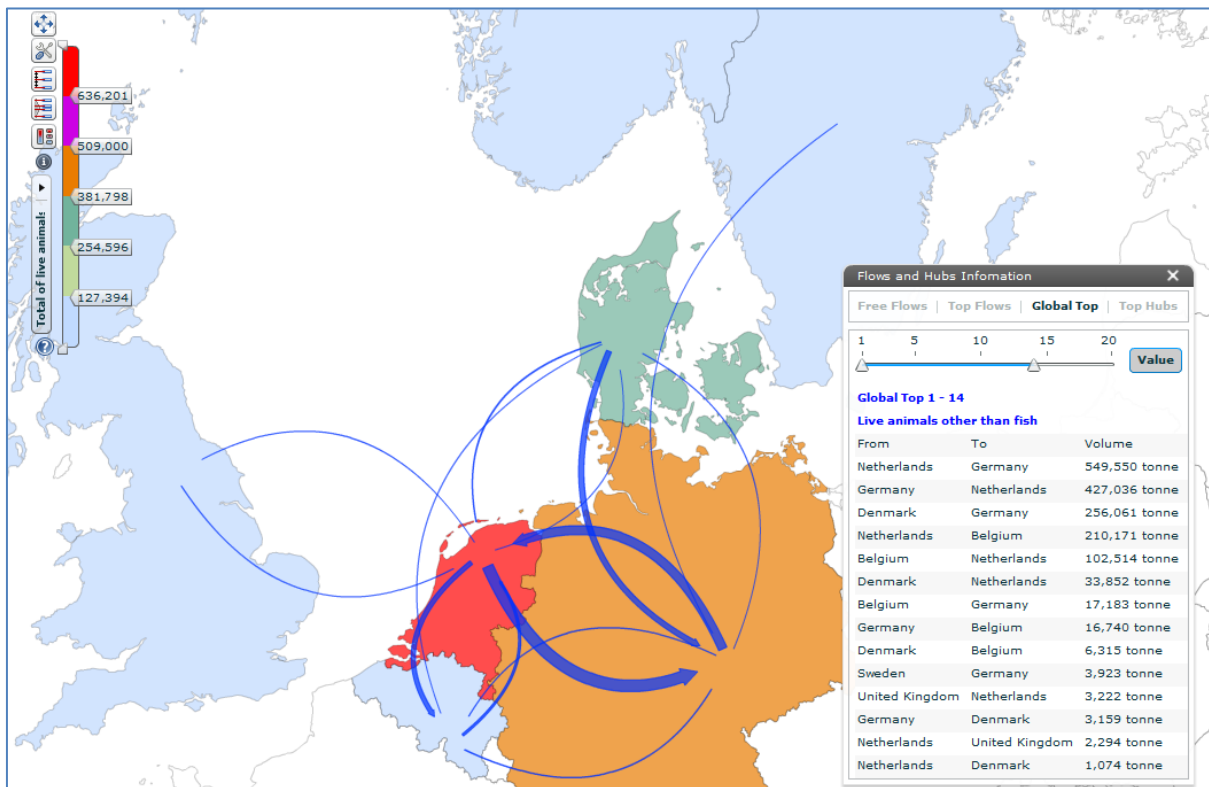
Note 1. ‘:’ means not available.

Note 2. The details of SITC code can be found in Section 4.

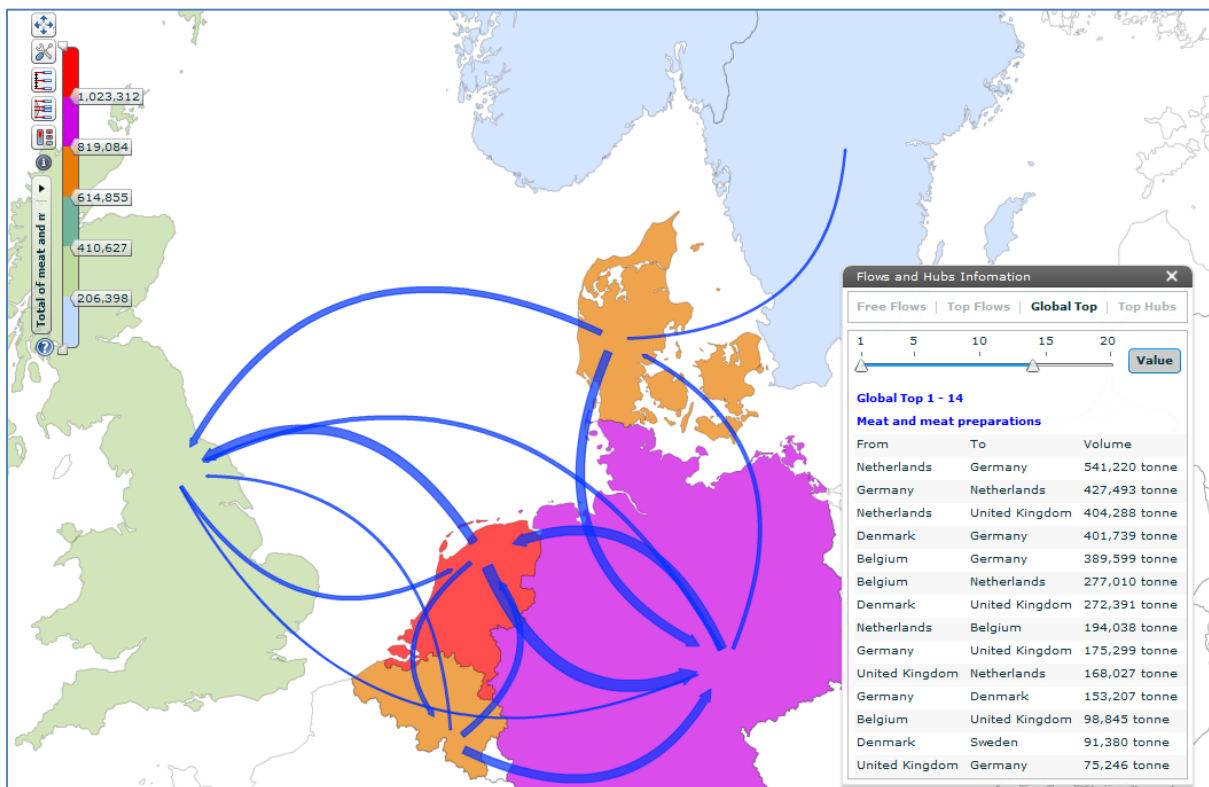
Note 3. Data sources include Eurostat and the national statistics database in the NSR countries.

Note 4. All above data has been cross-checked in the following way. Generally there are four records for each specific flow (from country A to country B), including (1) export of country A in Eurostat, (2) export of country A in A’s national statistics database, (3) import of country B in Eurostat and (4) import of country B in B’s national statistics. These four records are compared with each other, and normally import records are assumed to be more reliable. Wherever necessary, additional data has been collected from other sources, e.g. trade reports of individual country or region.

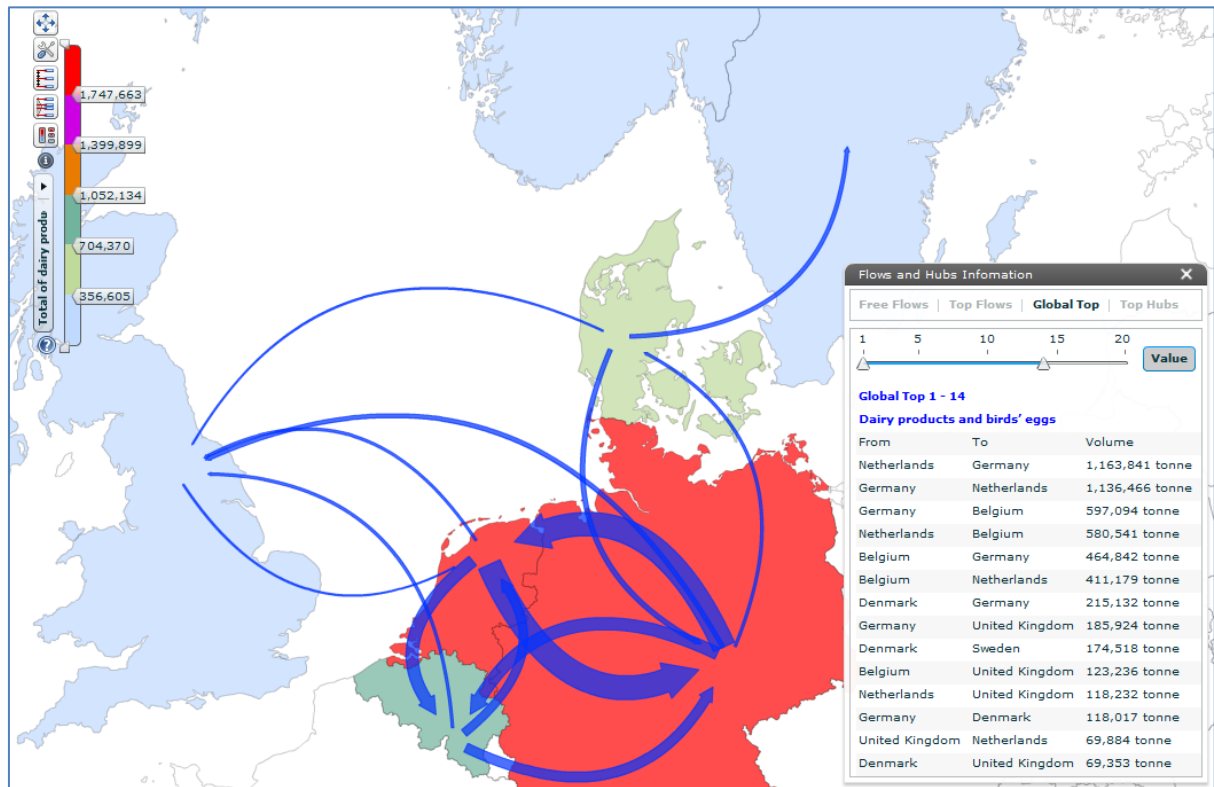
APPENDIX B: FLOW MAPS OF FOOD TRADE BETWEEN THE NSR COUNTRIES



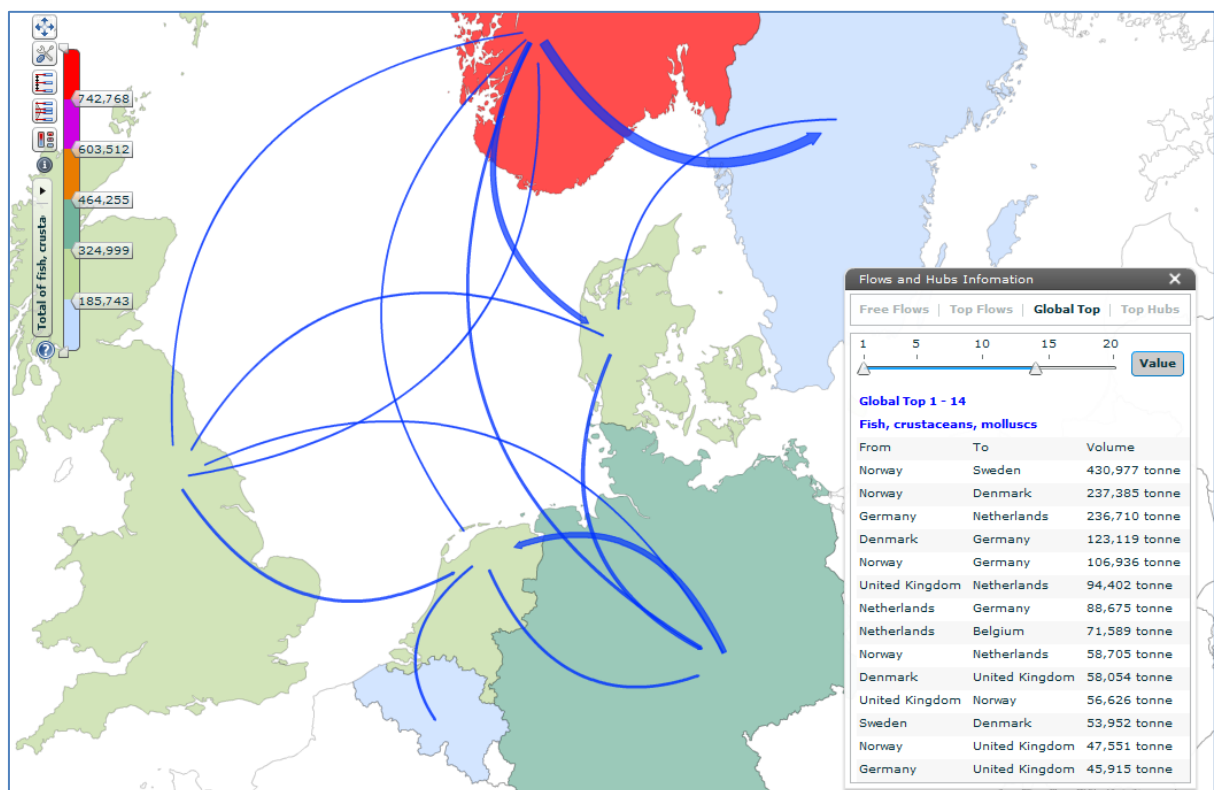
SITC 00 - Live animals other than the division of SITC 03 (unit: tonne)



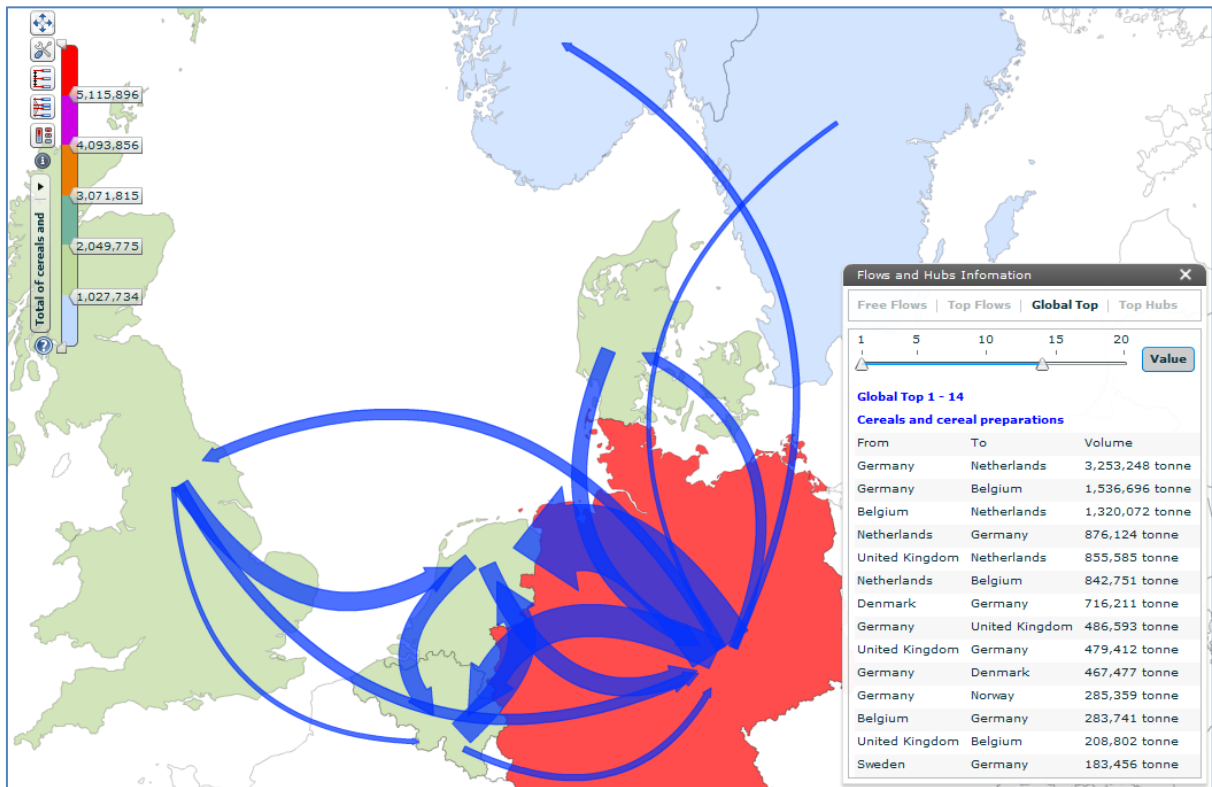
SITC 01 - Meat and meat preparations (unit: tonne)



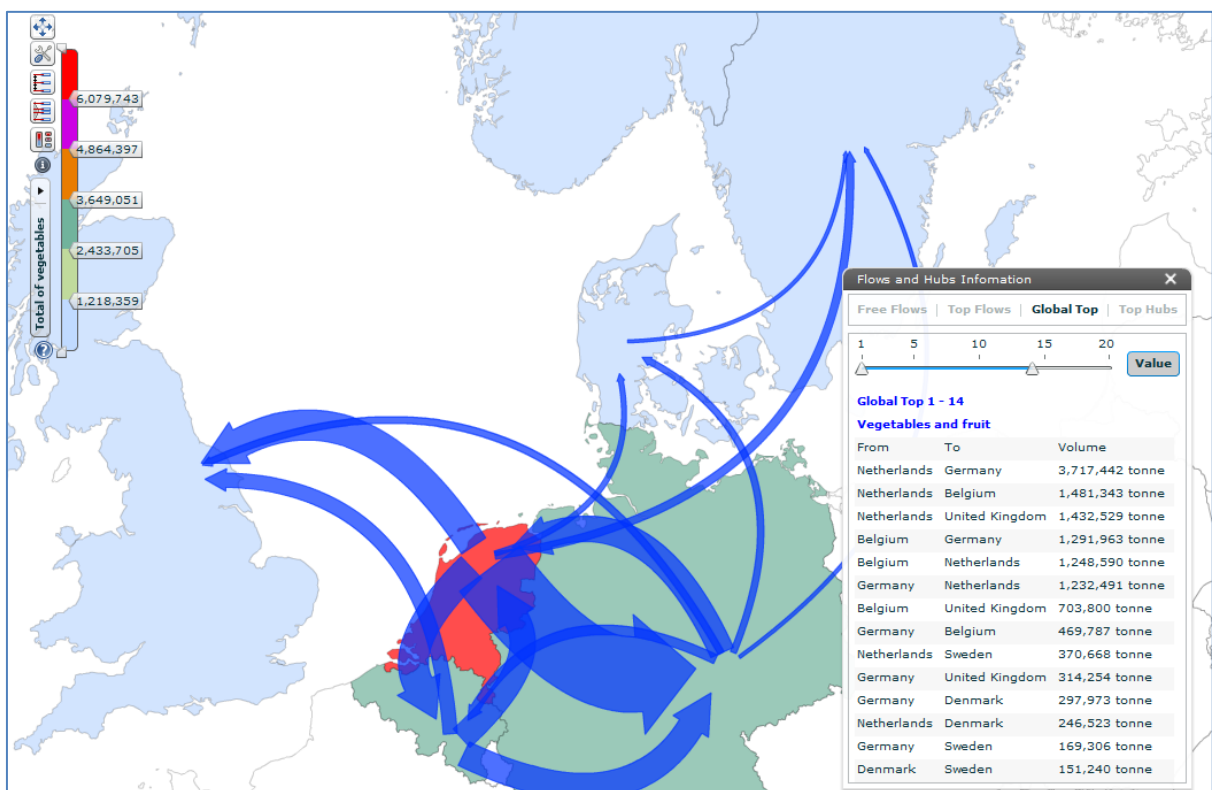
SITC 02 - Dairy products and birds' eggs (unit: tonne)



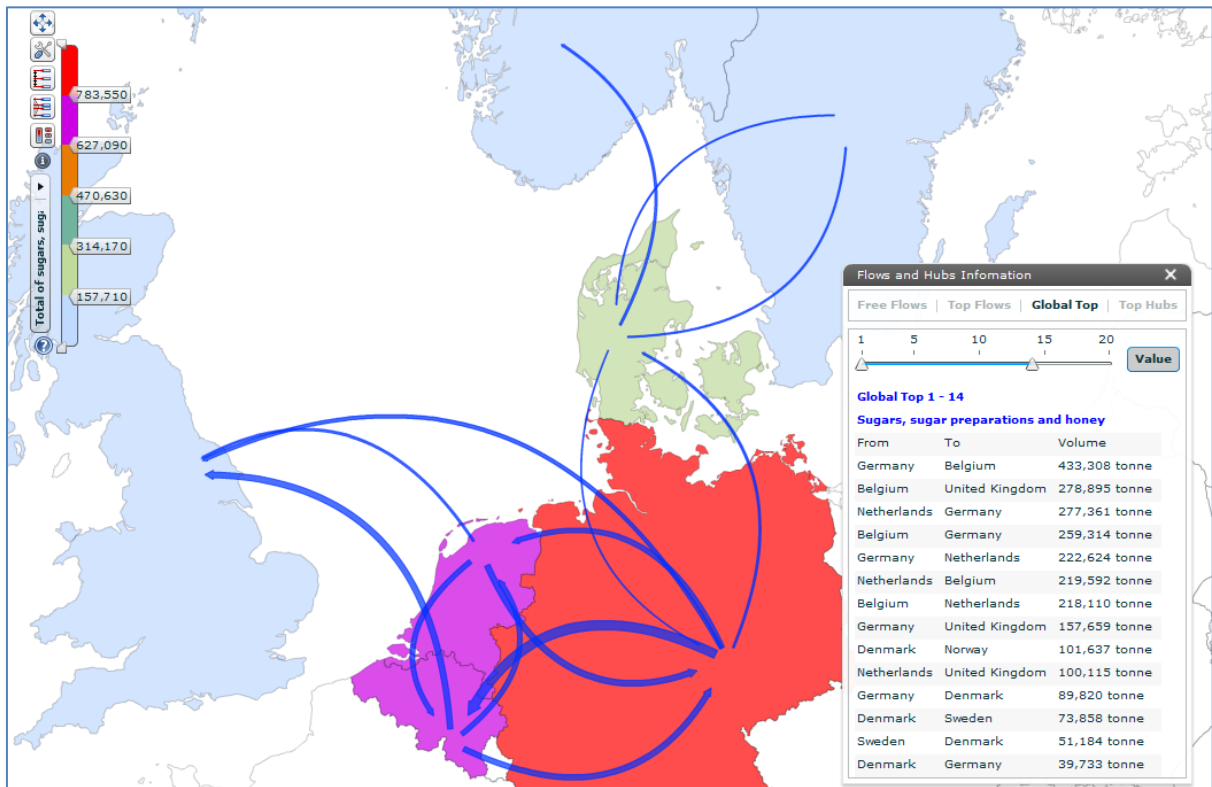
SITC 03 - Fish (not marine mammals), crustaceans, ... and preparations thereof (unit: tonne)



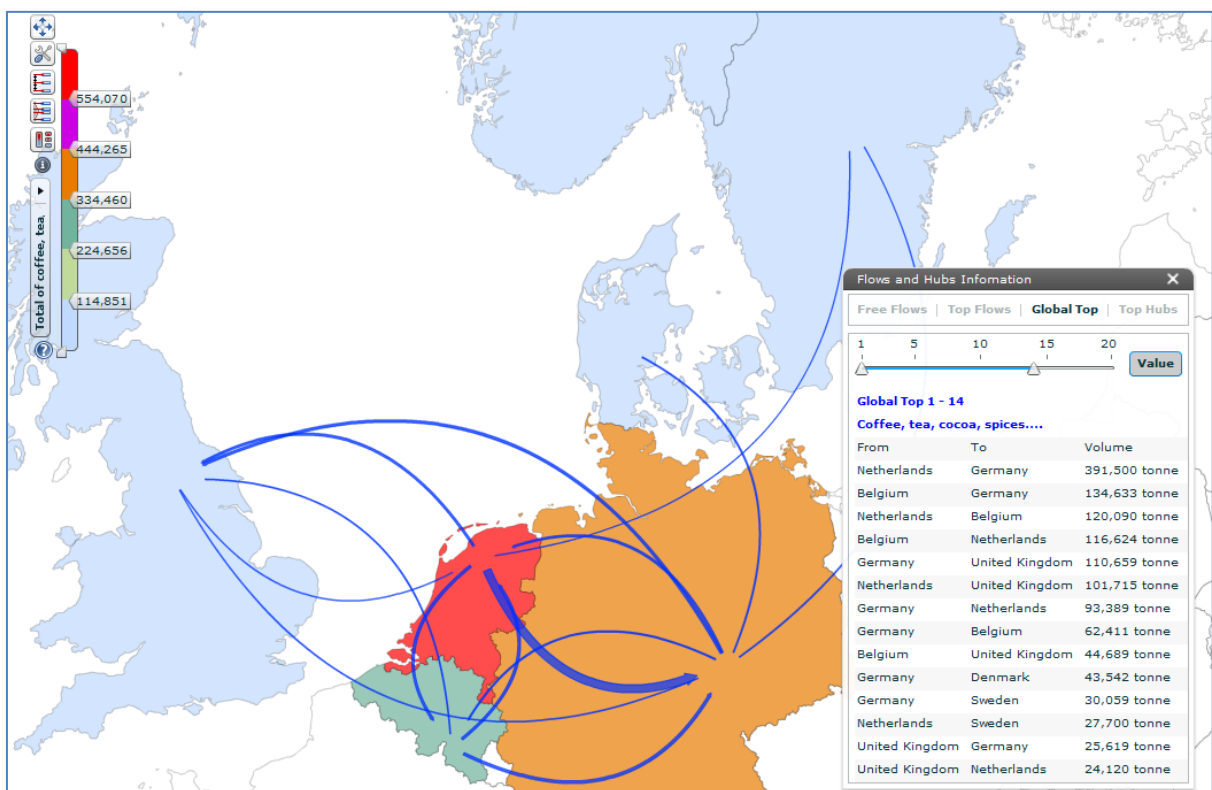
SITC 04 - Cereals and cereal preparations (unit: tonne)



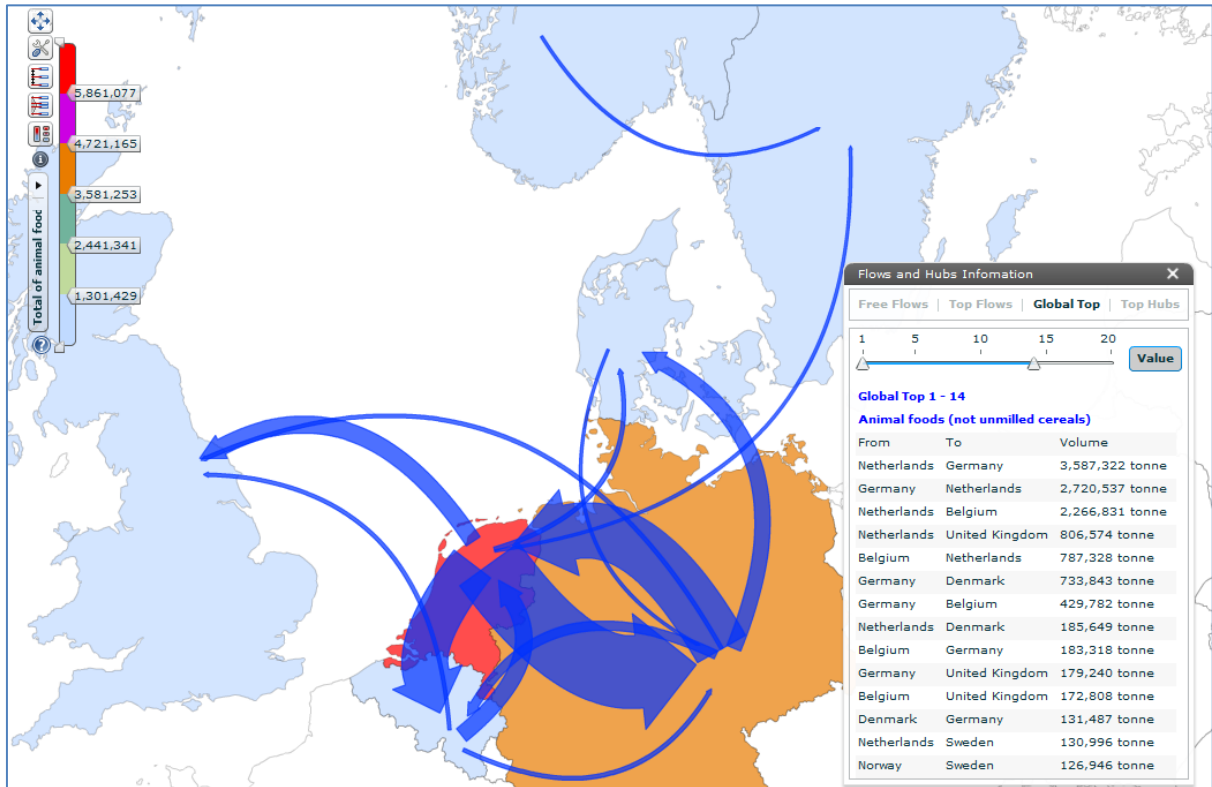
SITC 05 - Vegetables and fruit (unit: tonne)



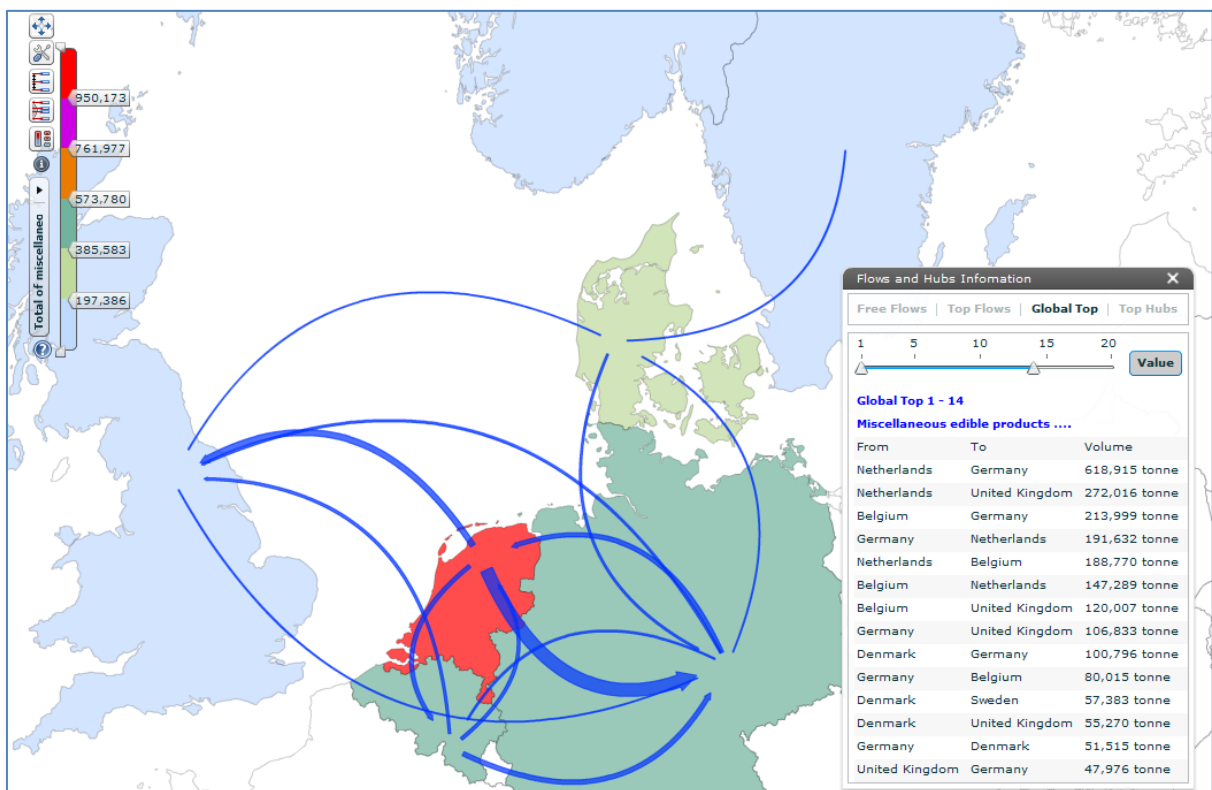
SITC 06 - Sugars, sugar preparations and honey (unit: tonne)



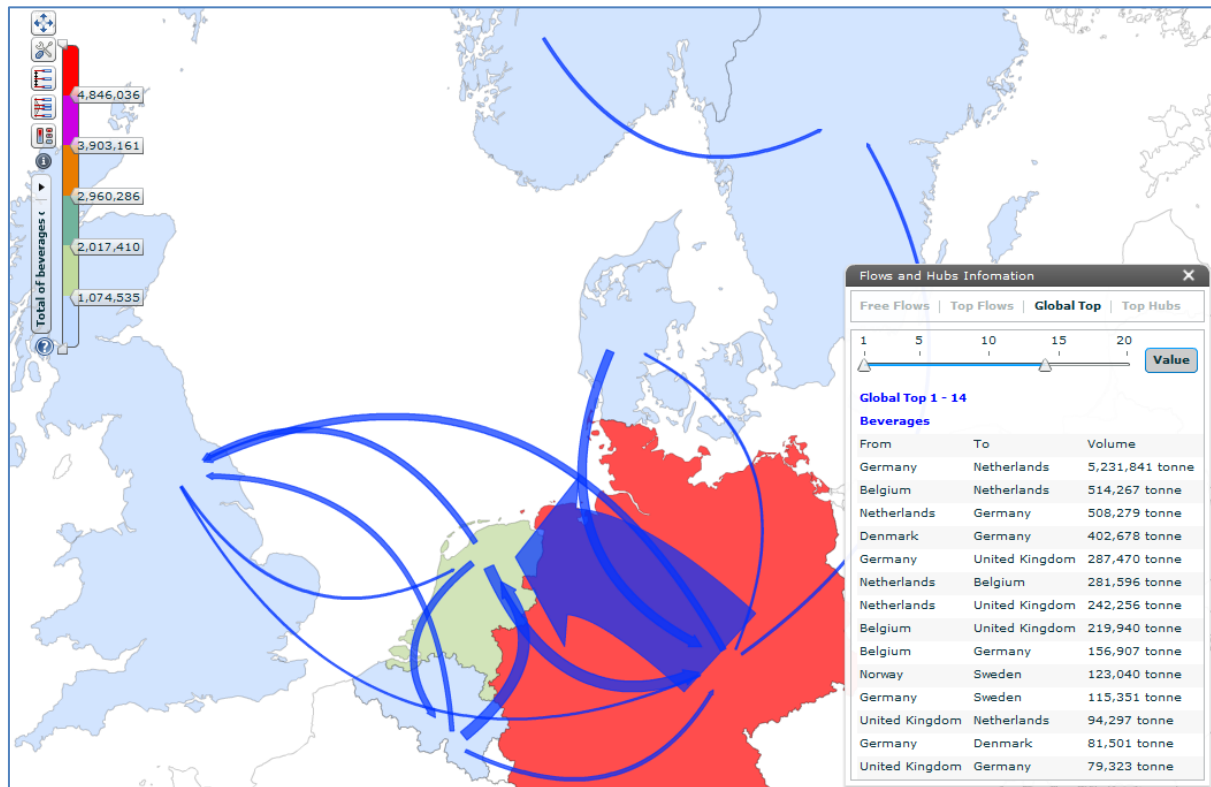
SITC 07 - Coffee, tea, cocoa, spices, and manufactures thereof (unit: tonne)



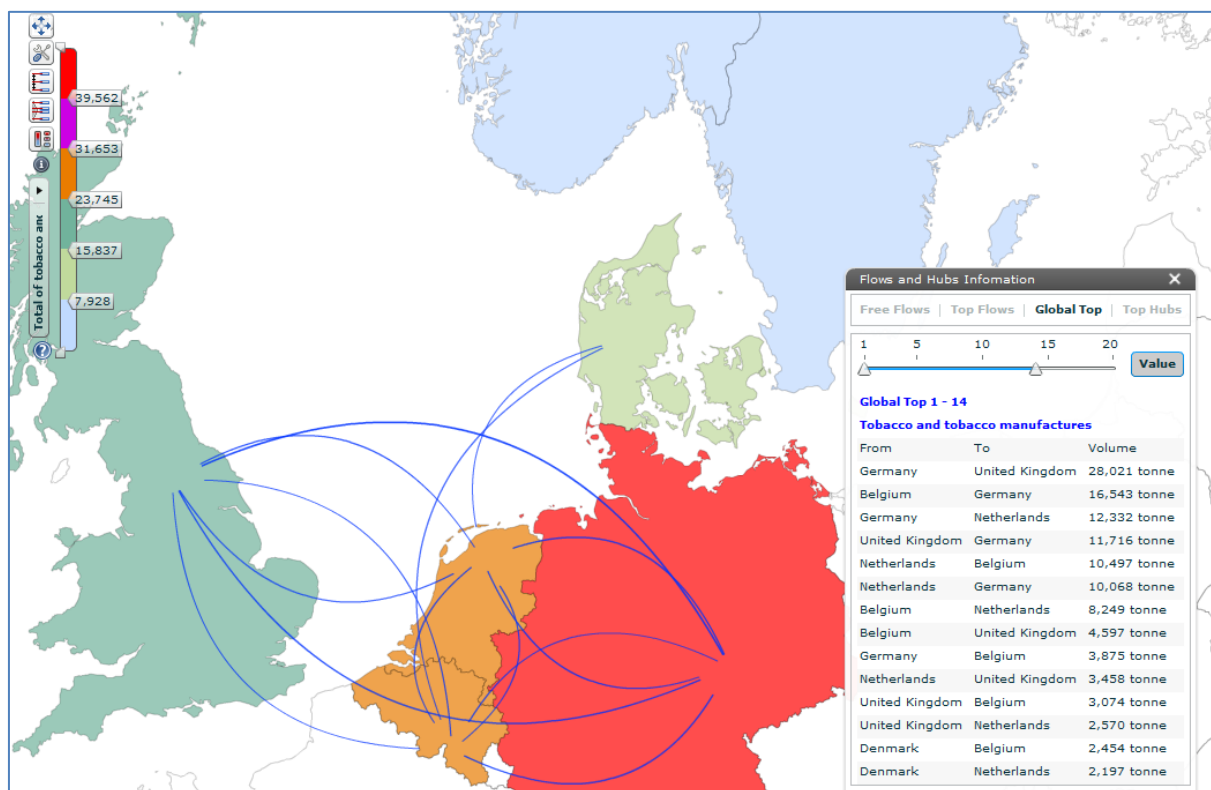
SITC 08 - Feeding stuff for animals (not including unmilled cereals) (unit: tonne)



SITC 09 - Miscellaneous edible products and preparations (unit: tonne)

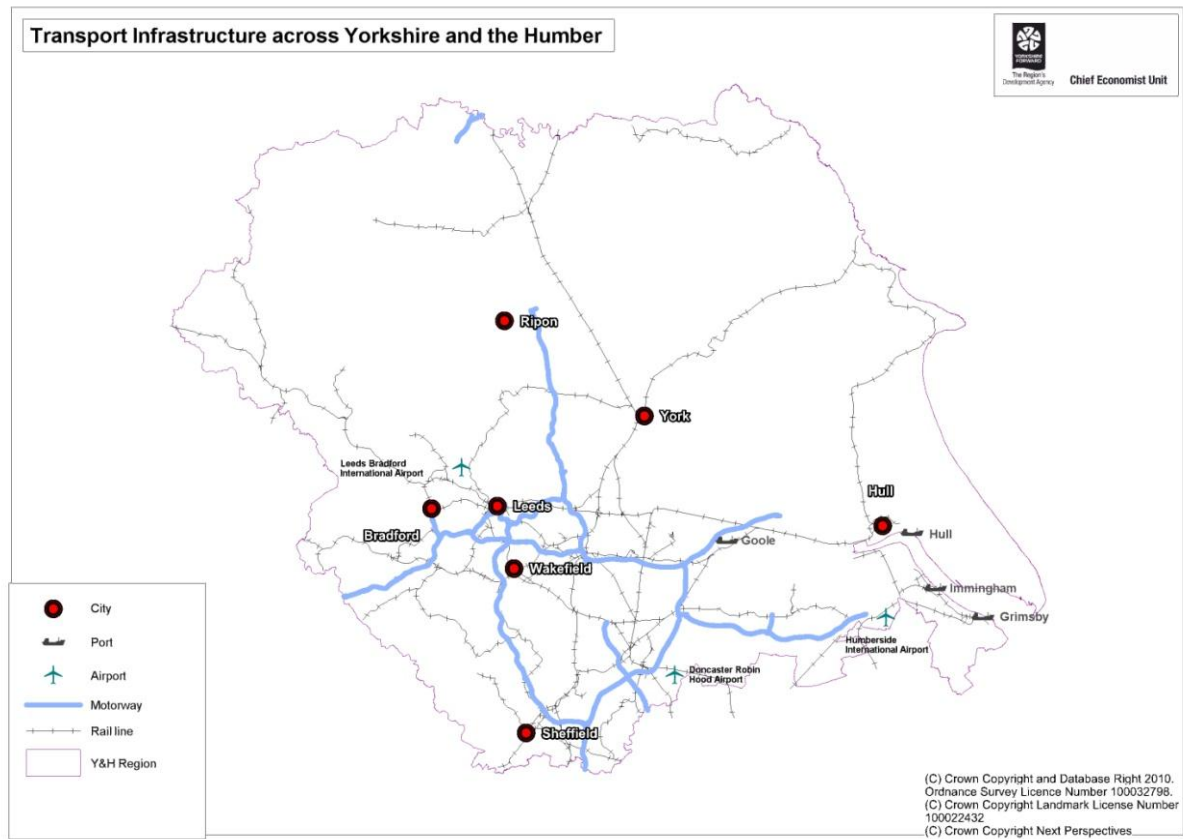


SITC 11 - Beverages (unit: tonne)

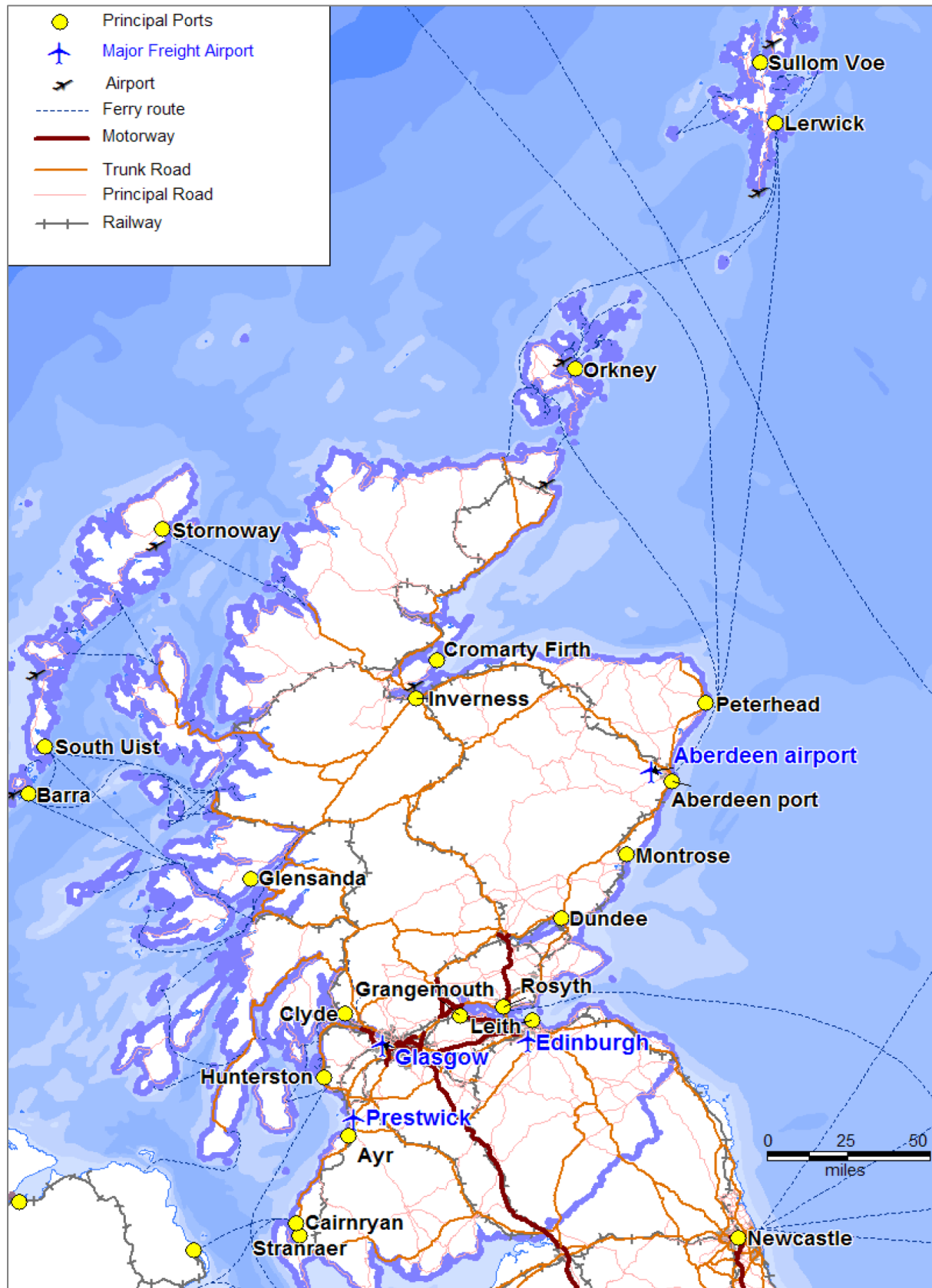


SITC 12 - Tobacco and tobacco manufactures (unit: tonne)

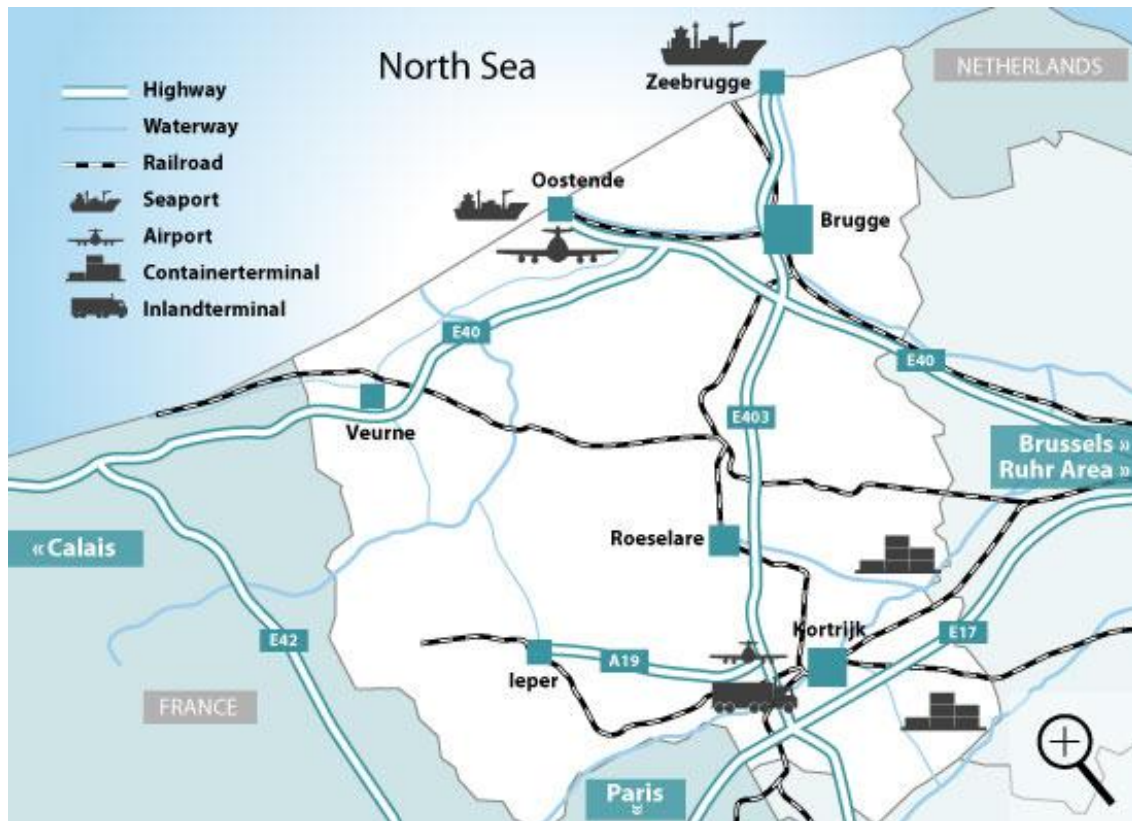
APPENDIX C: KEY CITIES AND LOGISTICS INFRASTRUCTURES AT PARTNER REGIONS



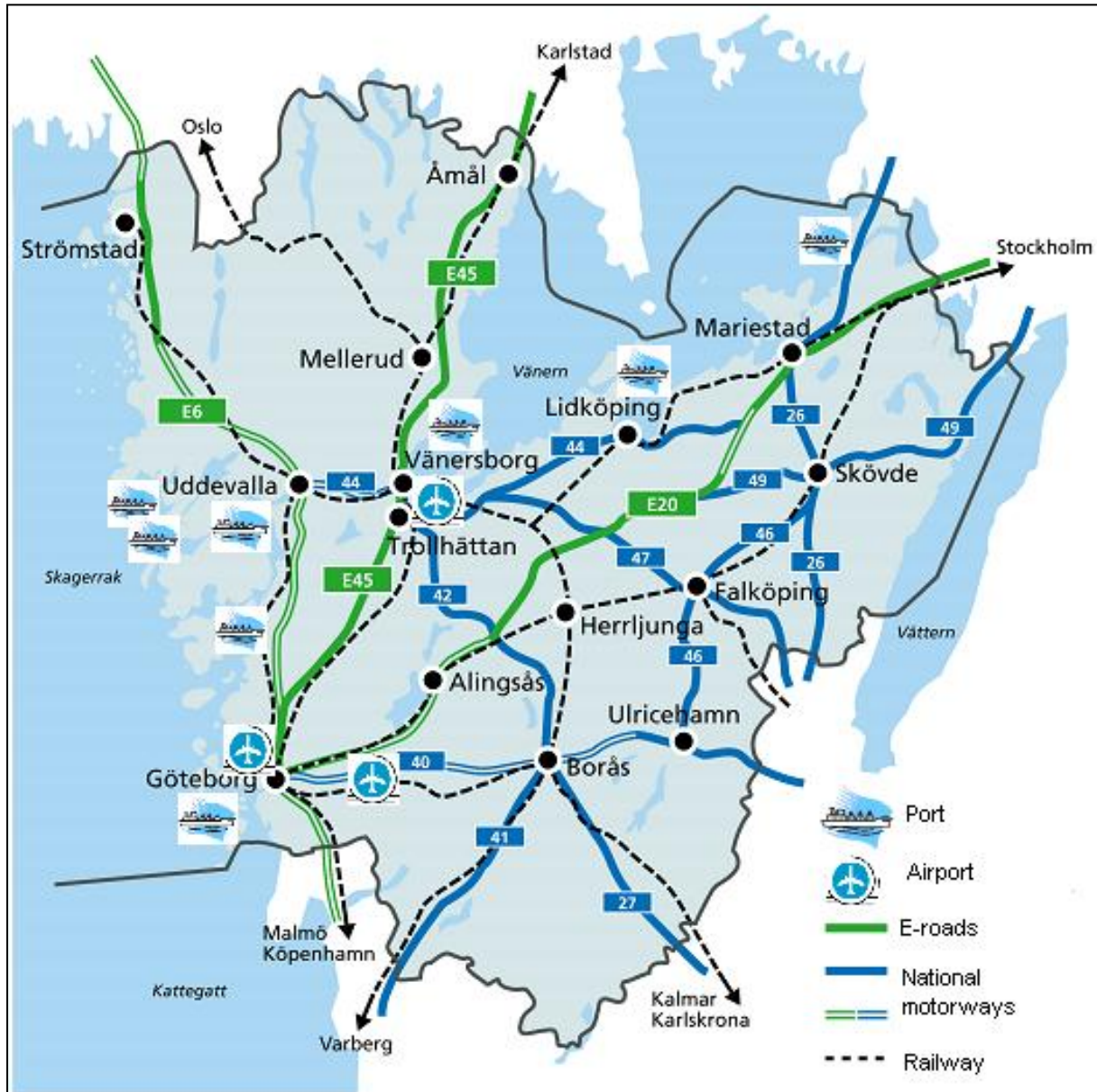
Key cities and logistics infrastructure at Yorkshire & Humber



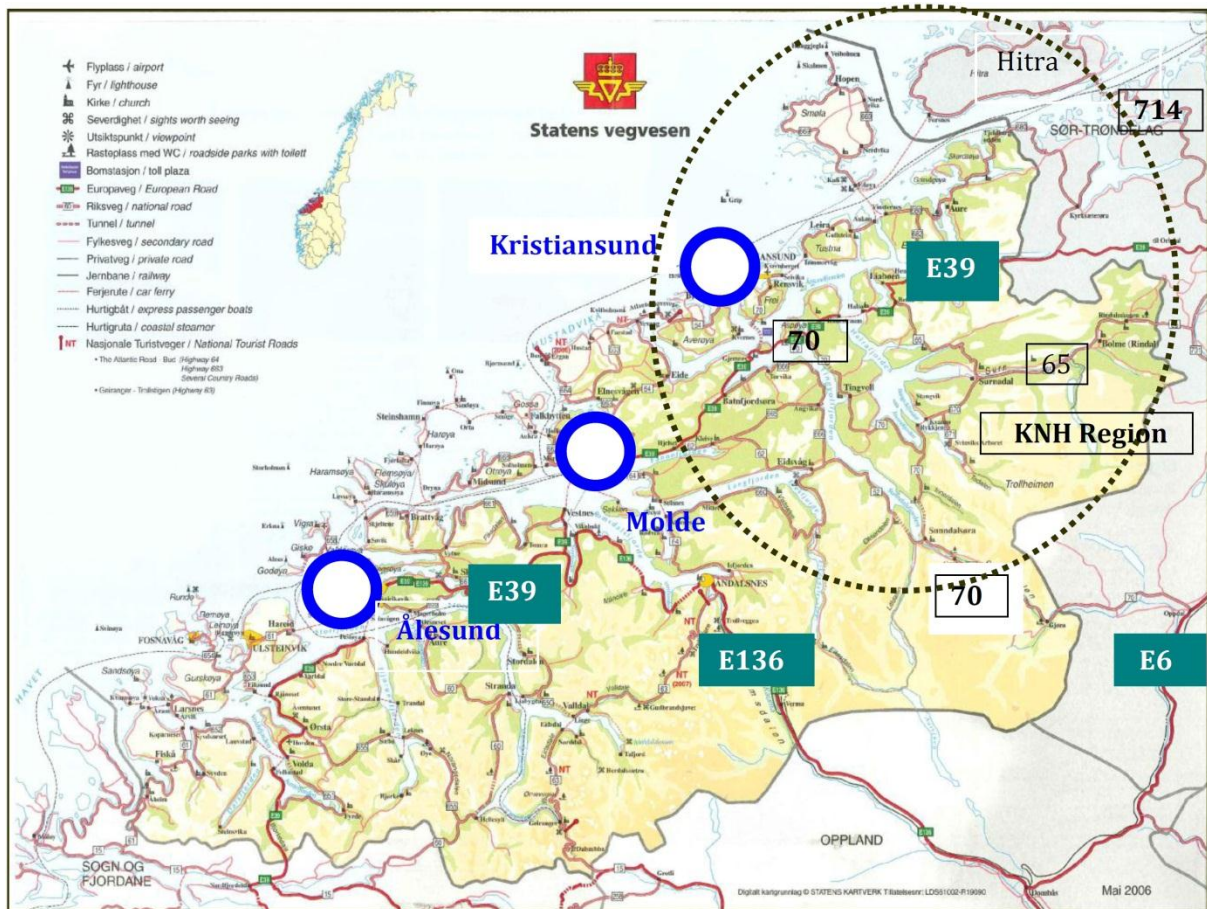
Main logistics infrastructure at Scotland



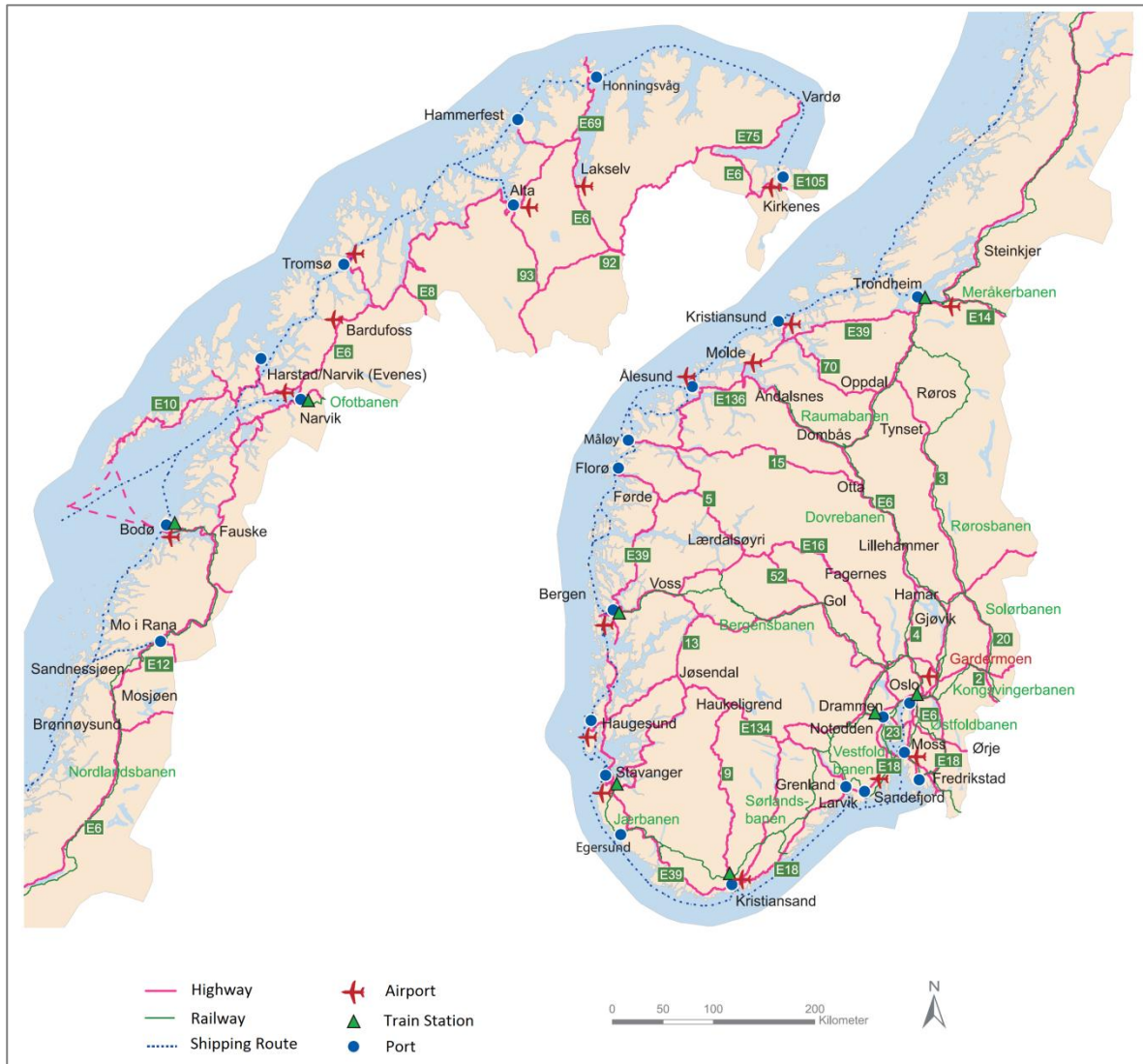
Key cities and logistics infrastructure at West Flanders



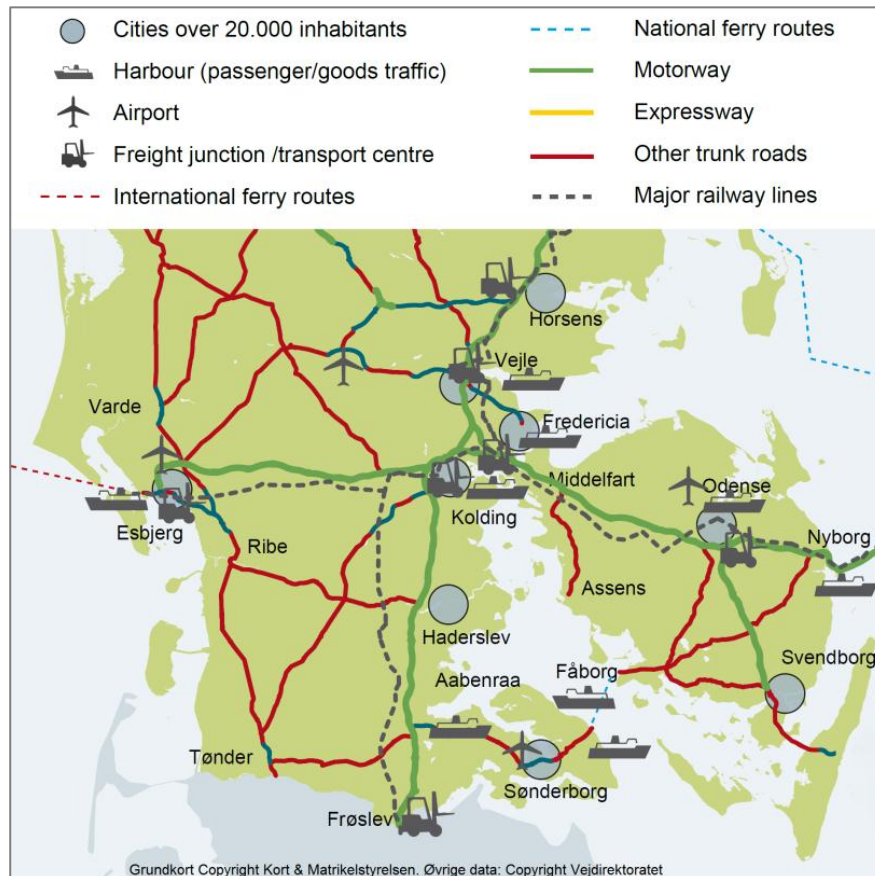
Key cities and logistics infrastructure at Västra Götaland



Key cities and logistics infrastructure in Møre & Romsdal County (incl. Nordmøre and KNH region)



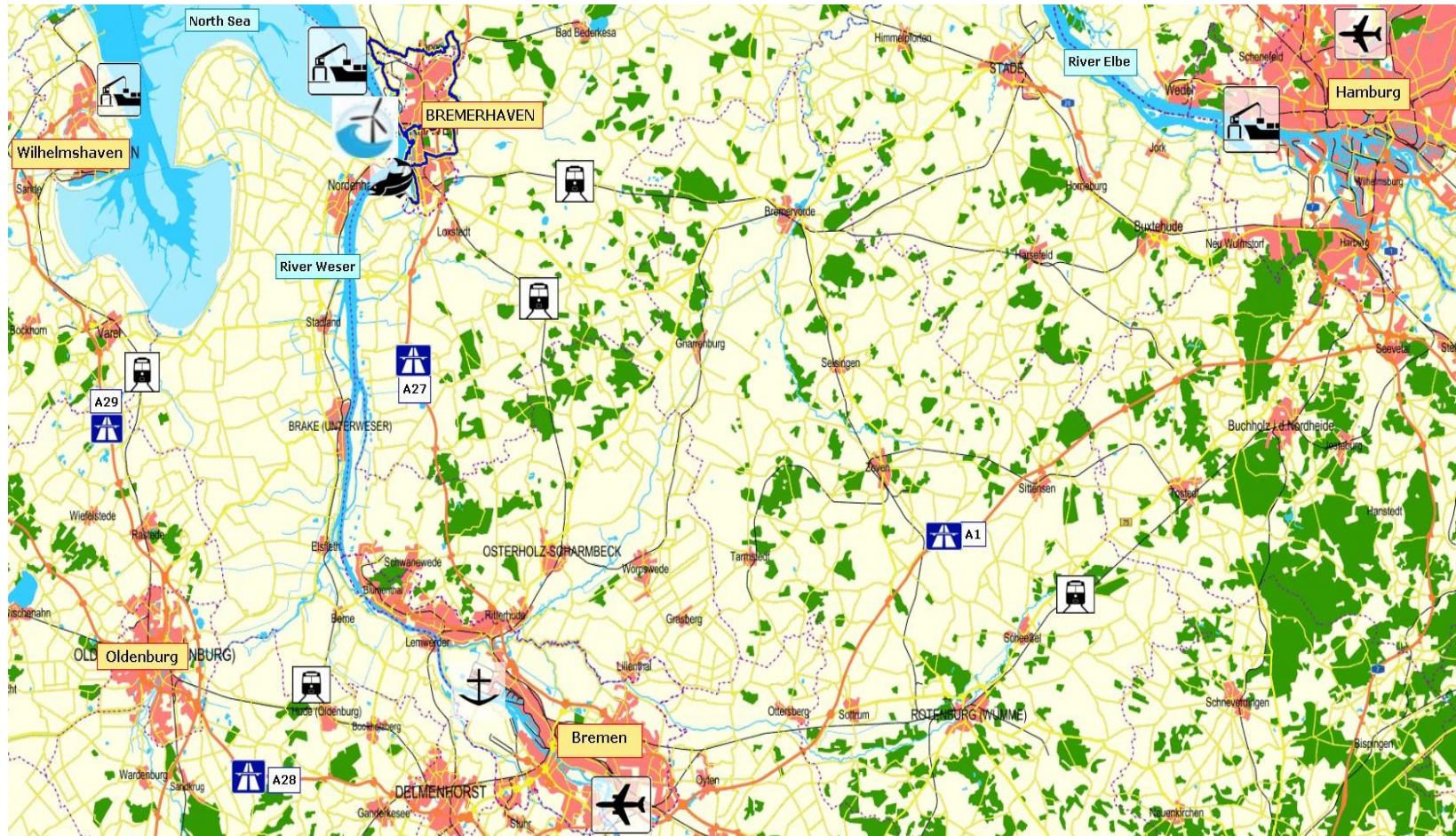
Key cities and logistics infrastructure in Norway



Key cities and logistics infrastructure at Southern Denmark



Key cities and logistics infrastructure in Denmark



Key cities and logistics infrastructure at Bremerhaven

APPENDIX D: KEY CITIES AND INFRASTRUCTURE

Yorkshire and Humber Region	
Key cities	Leeds, Bradford, Sheffield, Hull and York
Major seaports	<ul style="list-style-type: none"> ○ Grimsby – Grimsby caters for all types of cargo and handles vessels of up to 6,000 dwt. In addition. It is the chief vehicle-handling centre for the North, handling almost 400,000 vehicles annually for leading manufacturers. It handles a wide range of forest products. The port is also home to the UK's most advanced fish market; it handles some 30,000 tonnes of fresh fish each year, from local fishing industry, Norway and Iceland. It handles a variety of grain products, including grains for export. ○ Hull - Hull is one of the major general cargo ports. Hull handles around 260,000 TEU's containers per year. There is an agribulks handling and storage facility. Hull handles and stores bagged and bulk cocoa for companies such as Nestle and Cadbury. Hull also handles exports of wheat and barley to Europe and the rest of the world. There is also a fish auction market and a high-tech fish-handling facility providing real-time linkage to European fish market. Cold storage facilities are available. ○ Immingham - The port's links extend throughout Europe, to North and South America, Africa, Australia, the Middle East and the Far East. It handles significant volumes of fresh and frozen fish directly from Iceland on specialist lo-lo carriers. Immingham can meet demand for the freshest produce from around the world ○ Goole – Goole is an inland port; it is located at the River Ouse, some 80km from the open sea and 2km from the M62. It handles and stores agribulks and animal feed
Major airports	<ul style="list-style-type: none"> ○ Leeds / Bradford airport - there is a limited for of food through this airport ○ Humberside Airport - maintains a Perishable Food handling facility ○ Doncaster - there is a limited for of food through this airport
Major roads	<ul style="list-style-type: none"> ○ The key motorways are A1, A1M, M62, M180, M18, A64, M1, and the A63. ○ The A1 and M1 provide long distance corridors up and down the East of England with the M62 crossing the region and the country East West between Hull and Liverpool. ○ M1/A1 and M62 are part of the Trans European Network with the M62 serving as a particularly important international role providing a land bridge between Ireland and the rest of Northern Europe. ○ Although the motorway network in the region is good there is congestion on parts of the M1 and M62 in peak periods and the Highways Agency have plans to increase capacity between certain junctions in the future. ○ The rail network in the region also forms a core part of the national network for freight, both the East Coast Mainline and the Trans Pennine are very important.
Major railways	<ul style="list-style-type: none"> ○ The rail network in the region also forms a core part of the national network for freight, both the East Coast Mainline and the Trans Pennine are very important. ○ The capacity constrained South Humber Main Line (SHML) currently serves a vitally important role servicing power stations and heavy manufacturing with coal and other raw materials. SHML generates around 18% of the total UK

	<p>freight tonnage with potential for significantly more.</p> <ul style="list-style-type: none"> ○ The gauge constraints over the Pennines currently limit the amount of national and international traffic that can be carried between Hull/Immingham and Liverpool.
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SEStran Region	
Key cities	Edinburgh, Kirkcaldy, Dunfermline, Alloa, Falkirk, Livingston, Penicuik, Hawick, Musselburgh
Major seaports	<ul style="list-style-type: none"> ○ Grangemouth handles a substantial quantity of container-based traffic, and is also home to the only rail freight terminal in the SEStran area, the use of which is growing fast.
Major roads	<ul style="list-style-type: none"> • The trunk road network forms the key, highest volume routes providing links within SEStran and between SEStran and the rest of the country and consists of: <ul style="list-style-type: none"> ○ The A1, A7 (south of Galashiels) A68 (A6091), and A702, providing links to the south; ○ The A720 Edinburgh City Bypass; ○ The M8, M9 and A80 / M80 providing links to the west and north, M9 links Edinburgh with Grangemouth and M8 links Edinburgh with Glasgow; ○ The M90 to Perth, the A9 and the Highlands; ○ The A92 providing a link between Fife and Dundee / the north east; ○ The A876 / M876 and A985 Kincardine Bridge to Dunfermline. • One of the major constraints of trunk road network in this area is that the un-interrupted dual carriageway standard (A1) is not currently reached until Morpeth, over 100 miles from Edinburgh
Connections with other regions	<ul style="list-style-type: none"> ○ The Rosyth to Zeebrugge ferry service is run by DFDS as a freight-only operation with four departures a week from each port. This is the only direct RO-RO link between Scotland and the Continent with a capacity of 120-130 trailers (1900-2000 lane metres) ○ There are two Border Inspection Post (BIP) in Scotland – Peterhead and Prestwick

West Flanders Region	
Key cities	Bruges, Kortrijk (Courtrai), and Oostende; major logistics activities are concentrated in industrial logistical activities in the regions of Kortrijk and Roeselare, as well as the port zones of Zeebrugge and Ostend
Major seaports	<ul style="list-style-type: none"> ○ Port of Zeebrugge - is a young deep-sea seaport with modern port equipment suitable for the largest ships. It is now one of the most important entry ports for the European market. It handles European RO-RO traffic, intercontinental (container) traffic, container feeder traffic, conventional cargo, liquefied natural gas, cruises and traffic of new cars. A lot of companies are active in storage and handling of a wide range of foodstuffs, such as fresh fruit and vegetables, fresh fruit juices, potatoes, coffee, meat, dairy products, frozen products, mineral water, wine, cereals, dry food, ... These goods are mainly imported in the port by

	<p>reefer ships, reefer containers and bulk vessels. The number of logistic activities in the food sector is on the increase, because of which Zeebrugge is developing as a prominent European 'food hub'. The logistic centres mainly concentrate on climate-controlled storage, quality control, repacking and distribution to the large market chains.</p> <ul style="list-style-type: none"> Port of Oostende - is a short-sea port for bulk and general cargo. It is linked to France, Germany and further to Central Europe via European motorway E40. The rail-connections are in place and upgraded; it links Oostende to the terminal at the Zeewezendok. The port is also closely linked to the airport of Oostende, specialised in the transport of perishables. Oostende has many tools for redeveloping food-port activities, in close cooperation with the fishing-port. Both Ports of Zeebrugge and Oostende have daily sea links to UK ports e.g. Rosyth and Hull and the Thames region.
Major airports	<ul style="list-style-type: none"> Ostend-Bruges International Airport - The airport has an ideal location for international transport since it is close to a major European motorway, as well as to the seaports of Zeebrugge and Ostend. Freight transport is the airport's main business, which mainly includes international outsized cargo, perishables (this facility can handle up 300 tons) and livestock. Kortrijk-Wevelgem International Airport - 100,000 passengers passing through the facilities each year. Kortrijk-Wevelgem is mainly used for passengers, not for cargo. Intermodal terminals such as AVCT in Avelgem, RTW in Wielsbeke and the railway terminal LAR in Menen act as gateways to the ports of Zeebrugge, Antwerp and Rotterdam.
Major roads	<ul style="list-style-type: none"> West Flanders has 185km of motorway; there are two important European Axes – E40 and E17; there is also a fast and relatively easy reach to the UK via the channel tunnel
	<ul style="list-style-type: none">

Västra Götaland Region	
Key cities	Göteborg (Gothenburg), Borås, Mölndal, Trollhättan, Skövde and Uddevalla
Major seaports	<ul style="list-style-type: none"> Port of Göteborg is Scandinavia's largest port with trans-ocean and intra-European shipping lines. More than half of all freight to and from the Port of Göteborg is transported by rail. Close access to railways, motorways and Scandinavia's biggest port create good logistic conditions, and the region has been singled out as one of the foremost logistics locations in Sweden. 70% of the industry in Scandinavia is located within a radius of 500 km from Göteborg. This makes the Göteborg region an ideal hub between the three Scandinavian capitals: Stockholm, Oslo and Copenhagen. Both in 2006 and 2010 the Göteborg Region was appointed the strongest logistics location in the country by far.

Major airports	<ul style="list-style-type: none"> ○ Göteborg Landvetter Airport. Scandinavia is an air cargo-intensive region, and here Göteborg Landvetter Airport plays an important role.
Major roads	<ul style="list-style-type: none"> ○ The major motorways include E6, E45, and E20 <ul style="list-style-type: none"> ▪ E6 connects Göteborg with Oslo, Norway and Copenhagen, Denmark ▪ E45 connects Göteborg with the North of Sweden e.g. Karlstad ▪ E20 connects Göteborg with Stockholm

Møre & Romsdal / KNH Region	
Key cities	The region includes Nordmøre and two municipalities in Sør-Trøndelag county
Major seaports	<ul style="list-style-type: none"> ○ Kristiansund is the main seaport. It imports significantly more and export of food products and animal feed. It imports grains. It loads more than unloads food products and animal feed from the domestic market ○ Besides Kristiansund Port the coastal port of Hitra and regional port of Surnadal are in a developing planning stage ○ There is a planning process in progress to build a food port for food exports at Justen Island (Jøstenøya) in Hitra municipality, especially for fresh fish and seafood in general.
Major airports	<ul style="list-style-type: none"> ○ Kvernberget close to Kristiansund and Årø (close to Molde in the neighbouring region, Romsdal)
Major roads	<ul style="list-style-type: none"> ○ The key motorway is E39 connecting Kristiansund to Southern Norway and E6 connecting Kristiansund to Trøndelag counties and Trondheim up north ○ There are no rail connections in the KNH region, but further south in the Romsdal region there is a well known Rauma railway for cargo and public transport. It is connected to the main, national railway system.

Southern Denmark Region	
Key cities	Odense, Esbjerg, Kolding, Vejle, Fredericia, Svendborg, Sønderborg, and Billund.
Major seaports	<ul style="list-style-type: none"> ○ Esbjerg is the seaport at the west coast.
Major roads	<ul style="list-style-type: none"> ○ E20 connects west coast (Esbjerg) across the Jutland peninsula with Kolding and continuing across Fynen and over the belt to Sealand. ○ E45 runs from the north to south on the east coast connecting the region to the northern part of Jutland down through Vejle, Kolding and all the way to the German border.
Major railways	<ul style="list-style-type: none"> ○ There is a goods-only rail line connecting the main west to east rail to Grindsted from Bramming bringing the rail line close the region's largest airport in Billund. ○ The main rail lines connect the region to the rest of the country (both north and east) and towards Germany (south).

Bremerhaven Region	
Key cities	<ul style="list-style-type: none"> ○ Bremerhaven, Bremen, Oldenburg, Cuxhaven, Hamburg
Major seaports	<ul style="list-style-type: none"> ○ Bremerhaven: Container Terminal (container freight), Auto-Terminal (cars), Offshore Terminal (offshore wind mills), Kaiserhafen Columbuskaje (Fruit Terminal) ○ The ports of Bremen/Bremerhaven, are Germany's foreign trade location number two. The port of Bremerhaven is the sixteenth-largest container port in the world and the fourth-largest in Europe with 4.8 million Twenty-foot equivalent units (TEU) of cargo handled in 2010. In addition, more than 1,350,000 cars are imported or exported every year via Bremerhaven. Bremerhaven imports and exports more cars than any other city in Europe except for Rotterdam, and this traffic is also growing. In 2011 a new panamax-sized lock has been opened, replacing the 1897 Kaiserschleuse, now the largest lock worldwide. ○ The port transshipment in 2009 was strongly affected by the global financial and economic crisis and was significantly lower than in the boom year 2008. 2010, the volume handled in the ports of Bremerhaven increased by 7.5% and achieved the total second best result of the past 10 years. Also for the year 2011 significantly growth rates are recorded.
Major airports	<ul style="list-style-type: none"> ○ Airport Bremen ○ In Bremen is the airport of Bremen, 60 km, south of Bremerhaven, ○ Measured by the number of passengers the airport is in twelfth place in Germany, measured the cargo in sixteenth place (as of 2007). The operator of the airport Bremen GmbH is 100% of the city of Bremen. ○ There are two regional airports: Cuxhaven/Nordholz: 25 km north, JadeWeserAirport : 35 km west of Bremerhaven.
Major roads	<ul style="list-style-type: none"> ○ A 27. Both parts of the country (Bremerhaven, Bremen) are connected by the motorway A27. The city of Bremen is also connected to the A1. ○ In addition, there are plans for a coastal motorway A 20 / A 22 between Scandinavia / Poland and the Netherlands, Hamburg and Bremerhaven.
Major railways	<ul style="list-style-type: none"> ○ Bremerhaven – Bremen ○ Bremen and Bremerhaven are linked by an electrified double-track main line railway. Bremen main station leads to Hamburg, Hanover, Uelzen, the Ruhr region, and to Oldenburg, Osnabrück, Nordenham. Vegesack. From Bremerhaven rail links lead to Cuxhaven and to Bremervörde / Hamburg. ○ The railways in Bremerhaven carry a heavy load of freight traffic, mostly new cars, containers and food.

APPENDIX E: SWOT FOR AGRICULTURE AND HORTICULTURE

Yorkshire and Humber

- The region generates £921 million of agricultural GVA out of a total UK GVA of £8,828 million (10% of UK GVA)
- The region has an above average proportion of best quality land (Grade 1 & 2) but also an above average proportion of Grades 4 and 5 in the uplands
- The region focuses on cattle and sheep production in the hills and uplands to arable crops and horticulture in the lowlands and coastal areas. There are significant concentrations of beef, sheep, dairying, pigs, potatoes and outdoor and protected vegetables
- The region has four prominent agricultural segments, namely all types of crops / cereals, beef (for meat) and dairy (for milk and cheese etc), pigs and poultry (including eggs). The region accounted for around 7% of the English dairy herd, amounting to approximately 650,000 tonnes of milk in 2005 (ADAS, 2005). The regional dataset from DEFRA 2009 now indicates the region accounts for:-
 - 8% of the dairy herd, 11% of the beef herd and 10% of the cattle herd.
 - 29% of breeding pigs, 32% of pigs and 34% of pigs for fattening.
 - 13% of breeding fowls, 11% of laying fowls and 12% of table chickens
- Due to the relatively high unit costs of transporting bulky commodities, and a growing business need (across the supply chain) of protecting security of supply of raw materials, the proximity of a growing area to a large primary processing facility is increasing strategically important for both the supplier and customer
- Strengths
 - Diverse range of agricultural product
 - Strong resilience due to high number of farm holdings
 - Specialism's in dairy/beef, pigs, cereals/crops and poultry (inc. eggs)
 - A few well developed supply-chain links across the supply chain and especially between primary processors, manufacturers and retailers
- Weaknesses
 - Not enough supply-chain links with manufacturers and retailers that are equitable (esp. with SMEs)
 - Level of technology in logistics not as sophisticated as distribution to retailers (esp. communications and control)
 - Level of cooperation to share logistics assets improving between farmers but large opportunities for efficiency still exist
 - High transport costs for bulk products
 - Clarity of supply-chain links is poor
 - Location of primary processors not close enough to demand
- Opportunities
 - Opportunities to further develop existing or create new supply-chains with manufacturers and retailers (multiplier effect beneficial to regional economy)
 - Improving logistics communications and control to increase efficiency (through technology and management) (Open fields service provided by DHL a good example)
 - Further integration with retailer replenishment and distribution systems
 - Greater shared-user activity between farmers

- Improving the location of primary processors (such as abattoirs and mills) and possibly intermodal activity downstream
- Threats
 - High cost base in the UK for agriculture meaning imports are generally cheaper, although not necessarily sustainable over the long term – could lead to more imports
 - Land management pressures, such as flood defences and ecosystem – could lead to reduction in primary production
 - Demand for biofuel production impacting on production for food – could lead to more imports
 - CAP reforms reducing Single Farm Payments impacting on viability of farms (esp. small holdings) – could lead to more imports
 - All cost pressures shown above could entail farm closures or being amalgamated
 - Global food prices could mean changes in production (e.g. producing more wheat while wheat prices are high)

SEStran

- There are over 42,000 farm holdings in Scotland, 7,843 of which are located at the South East area
- The region accounts for around 40% of Scottish agricultural employment, even though it has only 18% of the farms
- There is a diverse range of agricultural activity but less dairy farming (in the west Scotland)
 - Cereal farms concentrated in the east of the country produces mainly barley
- Contains almost all Scotland's specialist poultry sector
 - Chicken worth £75 million together with £30 million worth of eggs was produced
 - Raspberries and strawberries as high value crops are produced in this region
- The geographical conditions favour cattle and sheep farming
 - Beef
 - The beef industry is the single largest sector in Scottish agriculture
 - Total production of beef worth £516 million in 2008
 - Scotland is home to 30% of the UK beef herd
 - Lamb
 - The value of Scottish finished lamb was £147 million and Scotland accounts for 20% of the UK breeding flock
 - Pig meat worth £60 million was produced in 2007
- SWOT for food and drink industry in Scotland
 - Strengths - Excellent raw materials, high animal welfare standards, family owned businesses fitting with consumer desire for provenance, premium image (eg Scotch beef).
 - Weaknesses – Exports from food manufacturing low compared to drink manufacturing, increasing input costs such as energy and commodities, producers are unable to pass on increased costs through the supply chain.
 - Opportunities - Harness the increasing demand on local foods and provenance, utilising carbon labels to highlight produce with lower carbon footprint than imports.
 - Threats – Economic downturn is suppressing demand, access to credit becoming increasing difficult

West Flanders

- The number of agricultural and horticultural enterprises and employment in West Flanders and Belgium as a whole has been falling over the last 20 years:
 - The number of agricultural and horticultural enterprises in West Flanders dropped by 26.63% over the last 20 years;
 - There are 9,883 agricultural and horticultural enterprises in West Flanders in 2009, which is 33.6% of the total number of agricultural and horticultural enterprises in the Flemish region;
 - In 2009, the agricultural and horticultural sector in West Flanders employed 19,786 people, equivalent to 33.7% of the Flemish region
- The following crops are among the most important for West Flanders region:
 - Meadows and grassland: 33% of the total cultivation;
 - Corn crops: 24,5% of the total cultivation; harvested 1,705.7 thousand tonnes of green maize;
 - Silage: 17,4% of the total cultivation;
 - Potatoes, incl. seed-potatoes: 9,7% of the total cultivation; harvested 885.7 thousand tonnes in 2009;
 - Vegetable cultivation (in open air): 8% of the total cultivation.
- Both potatoes and vegetable cultivations are relatively important in West Flanders compared to the rest of Flanders
 - 53.6% of all Flemish Businesses with vegetable cultivation (in open air) are located in West Flanders
 - 47.4% of all Flemish Businesses with potatoes cultivation (including seed-potatoes) are located in West Flanders; 46.7% of all Flemish potatoes are harvested in West Flanders
- Other important crops are for example wheat, oil flex, sugar beet and cereals (including rice).
- There are also open air cultivation for fruit, ornamental plant, tree nurseries, horticultural seeds and plants, and greenhouse cultivation at West Flanders.
- Livestock in West Flanders is decreasing (except for ungulates), just as the rest of Flanders region and Belgium; however, livestock is still very important for West Flanders' economy.
- Key livestock include (in 2009-09)
 - Pig - 3,263,853 (55.2% of Flanders); 54.4% of all Flemish businesses with pigs are located at West Flanders
 - Cattle - 413,777 (31.9% of Flanders)
 - Poultry - 10,189,407 (37.0% of Flanders)
 - Ungulates - 5,419 (24.5% of Flanders)
 - Sheep and goats - 32,556 (32.4% of Flanders)

Västra Götaland

- Account for 17% of the dairy herd, 17% of the beef herd and 16% of the cattle herd
- Account for 20% of breeding pigs, 19% of pigs and 21% of pigs for fattening
- Account for 16% of fowls older than 20 weeks, 16% of laying fowls and 11% of table chickens

- Is the region with the highest number of farm businesses in Sweden, about 20% of the companies (14,621 businesses, based on 2007 data)
 - 7% to 16% of Barley, Wheat, Rye, and potatoes in Sweden
 - 36% of oats and 38% of mixed grains in Sweden
- Strength
 - Diverse range of agricultural products
 - Several prominent areas (cereals, dairy/beef, pigs and poultry)
 - Strategically situated for ocean trade
 - Highest number of farm businesses of all the Swedish regions
 - High number of processors
 - Proximity to densely populated areas/demand
 - Highly developed animal care compared to other countries
 - 70% of Scandinavian industry within 500 km
- Weakness
 - Lack of cooperation within logistics/transport
 - Level of communication and control in logistics
 - Lack of knowledge about the flow of food products.
- Opportunity
 - Opportunity to improve cooperation in transport
 - Opportunities to increase the export by sea trade
 - Improve communication and control in logistics in order to improve the efficiency
- Threat
 - High cost for agriculture in Sweden could lead to more imports
 - Low profitability in agriculture - could lead to close down of farms
 - Increased fuel price

Møre & Romsdal

- Fisheries and aquaculture combined produce eight times more than Norway consumes
- Seafood industry employs 4% of the county's workforce
- Fisheries
 - Møre & Romsdal produces more seafood in quantity than any other county, contribute to 20% of Norwegian total for landings from wild-capture fisheries and production from aquaculture
 - Fishing fleets in the region accounts for 25% in quantity and value of Norwegian catch
 - Total annual catch for the region is worth NOK3.2 billion
 - Cod is the most valuable fish species in total sales
 - The majority of the cod harvest is from the Northeast Arctic cod stock, known as "skrei"
 - It is the world largest and most well managed cod stock
 - In 2011, 985,000 tonnes of Atlantic salmon are harvested in Norway
 - Other whitefish species e.g. saithe and haddock from the Møre coast
 - The firsthand value for whitefish landed in Møre & Romsdal is roughly the same as for pelagic fish, at NOK1.8i billion per year

- The majority of seafood production in the region comes from fisheries
- In terms of quantity, the annual landings of whitefish (200,000 tonnes) are half that of pelagic fish (400,000 tonnes)
- Strongly supported by R&D in various aspects to improve the efficiency and to meet environmental demands
- Aquaculture
 - Directly employ 650 people
 - Møre & Romsdal is one of the three largest counties in Norway for aquaculture
 - Møre & Romsdal is the leader in farming cod and Atlantic halibut
 - Møre & Romsdal has 38 licences for production of juveniles in hatcheries e.g. salmon and trout
 - 11% licences allocated in Norway for farming fish for consumption
 - Each licence permits a maximum biomass of 780 tonnes of fish in the sea at any given time
 - Produces 13% of total production of aquaculture products in Norway – weight 100000 tonnes of fish, worth NOK2.5 billion
 - Species
 - Fish e.g. Atlantic salmon are produced by aquaculture
 - Salmon represent 90% of production from aquaculture in Møre & Romsdal
 - Other e.g. cod and halibut
 - Strongly supported by R&D in various aspects to improve the efficiency and to meet environmental demands
- Biomarine sector
 - Biomarine companies in Møre & Romsdal have been able to build an industrial cluster of expertise that has become dominant in this sector
 - The cluster is known Omegaland
 - Major products e.g. Omega-3 oils
 - Employ 200 people directly
 - Produce 40% of world's omega oil marketed for human consumption
 - Combined sales from these companies worth NOK1.5 billion in 2008
 - Employ more than 200 on the county

Southern Denmark

- There are a total of 41,385 agricultural businesses in Denmark, of these 27.3% are located in the region covering a total of 29.7% of the farmed land in the country.
- For the region, agriculture is concentrated with 69.1% of the businesses located in the Jutland part of the region, accounting for 71.6% of the regions total agricultural land.
- At a country total about 85,000 people are employed in the agricultural sector with 30% employed in the region. 64% of the region's agricultural employees are located in the Jutland part of the region.
- In summary the region has five prominent segments for primary agri-food industry; beef, dairy, poultry, pork, and cereals & grains.
 - There are high concentrations of cattle (both for slaughtering and for dairy) with almost 40% of the nations' cattle in the region.
 - There is a concentration of pigs with almost 30% of the nation's pigs located in the area.

- As for poultry there is a very strong concentration in the region with almost 60% of slaughter chickens and over 50% of all poultry.
- Measured by hectares farmed about 28% of all cereals are farmed in the region as well as 30% of the nation's potatoes.
- Strength
 - Broad range of products
 - Specialism: beef, dairy, poultry, pork, and cereals and grains
 - Well-developed supply chain links especially in meats and dairy.
 - Close proximity to processing (especially meats, dairy and poultry)
- Weakness
 - Continuous production consolidation means longer transport distances
- Opportunity
 - Further integration (beyond the primary and manufacturing stages) between supply chain links
- Threat
 - High cost agriculture
 - Growing focus on environmental impact on farming (leading to more stringent legislation)
 - Changes in agricultural policies (EU)

Bremerhaven

- In Bremerhaven, agriculture is concentrated on 164 hectares and in 10 businesses. Only 40 people are employed in the agricultural sector which includes fishery farming.
- In summary, agriculture does not play a very important role in the City's economy. The 0,7% of GVA that are added by the agriculture, forestry and fishing sector are mainly coursed by the fishery sector. Farming is the economic basis of the area surrounding Bremerhaven: Cuxhaven County Council. About 70% of the Cuxhaven region is agricultural land (about 140,000 hectares). Of these, about 70% is grassland and 30% of arable land. The grassland, dominated by forage production and cattle farming (85% of holdings), in all areas of marsh and Geest.
- Strength
 - Specialism: fish farming, grassland
 - Close proximity to agriculturally structured neighbouring region
- Opportunity
 - Increased cooperation with neighbouring region
- Weakness
 - Low economic importance for Bremerhaven
 - No further land available for agriculture within City borders
- Threat
 - High cost of agricultural products

APPENDIX F: SWOT ANALYSIS FOR FOOD AND DRINK MANUFACTURING

Yorkshire and Humber

- Food manufacturing in the region generates £2,427m of GVA compared to the UK total GVA of £21,122m, or 11% of the UK total
- There are 990 business units in the region out of a total 9,290, or 11% of UK business units
- The location of manufacturing businesses in the Yorkshire and Humber region are primarily located at the south and west and along the major motorway network
- Employment in the sector has decreased over the past ten years but output has remained stable
- The clusters or important sub-sectors within the region's food and drink manufacturing sector are:
 - **Seafood processing and manufacturing in Grimsby** - a few large enterprises (e.g. Young's Bluecrest Seafoods, Five Star Fish, and Coldwater Seafoods) and many smaller SMEs operate in the sub-sector.
 - **Brewing** - there are several major manufacturers of beer, cider and ale in the region, including John Smiths (Tadcaster), Carlsberg Tetley (Leeds), Muntions (Bridlington), Theakstons (Masham), and Black Sheep (Masham), as well as smaller independents, such as Wold Top (Driffield), Ampleforth Abbey Orchards (Ampleforth), and Hambleton Ales (Hambleton). The large number of brewers in the region is due to the availability of malting barley.
 - **Bakery** - the bakery sub-sector dominates the food and drink manufacturing sector, with concentrations of activity in Yorkshire and Humber (15% of employment), the North West (19%) and Scotland (12%). There are many bakeries in the region with prominent names including Fosters Bakery (Doncaster), Cooplands (Scarborough), Jackson's Bakery (Hull), British Bakeries (Bradford), Fletchers Bakery (Sheffield), and Rank Hovis (Hull). Again, the number of bakeries is related to the availability of milling wheat from the region.
- Strengths - road transport for outbound to retail via motorway, diverse range of manufacturing, well invested advanced production infrastructure for "new" manufacturers
- Weaknesses - Old manufacturing sites out-dated with lack of investment, dependence on road transport for inbound and out-bound logistics, dominated by retailers and their distribution systems
- Opportunities - increased collaboration between LEs on inbound raw materials, esp. those imported to the UK, increased collaboration (sharing of assets) between 'smaller' SMEs on outbound delivery to retailers, modal shift to rail, greater use of regional sea ports for imported product and subsequent modal shift to rail, sharing information and assets to seek efficiencies or modal shift to rail
- Threats - Increased competition for lower cost economies (i.e. BRIC), fuel price increase impacting of supply-chains, increased competition for raw material within and outside of the food and drink industry

Scotland

- There are over 1,200 companies working in the food and drink manufacturing sector of Scotland

- The food and drink manufacturing sector is concentrated at 11 local authority areas – Glasgow City, Moray, North Lanarkshire, Fife, Renfrewshire, Aberdeenshire, Edinburgh City, West Lothian, South Lanarkshire, Highland, Dumfries and Galloway, all together contribute to 76.3% GVA and 72.9% employment of food and drink manufacturing sector in Scotland
- Food and drink manufacturing sector is an important trading partner of the agriculture sector, forming an integrated cluster of agriculture and food and drink industries
- A significant percentage of inputs for Scottish food manufacturers are sourced by land locally
- Over one third of processors source inputs entirely from within Scotland
- Major food processing industries
 - Whisky distilling, bottling, packaging and distribution
 - Contribute £2.7 billion in GVA
 - Exported 1.08 million bottles (£3.1 billion) of whisky
 - Employ 10,284 people, especially for bottling, packaging and distribution
 - Strong links between distilling sector and local agriculture
 - Bottling and packaging takes place mainly in urban area
 - However, around 15% of Scottish whisky is bottled overseas
 - Around £30 million was spent on transport and distribute whisky (3% of the operating cost of Scottish whisky supply chain)
 - Fish processing
 - Contribute to £250 million in GVA
 - About 230 processors in Scotland, employing approximately 7,000 people
 - Grampian (Aberdeenshire) is the predominant location for fish processing, followed by the highlands and islands
 - A significant share of Scottish fresh fish is trucked south to Humberside for value-adding processing
 - There is an increasing trend of importing frozen fish
 - Meat processing
 - Contribute to £247 million in GVA
 - Produced 175,300 tonnes of beef worth £466.3 million, 58,700 tonnes of lamb worth £138.6 million and 50,400 tonnes of pork worth £60.7 million
 - Beef (94%), lamb (87%) and pork (97%) production in Scotland are assured through the supply chain from feed to slaughter
 - Good reputation e.g. “Scotch Beef”, “Scotch Lamb” and “Special Selected Port”
 - Half of Scottish-slaughtered lamb and around 60% of beef are further processed outside Scotland
- The UK domestic market dominates the consumptions of all Scottish food and drink processors’ output
 - 15% of all Scottish processors’ output is exported to overseas market
 - 100% domestic consumption for dairy sector
 - Drink processing sector focuses largely on export market (42%)
- Strengths
 - Reputation, strong export performance on drink, relatively high productivity and sustainable policy supported by local government

- Weaknesses
 - Lack of secondary processing particularly fish and meat products, relatively low connectivity if maritime services
- Opportunities
 - Grow potential in international and UK market, increase demand for organic food
- Threats
 - Competition from other spirit producers outside Scotland, impacts of economic recession, high inflation rate increasing labour and raw material cost

West Flanders

- There are in approximately 973 business locations and 15,567 employees involved in food manufacturing sector in West Flanders, representing 27% and 27.2% of the Flemish region respective. Some of the most significant processing industries in terms of employment are:
 - Processing and preserving of fish, shellfish and mollusc
 - Processing and preserving of fruit
 - Production of vegetable oil and animal oil and fat
 - Production of animal food
- Other food processing industries include
 - Meat processing and preserving and meat products manufacturing
 - Processing of fresh and frozen vegetables and potatoes.
 - Production of dairy products
 - Production of milling products, starch and starch products
 - Production of bakery products and pasta
 - Production of other food products
- Business locations for food manufacturing are relatively scattered but close to the major cities with good connections to rail and road freight services. Major industrial clusters are located at
 - South-West Flanders e.g. Roeselare, Ardooie, Izegem
 - Counties of Courtrai, Menem, and Wevelgem, also an elaborate logistics service offering due to the presence of the transport zone LAR and the airport of Kortrijk-Wevelgem

Västra Götaland

- Key food and drink manufacturing industries are:
 - Bakery / bread
 - Dairy products
 - Meat and fish
 - Beverage
- Some of the large food and drink manufacturers in the region are:
 - Gunnar Dafgård AB – manufactures and distribute frozen and chilled food services and to retail outlets
 - Santa Maria AB – seasoning
 - Abba Seafood – market leading fish and seafood company
 - Others e.g. Fazer Bageri AB, Göteborgs Kex AB, Estrella AB, Pågen AB, Arla Foods AB
- Strengths – diverse range of products, proximity to densely populated areas or demand, near ocean trade, highly developed IT

- Weaknesses – Equipment and buildings are not adapted to modern requirements for different product varieties
- Opportunities – Improve communication and control, improve overall production efficiency
- Threats – increased competition from low cost economies, increase competition for raw material

Møre & Romsdal

- 700 thousand tonnes of seafood worth NOK6 billion is processed annually in the county
- Seafood processing has a very long tradition in Møre & Romsdal
 - The clip fish industry is over 500 years old and is an integral part of the county's identity
 - 90% of all Norwegian clip fish is produced in Møre & Romsdal, contributing to 30% of the seafood export from the county
- Other seafood processing and value-adding activities in the region include
 - Salt fish and stockfish of cod and other whitefish
 - Farmed salmon
 - Canned seafood
 - Frozen seafood
 - Fillets of various species including herring and mackerel
 - Shellfish
- Fish processing takes place both on land and at sea (e.g. factory trawlers producing frozen fish)
- Processing at landside in the county increases the annual value of whitefish exports from NOK1.8 billion (catch) to NOK4 billion (processed)
- The use of high tech and R&D to meet demands for processed seafood
- Most fish processing plants are located near the coast of Møre
- Road freight is the most common way to transport seafood out of the county

Southern Denmark

- Largest concentration of manufacture in the agri-food sector in the region is located in the municipalities of Esbjerg and Vejle with other strong areas in Kolding, Fredericia, Haderslev, Odense and Faaborg-Midtfyn.
- The major players in the region (based on roughly the 30 most important players present in the region) are located heavily around Esbjerg, Kolding, Fredericia, Vejle, Odense and more sparsely down from Kolding and south with the E-45 through Christiansfeld, Haderslev, Vojens, Aabenraa, Bolderslev, Gråsten and surrounding areas as well as on Fynen with Faaborg and Nyborg the most concentrated areas and other facilities in Ring and north of Odense.
- Number of businesses in the foods, drinks and tobacco industry for the region was about 28.4% of total businesses in the nation over the period 2006 to 2008.
- In terms of turnover, the largest food sectors are slaughterhouse (25.8%), dairies (17.9%), fishery (8.4%), bakeries and bread 5.7%), drinks (7.8%), and other industries (34.4%)
- Major players are Danish Crown (meat), Arla Food (Dairy), Danisco (additives), Carlsberg (beverage), etc.
- Strength
 - Modern facilities (health, efficiency and environment in focus)

- High focus on optimizing logistics (large cooperatives especially – both from primary to manufacturing and then to wholesale/retail)
- Broad range of product specialties in the region
- Weakness
 - High reliance on road transport
- Opportunity
 - Locations give opportunities for modal shifts (close to rail net and sea ports)
- Threat
 - Increase competition from low cost producing countries

Bremerhaven

- The fish and food processing industry in Bremerhaven is not only a major employer. It has also a distinctive competence profile. The complete know-how from fishing to end users, including the entire suppliers as well as scientific monitoring and maritime tourist attractions is offered here. The decline in the fishing industry threatens this competency profile, which can have a negative effect on the entire business location.
- The percentage of manufactures of all businesses is 7,4% in Bremerhaven.
- Due to the industry's migration trends to Eastern Europe the economic situation of that industry in the region of Bremerhaven is rated as poor. However, since many fish processing plants have been restructured in recent years to food manufacturers, their position in the market can be considered as relatively stable. In Bremen there is other food industry: Kraft Foods, Hachez, Beck & Co., Kellogg's, Melitta coffee.
- Some of the most significant processing industries in terms of employment are:
 - Processing and preserving of fish
 - Processing and preserving of frozen food/convenience food
 - Processing and preserving of fruit
- Other food processing industries include
 - Processing of fresh vegetables and potatoes.
 - Production of other food products
 - Production of frozen fish products
 - Production of frozen meals
- Strength
 - Bremerhaven is the most important fish processing and fish trading centre in Germany.
 - Business locations for food manufacturing are centrally located
 - High integration of suppliers and customer base in the region of Bremerhaven
 - High expertise: complete know-how from fishing to end users, including all suppliers
 - The port plays an important role as a logistics hub for frozen fish in containers.
 - The companies follow a cooperative purchasing strategy, they jointly procure raw materials.
 - Occasional project-related cooperation between Bremerhaven fish and food processing industry and the institutions of the blue biotechnology
 - Within the industry the companies cooperate with each other if fluctuations in production need to be intercepted.

- High innovation ability of enterprises due to support of the public supported institutions of biotechnology and food technology and the companies own research departments.
- Weakness
 - The decline in the fish and food industry threatens the city's competency profile.
 - Bottlenecks in the supply of the commodity "fish".
 - Positive future employment effects are possible only in the higher income groups.
 - The decision-making centres of major Bremerhaven fish and food companies are not located in the region
 - The big companies buy their inputs little from local companies.
- Opportunity
 - The processing sector has restructured itself; the sector is increasingly reliant on new innovations. This opens up new fields of employment in higher skilled and scientific areas.
- Threat
 - The demand for edible fish is steadily increasing, while supply is becoming increasingly scarce, because the fish stocks in some cases are declining.
 - A strong pressure is exerted on prices, because big discounters like Aldi and Lidl increasingly offer frozen fish.
 - A decrease of the company's ties to the city increases migration trends towards regions with lower labour costs.
 - The "producer" countries are also increasingly interested to increase their value-added share of fish production through improved cooling techniques
 - The increasing proportion of air freight decreases the fish and food processing company's ties to the port locations
 - For Bremerhaven the possibilities for processing of fresh fish decrease because of the strong competition with other locations in Inland and eastern Europe. As the EU in supports the creation of jobs in the fisheries and aquaculture in the new Member States (mainly in Poland), there is a danger that this trend continues further.
 - The industry is heavily influenced by the fact that often new legislation has to be adopted to ensure an improvement in quality. The fish and food processing industry was thus forced to make large investments, mainly medium-sized enterprises are often overworked and partly forced close their business.
 - This development has restructured the processing sector. The result was that despite an increase in production, employment declined. The number of employees in the fish and food processing Industry might continue to sink.

APPENDIX G: SWOT ANALYSIS FOR TRANSPORT AND STORAGE

Yorkshire and Humber

- There are 4,595 transport and storage business units operating in the region out of a UK total of 49,350 units, or 9% of UK business units. The region produces £6,518m of GVA out of a UK total of £91,347m, or 7% of total UK GVA.
- Food is responsible for a quarter of all miles travelled in the UK
- Temperature controlled logistics is developed due to the fishing industry in Grimsby and Hull
 - Grimsby continues today as a major producer of a wide range of food products, especially seafood
 - Grimsby has the highest concentration of cold store space in Europe
- Food production is greatest in the region, especially along the M62 corridor
- Examples of key logistics operators in the region include:-
 - Reed Boardall – Boroughbridge: Frozen storage and distribution. Operates the largest single site facility in the UK
 - ACS&T Food Logistics – Grimsby and Scarborough: Frozen and ambient storage and distribution operated from its Grimsby sites. Transport only operated in Scarborough for trunking McCain Foods product across the UK. Operates other sites and services across the UK and specialises in primary foodservice distribution
 - Harry Yearsley – Grimsby: Frozen storage and distribution. Operates other sites and services across the UK
 - Langdons – Barnsley: Frozen storage and distribution. Operates as part of the ChillNet partnership network
 - Samskip – Immingham: Container distribution across the UK ex-Immingham port.
 - Igloo – Leeds: Ambient, chilled and frozen storage and distribution. Operates other sites across the UK.
 - IBL Bulk Liquids – Hull: Services and facilities for the handling and storage of bulk liquids.
 - Norbert-dentressangle – Hull, Grimsby, Castleford, Doncaster, Leeds, Rotherham: Not all sites may manage food but the company operates ambient, chilled and frozen storage and distribution.
- Nationally, the number of logistics companies in the chilled, frozen and ambient chain has fallen due to acquisitions and closures and that some companies are expanding into multi-modal 'one stop shop' offerings.
- Modal shift (with multi-temperature or temperature controlled) initiatives
 - Eddie Stobart and DB Schenker are examples of the move to expand services to provide multi-modal, multi-temperature logistics
 - The impetus and opportunity behind further collaboration lies with retailers and manufacturers.
 - There are Government grants available to assist shift modal from road to rail and for developing rail freight facilities, i.e. terminals.
 - However, the most common cry from manufacturers to rail operators is twofold:
 - The requirement to carry 'less than train loads'

- The need for greater cooperation between rail operators to provide services and facilities

Scotland

- The lack of suitable distribution or access to appropriate distribution channels are both often cited as a major barrier to expanding micro, small and medium sized business
- One of the reasons for this problem is the remoteness of the Scottish companies
- Transport and distribution of food is highly dependent on road transportation
- A typical structure of food and drink distribution leaving Scotland
 - Primary – production and arrival of imports → primary consolidation centre
 - Secondary – regional distribution centre for supermarket chains and wholesalers
 - Tertiary – multiple retail outlets or local wholesaler cash and carry warehouse → independent retail outlets and catering outlets
- Whisky supply chain
 - Large number of distilleries mainly located at Highland, Lowland, Speyside, Islay and Campbeltown
 - Small number of bottling and storage facilities concentrated in West Central Scotland and Fife
 - For export to
 - North America and Asian markets - by road to Grangemouth to be loaded on deep-sea container ships
 - Bulk export also via road directly from distilleries to Grangemouth, then deep-sea container ships
 - European market – by road to cross the Channel at Dover
- Fish supply chain
 - From Shetland via short sea shipping to Aberdeen (primary processing industry) then road transport to
 - Export to Europe via Channel at Dover
 - Grimsby for secondary processing
 - Small number of direct shipment from Shetland to Russia, Japan and Nigeria (Frozen Pelagic fish) and to Asia via Rotterdam (pelagic fish)
- Manufacturers no longer have exclusive control on food transport and storage over the last 40 years; it is now managed by major supermarkets
- Grocery food distribution entering Scotland is usually originated from RDCs in Midland
 - Within SEStran, distributions centres for major supermarkets such as Tesco (Livingston), ASDA (Grangemouth and Falkirk), Sainsbury's (Glasgow and Langlands Park), Cooperative (Cumbernauld, Harthill and Dalcross) and Morrison's (Eurocentral Mossend) within this region
 - The above RDCs or NDCs are primarily served by road
 - More than 80% of deep sea containers arrived in the UK ports were distributed by road
 - Road transport is the most competitive modes for Scotland due to its geographical nature and size
- Potential of modal shift for grocery distribution

- ASDA now bring some containers from Felixstowe to Tees Port import centre by feeder ships – there is a potential of extending such arrangement to Scotland (Grangemouth)
- ASDA is sending some containers from Grangemouth to Aberdeen by rail
- Tesco is bringing some containers from Daventry to Grangemouth by rail then by road to its distribution centre at Livingston
- Tesco is sending some containers by road from Livingston to Grangemouth then by rail to Inverness
- Co-op is running a trial of 2 containers per night from Coventry to Daventry by road, then by rail to Coatbridge then road to Cumbernauld distribution centre
- Imbalance of equipment flow is a problem due to
 - The consolidation of traffic via RDCs breaks the transport chain between English ports and Scotland and reduces opportunity for feeder or rail services
 - Constraints to the rail infrastructure in the South of England
 - The choice of transport provider and appropriate frequency of feeder services are restricted.
 - Path dependency
 - There is also need for specialised transport equipment (i.e. frozen and chilled food products)
- A modal shift solution is proposed by SEStran
 - The Coatbridge rail terminal (or possibly Lockerbie) can be used a load centres with modal shift potential to connect with distribution centres in Midland. There are already existing container rail services connecting these Coatbridge and major UK ports
 - Port centric logistics development at Grangemouth will offer new opportunity for cargo in- and outward distribution and value adding services at port
 - Development of Zeebrugge offshore DC will create possible distribution channel for direct import and export
- SWOT of transport and storage in Scotland
 - Strengths –major distribution centres located close to main rail freight terminals at Coatbridge and gateway port Grangemouth
 - Weaknesses – High dependency on road transport, need specialist equipment for frozen and chilled products, lack of appropriate frequency of feeder services
 - Opportunities – Long distance travelling from major ports at South East England provides opportunity for intermodal solutions, potential use of feeder services to reach EU market, integration of Grangemouth port and nearby terminals as a central freight hub serving Scotland
 - Threats – direct import to Scotland lacks economy of scale, road transport with double-decker trailer can be cheaper than intermodal solution, lack of backhaul for rail and water feeder services, competition from Tees Port

West Flanders

- The transport and logistics sector is mainly focused on the distribution activities in and nearby the seaports of Oostende and Zeebrugge and the airport of Oostende.

- West Flanders handles a total import and export amounts to approximately 155 million tonnes per year (59 million tonnes are actually transit freight).
- Strengths - well connected ports, logistics hubs, some intermodal terminals, well trained employees, availability of logistics education, strong industrial networks.
- Weaknesses - Mainly related to infrastructure e.g. acute shortage of space outside the port areas, rising land price, lack of modern warehousing space, few intermodal facilities still not optimal, infrastructure bottleneck between Zeebrugge and Oostende, LAR terminal only transport maritime goods, limited direct shuttles to large European cities, unfilled vacancies in logistics and transport, TDL sector adds low value.
- Opportunities – proximity to important European economy conglomerates, improving infrastructure for multimodal platforms in e.g. Roeselare and Izegem, study to improve inland navigation, education and growth of TDL industry, “Flanders logistics” as part of “Flanders in Action” programme.
- Threats – there exists an internal competition between the new multimodal terminals in Roeselare and Izegem and the inland navigation terminals in Wielsbeke and Avelgem and the LAR rail terminal, RDL lacks attractiveness, political decisions take too long, threats from logistics hubs of other regions e.g. Nord-Pas-De-Calais, high level of logistics outsourcing.

Västra Götaland

- Three categories of road transport companies – hauliers (14,003 companies), truck centrals (116 companies), forwarders (13 companies)
- Truck centrals
 - A unique concept used in Sweden
 - Consists of hauliers, who start a company for common administration and marketing
 - E.g. Göteborg's Lastbilscentral, Fraktkedjan
- Forwarders
 - There are few large forwarders in Sweden; all have offices in Gothenburg
 - Most forwarders can handle fresh, chilled and frozen food
 - E.g. Schenker, DHL Express Service, DSV, Bring, K+N
- Rail operators
 - Rough 20 companies offering rail services in Sweden
 - Dry port shuttles are provided at Gothenburg port
- Dry ports
 - Port of Gothenburg has 26 daily shuttles in the dry port system, served by 8 rail service operators
 - 366,350 TEU exports and import (out of total 817,616) from Gothenburg Port were transported by rail in 2009
- Other train connections
 - Green Cargo and Cargonet provide rail freight services from Gothenburg port; main customers are hauliers, forwarders and shipping lines
- SWOT for Gothenburg port
 - Strengths – largest import/export port in Nordic countries, highly developed dry port system, best logistics location, motorway connect Oslo, dual track train to Malmö and Copenhagen, highly developed IT

- Weaknesses – road is used to high extent for food products
- Opportunities – Use of intermodal services, use of sea and rail freight
- Threats - none

Møre & Romsdal/KNH region

- There are some hauliers and forwarders established in the region due to both the offshore industry activities and fish related activities and more.
- Hauliers: Bring Logistics, Orkdal Transport, Surnadal Transport
- Forwarders: Kuehne+Nagel, Bring Logistics, Erling Haug, etc.
- SWOT of KNH region transport and storage
 - Strengths –Very good seaports located close to coastline and main fairways (Kristiansund/Husøya, Hitra, Surnadal, Høgset, etc.). Main short sea ship lines are calling at ports in the KNH region. The area potentials in the region are very good.
 - Weaknesses –Road transport is dominating in and out of the region, no direct sea transport routes to UK or Continental Europe
 - Opportunities – Growing interest for sea transport possibilities. Upgrading ports and road connections in the region, establishing a regional port network in Mid-Norway
 - Threats – Focus on better road systems could give road transport a better position in transport planning. Unbalance in imports/exports on the Norwegian west coast (mostly exports).

Southern Denmark

- There were 195,000 jobs in the transport industry in Denmark in 2008. 25% of these jobs were located in the southern region. The region is the only area in Denmark that is specialized in transport.
- Transport makes up 12% of total jobs in the private sector in the region, compared with 10% for the nation.
- The industry accounts for almost 25% of GVA. In some cities (Esbjerg and Ærø), the industry accounts for about half of the total GVA. Seven southern municipalities rely on the transport industry to provide over 20 percent of GVA.
- Agri-food transport and storage companies are: Andreas Andresen A/S, DFDS A/S, DHL Solutions A/S DK, DSV Road A/S, Frigoscandia A/S, HP Therkelsen A/S, Railion Denmark A/S, AP Møller Mærsk A/S, TNT Denmark A/S.
- Larger transport centers are located in Vejle and Fredericia (Taulov).
- A large volume of the transport through the region to Germany or continental Europe runs through Padborg, which has been suggested as a future transport centre (or a dryport).
- The majority of transport of agricultural and food products in Denmark are done by road (truck) transport (59% tonnage) and sea (38%). Rail and rail intermodal only accounts for 2% of the transportation modes.
- Agri- and food product transport by sea is especially important to the harbours in Odense, Vejle, Kolding, Ærøskøbing, Rudkøbing, Svendborg and Haderslev, all located at the Eastern part of the region. Almost no transportation (of food) by sea exists to or from the west coast (Esbjerg).

- Strength
 - Specialized firms for food transport (temperature controlled, daily deliveries etc)
 - Some intermodal shifts from road to rail (still limited)
- Weakness
 - High reliance on road transport, only some rail and very limited sea
 - Short distances not ideal for modal shifts
- Opportunity
 - More focus on intermodal shifts, especially to sea transport (with existing sea routes – but might require on shore investments)
- Threat
 - None.

Bremerhaven

- Bremerhaven is of the largest hubs in Europe regarding container and a car handling. The City is currently the fourth largest container terminal in Europe.
- Bremen's ports recovered fast from the economic crisis in 2010: the total handling rose by 9.1% to around 68.9 million tons. Container Handling in Bremerhaven increased by 6.5% to around 4.9 million standard containers (TEU). The car transshipment in Bremerhaven with increased significantly with 29%. In 2009 1.59 million vehicles were transhipped in 2010. Next to Zeebrugge Bremerhaven is the most important European hub for the Vehicle handling. Maersk Sealand has relocated its scheduled services from other ports to Bremerhaven, which has led to a significant economic growth. Regional politics invested in the container terminals to a large extent. With the port extension of the fourth terminal, the total capacity of the container transshipment points in Bremerhaven increased up to 7 million TEUs annually.
- Nearly 8,000 employees are working in the ports of Bremerhaven. 1,700 are working in the container terminal and 900 in the car terminal. The remaining jobs are with the suppliers of the port industry, located in Bremen and Bremerhaven.
- Bremerhaven benefits only little of the indirect employment effects of the container handling, because here the container is usually only turned over but the contents are further processed in other locations. There have been made quite some efforts to increase the Loco-rate – but unfortunately with limited success. While the loco-rate in Bremerhaven is 3 to 5%, in Hamburg it is about 40%. Also the car transshipment in Bremerhaven recorded a steady growth. However, Bremerhaven lost its position as the leading car port Europe to Zeebrugge. The Belgian port has doubled its turnover in the last years because of considerably cheaper handling costs. The port industry has responded to this development with cost reduction programs and policies of considerable investments in the infrastructure: From 2007 to 2011 the Kaiser Lock was constructed, being the largest project of its kind in Europe; it achieves Panamax size. It has a clearance width of 55 m and extends a length of 305 m, to provide enough space for the growing Ro-Ro ships and to ensure the accessibility of the ports located behind the lock for maintenance or failure of one of the two locks.
- Bremen University, Jacobs University and Bremerhaven University of Applied Sciences all offer excellent logistics degree programmes. Other institutions, such as the [German Academy of Foreign Trade and Transport](#) (DAV) and the [German Logistics Academy](#) (DLA),

also run highly diverse advanced training courses. At the end of 2010, the new [College of International Economics and Logistics](#) (HIWL) will roll out two dual courses of studies. More than 1000 logistics companies and [ma-co maritimes kompetenzentrum training centre](#) all provide vocational training for skilled workers.

- Strength
 - Cheap and many commercial sites
 - Cheap and adequate manpower
 - Good highway access
 - Satisfactory rail link
 - Bremerhaven has a greater depth for vessels with less problems than Hamburg
 - Positive development of employment and turnover in the Port industry are expected in the next years.
 - High collaboration within the local port industry: Joint Logistics, procurement as well as joint research and development
 - highly-developed supplier network system
 - 70% of all jobs in the Bremerhaven port industry are in the final producers and the direct suppliers
- Weakness
 - Bremerhaven has failed to build own high quality hubs
 - Strong dependence on industry with the direct suppliers and customers of the port industry.
- Opportunity
 - The shipyards benefit of the new Kaiser Lock, since after the completion of the lock the docks of the shipbuilding companies in the overseas port can be reached easier.
 - The positive development in the container logistics has a direct effect on the labour market.
 - Bremerhaven is a very interesting location for investments by key-suppliers of the port industry.
 - The new Kaiser Lock ensures Bremerhaven's leading position among European car ports.
- Threat
 - Competition with Hamburg
 - Certain difficulties in finding highly qualified employees, since most of them prefer other regions and cities more liveable.
 - The positive employment effects in the Bremerhaven port industry are dependent on public investment in high degrees.

APPENDIX H: SWOT ANALYSIS FOR WHOLESALE AND RETAIL

Yorkshire and Humber

- There are 1,555 whole sale business and 6.265 retail businesses in the region
- The sector produces £11.348 billion GVA, equivalent to 8% of UK total
- The two dominating delivery food service organisations in the UK are
 - Brakes – regional depot in Leeds
 - 3663 First for Foodservice – regional depots in Bradford and Wakefield
- Other food service businesses are e.g. Fairway Foodservice, David Price, 3G Foodservice and Windsor
- Foodservice supply food to public service organisations worth £208million in 2005
- There are four major grocery and food retailers in the UK: Tesco, Sainsbury's, ASDA and Morrison's
- Factory gate pricing is used extensively by retailers in the UK to reduce inbound logistic costs

SEStran area

- There is a significant number of wholesalers located within this region, many of which are located in the Edinburgh area
- Distributions centres for major supermarkets such as Tesco (Livingston), ASDA (Grangemouth and Falkirk), Sainsbury's (Glasgow and Langlands Park), Cooperative (Cumbernauld, Harthill and Dalcross) and Morrison's (Eurocentral Mossend) within this region
- Waitrose does not have distribution centre in this region

West Flanders

- There is a significant number of wholesalers and retail outlets in the region
- Wholesale and retail provide 10.4% of total employment in West Flanders
- Some of the key wholesale and retail businesses in this region are:
 - Marine Harvest Pieters NV – source, primary and secondary processing of fresh bulk, fresh pre-packed fish, frozen fish, coated and elaborated products; also manage logistic & distribution
 - Kaasimport Jan Dupont NV – cheese import and logistics
 - Carrefour Belgium NV – part of the Carrefour Group, one of the leading retailers in the world.
 - Aldi Markt NV – part of the Aldi group
 - Ranson NV – distributor and producers of bakery products

Västra Götaland

- Large retailers such as ICA, Coop, Axfood and Bergendahls pool together their wholesale and retail business; most of them manage their own store distribution
 - ICA accounts or 49% of the market share in Sweden; it has a smaller warehouse in Kungälv, north of Gothenburg but its main warehouse is in Västerås
 - Coop accounts for 20% of the Swedish market
 - Axfood accounts for 18% of the Swedish market

Møre & Romsdal

- No detail data available when this report is made.

Southern Denmark

- The region accounts for 23 percent of all jobs in the Agri-food service sector on a national scale.
- There are several large wholesalers in the region including Supergros A/S, V&S Denmark A/S (also V&S Wine Engros A/S), BC Catering Grossisten A/S (also BC Catering Kolding A/S), Metro Cash & Carry Denmark APS, Catering Engros A/S, Credin Bargeripartner A/S, H&P Frugt Import A/S, and Uhrenholt A/S.
- There are 2 major players on the retail market in Denmark, COOP Denmark and Dansk Supermarket that together account for 50% of total grocery sales. Other retailers are Alsi, Fakta, and Lidl.

Bremerhaven

- There are several large wholesalers in the region, mainly in the fishery and machine/equipment business.
- Some of the key wholesale businesses in this region are:
 - Wholesaler Fish: (order by size)
FRoSTA AG, Deutsche See GmbH, Ties-Uwe Spittler Versand Erlesener Lunedeich Spezialitäten GmbH, Fiedlers Meeresdelikatessen GmbH, Abelmann GmbH, Sandelmann GmbH, Meereskost GmbH
 - Wholesaler Electrical appliance: Berding Fachgroßhandel
 - Wholesaler cleaning and hygiene products: Erich Nonne GmbH
 - Wholesaler mobile communication: Telemann-Mobilfunk Vertrieb- und Service GmbH
 - Wholesaler ship equipment: Kraeft GmbH Systemtechnik
 - Wholesaler machines and tools: Hans Kiesling GmbH & Co. KG
 - Wholesaler packing machines for fish production: Dr. Hochstrasser Handelsgesellschaft mbH & Co. KG
 - Wholesaler Marine equipment and commercial kitchens: Grossmarkt Bremerhaven Eduard Ruge GmbH
 - Wholesaler Nets and fishing gear: Engel-Netze GmbH & Co. KG Netzfabrikation
- In Bremen there are wholesalers for the Daimler factory, Airbus production and Space technology (EADS, OHB Technology)
- Strength, Weakness, Opportunity and Threat are not mentioned for wholesale and retail.

APPENDIX I: SWOT ANALYSIS FOR IMPORT AND EXPORT

Yorkshire and Humber

- In 2008 the value of imports was £7.2 billion against the value of exports of £0.7 billion giving a trade gap of £6.5 billion; there is a growing trade deficit for food and drink in the UK
- The value of imports is greater than the value of exports in each of the eleven broad categories of food, feed and drink except 'Drink' which had a trade surplus of £0.2 billion in 2008.
 - The group for which the UK has the largest trade deficit is fruit and vegetables.
 - The second largest groups in terms of imports in 2008 were meat and drink with imports of £4.7 and £4.4 billion respectively.
- The major food and drinks exported by the UK are:
 - Drinks, including alcoholic drinks, are the largest export category by far with a total export value of £4.6 billion in 2008, of which around 70% is Scottish whisky.
 - Cereals and meat are the groups with the next largest export values with £1.8 billion and £1.2 billion respectively.
- The UK primarily exports food to the following countries
 - Ireland, France, Netherlands and other EU countries
 - Germany e.g. fats, oils, cheese
 - USA e.g. fish and seafood
 - UAE e.g. dairy products
 - Hong Kong e.g. meat products
- Cereals, bakery, meat and animal products, fish and seafood, dairy are the major food being exported
- Most food products and raw materials from EU and non-EU countries enters the UK via the ports in the south east of England (e.g. London, Southampton and Felixstowe) and are then transhipped by road to the main manufacturing and processing centres in Yorkshire and Humber, North West and the East Midlands.
- There is a huge amount of transshipping of food materials from the South East entry points to manufacturing points higher up the country.
- Furthermore, many of the finished shelf-ready food products resulting from the added value processing in these areas will be returned back to the southern cities for consumption and southern ports for exports.
- The development of the Humber ports for food imports and exports could alleviate this issue through the utilisation of increased sea freight of food.
 - There are two Border Inspection Posts (BIP) in Hull and Grimsby
 - The creation of a new BIP in Immingham would allow for a greater range of products through the Humber
- Use of rail freight
 - Only in recent years has rail freight been used again to transport fresh produce from the London ports (Thameslink) e.g. overnight transshipments by EWS to the Wakefield rail port of fruit for ASDA and weekly shipments of Volvic bottled water from Europe to the Daventry Interchange

- Bakkavor, one of the major food manufacturers in Europe with sites in Y&H, the East Midlands, Spain and Italy, is trialling the movement of fresh produce from Spain by rail. It is working with Transfesa of Valencia (part of Deutsche Bahn) experimenting in container design to ensure chill chain integrity and temperature control over the 36-48 hours journey
- Changes will be needed to the UK rail system if fresh produce is to reach the UK in the correct condition with sufficient product shelf-life to meet retailer needs.
 - A common rail gauge
 - Off line power supply for container refrigeration
 - A UK rail hub with fast intermodal transshipments to factories and NDCs/RDCs
- SWOT analysis
 - Strengths - Two of the major retailers based in the region, Humber Estuary already capable of handling food and drink imports
 - Weaknesses - BIP capabilities and development of regional ports to handle food imports and export, regional strategic planning to develop ports for food imports and exports, food imported via South East part of the UK
 - Opportunities - Greater use of Humber ports for imports and export of food, supply (export) of meat and dairy products to China from regional agricultural base, increased UK demand (import) for fresh produce, increased demand (export) for premium product across China and BRIC countries
 - Threats - Fuel prices affecting ability to import / export, lack of investment in Humber ports and increased investment in other UK ports

Scotland

- Export of food and drink overseas reached a new high of £4,073 million in 2009 (1/3 of UK total food and drink industry)
 - Europe accounts for 80% of all Scottish food export overseas
 - France accounts for 25.3 of the total overseas food export
 - Northern Ireland (9.6%) and Spain (8.2%) food export
- Strong growth especially for manufactured drink export
 - Worth £3,136 million
 - 77% of Scottish food and drink export
 - Import only £155 million of drink
- In terms of volume, drink and fish products hold high proportions of total export volume
 - Whisky export – 1121.5 million bottles to overseas market
 - High volume to France, Spain and USA
 - East Asian countries e.g. Singapore, South Korea and Taiwan as emerging market
 - About 15% of whisky products are bulk export to Latin America
 - Export by sea for USA, Asia, Latin America and other overseas market
- Major import – animal feed (62.3% of total import flow, mainly from Latin America and Caribbean, North America and Eastern European), dairy and eggs (from European Community), fish and seafood products (from Western Europe, Asia and Oceania), vegetable and fruit (from Sub-Saharan Africa, Middle East and North Africa)

- The majority (55%) of all food imported into Scotland from overseas comes from the EU 15, and most journeys are completed by road.
- Latin America and the Caribbean is the second major location for food import into Scotland (29%). About 87% of total import value from Latin America and the Caribbean is transported (deep-sea shipping) to ports located in South East England and then delivered to Scotland
- There are two Border Inspection Post (BIP) in Scotland – Peterhead and Prestwick
- Strengths – Increase in export demand, concentration of manufacturers in central Scotland and Fife, supermarket distribution centres closely located around rail freight terminal (Coatbridge) and gateway port (Grangemouth)
- Weaknesses – Reliance on ports and channel tunnel in South East England, low usage of rail and coaster shipping, existing port infrastructure is not for large container ship, export of food products need specialised equipment, lack of government support for improving global connection
- Opportunities – Long distance travelling from Scotland to South East of England provide great opportunity of intermodal solutions, EU mainly connection of rail and ferry services may significantly reduce cost and time of both import and export, direct deep-sea shipping to Far East and other international markets
- Threats – Competition from India, Japan and Canada in the whisky export market, high proportion of raw material import, economic recession affecting international export

West Flanders

- The total import and export amounts to approximately 155 million tonnes per year (59 million tonnes are actually transit freight)
- There is no data for the export of food from West Flanders, but overall Belgium exported (2009)
 - Meat and edible offal: €2.777 billion
 - Fruit; skins of citrus fruits and melons: €2.346 billion
 - Preparations of vegetables, fruit, nuts or other parts of plants: €2.241 billion
 - Milk and dairy products; bird eggs; natural honey: €2.180 billion
 - Preparations of cereals, flour, starch or milk; pastry: €2.009 billion
 - Cocoa and preparations thereof (chocolate): €1.869 billion
 - Beverages, spirits and vinegar (beer): €1.791 billion
 - Vegetables, plants, roots, tubers for alimentation purposes: 1.653 million Euros
- There is no information for the destinations of the exports of the above food products. They go to different place all over the world.
- There is no data for import of food into West Flanders, but overall Belgium imported (2009)
 - Fruit; skins of citrus fruits and melons: €2.645 billion
 - Milk and dairy products; bird eggs; natural honey: €2.187 billion
 - Beverages, spirits and vinegar: €2.023 billion
 - Preparations of vegetables, fruit, nuts or other parts of plants: €1.343 billion
 - Cereals: €1.268 billion
 - Residues and waste from the food industry; prepared animal fodder: €1.253 billion
 - Meat and edible offal: €1.208 billion

- Preparations of cereals, flour, starch or milk; pastry: €1.192 billion
- There is no information for the countries of origins of the import of the above food products. They come from different places all over the world.

Västra Götaland

- Data presented are for the whole Sweden, not the region
- Food, beverages and tobacco stands for 3 % of Sweden's import measured in weight but up to 9 % when measured in monetary terms.
- Port of Gothenburg is the main seaport for import. Through this port, it is thought that a lot of goods transported by road through the south of Sweden
- The Netherlands, Denmark, Italy, Spain, Germany and Belgium are five of the European countries who import food to Sweden
- UK exports some frozen and fresh food to Sweden
- Norway exports some frozen, chilled and fresh food to Sweden
- Finland exports some chilled and fresh food to Sweden

Møre & Romsdal

- The European Union (EU) is the most important market for seafood export from Norway and Møre & Romsdal
 - The EU imports mostly Atlantic Cod and Atlantic Salmon
 - The markets that pay the best price for cod are Portugal, France and the UK
 - Portugal is the main market for whitefish (clip fish)
 - France is the major market for Atlantic Salmon
- Apart from the EU, Russian and Japan imports large amount of seafood from Norway
 - Japan imports large quantity of Atlantic Mackerel
 - Russian and Ukraine are very important markets for pelagic fish such as herring
- Other parts of the world
 - Brazil is a major importer of seafood from Møre & Romsdal (mainly clip fish and salted fish or other cod species, in particular saithe)
 - Nigeria has recently become a large importer of Norwegian herring
 - The lack of supply from Chile led to an increase of demand in the US for Norwegian seafood
- Møre & Romsdal also exports redfish and deep-water species e.g. Greenland halibut
- Farmed Atlantic halibut is a growing export product
- 90% of all Norwegian clip fish is produced in Møre & Romsdal, contributing to 30% of the seafood export from the county

Southern Denmark

- Agri-food exports from Denmark in 2010 amounted to 13 billion EUR (almost 18% of total exports) with an average growth rate of 1.3% since 2007, compared to agri-food imports of 8 billion EUR.
- Major export categories in agri-food are meat and meat products (29.2% of agri-food total), dairy products and bird eggs (14.5% of agri-food total), and fish and seafood products (whole and processed, at 15.8% of agri-food total).

- 80.8% of meat products are exported part processed, and only 19.2 of them are exported as finished goods.
- 98.5% of the dairy products and bird eggs are exported in the form of finished goods.
- In terms of fish and seafood, 64.8% of them are exported unprocessed.
- Major freight forwarders involved in import and export of food are for example Blue Water Shipping, Damco, DHL Global Forwarding, DSV Air and Sea Holding, East Logistics APS, Kuehne + Nagel, NAC Nordic and Schenker.
- In terms of the shares of handling international turnover attributed to agricultural product and animal feed, the ports of Frederica (18%), Odense (15%), Esbjerg (1%), Kolding (22%), Aabenraa (4%), and Nyborg (0%). They account for 22% of total international turnover for all Danish ports.
- The region contributes to 33.3% of the nation's exports of live animal and 49.7% of cereal and cereal products by sea freight. Meat, fish and seafood products each accounts for less than 10% of the nation's exports by sea freight.
- About 3% of the goods exported by rail in Denmark are agri-food products amounting to 440,000 tons in total for 2009.
- About 1,375,000 tons of agri-food products are exported by road transport from Denmark.
- Agri-food imports to Denmark in 2010 amounted to 8 billion EUR (12.6% of total imports) with an average growth rate of -2.6% since 2007.
- In terms of the percentages of total agri-food imports, major import are
 - Meat and meat products (14.4%),
 - Fish and seafood products, whole and processed (17.2%),
 - Fruits and Vegetables (16.2%),
 - Feed (12.9%).
- The region has a high share (above 25 %) of the total sea import of meat and meat products, dairy products and bird eggs, cereal and cereal products.
- There are 4 border inspection posts in located in the region, 3 by ports; Fredericia, Kolding, and Esbjerg and 1 at Billund Airport.
- Rail transport of imported agri-food products is almost non-existent in Denmark.
- Almost 1 million tons of agri-food products were imported to Denmark via road transport in 2009.

Bremerhaven

- In Bremerhaven including Bremen:
 - In October 2011 BLG (BREMER LAGERHAUS-GESELLSCHAFT) recorded its best monthly earnings ever at the Bremerhaven car terminal, turning over a total of 201,000 vehicles. This was mainly due to the ongoing export boom among German car manufacturers, although imports of German brands from the USA have also risen in 2011. During the first nine months of this year, almost 1.5 million vehicles were exported and imported via Bremerhaven, compared to 1.1 million in the same period in 2010.
 - In 2010 the downward trend of the previous two years stopped at import. There was an increase in the imports 18.6 %, in the tonnage 22, 9 % are recorded. Europe is

still leader as a foreign trade partner with a share of 57%. They are followed by Asia with 20% and America 19%.

- Gains can be achieved in the export (up from 29.8%) and also in terms of tonnage (up from 6.4 percent) in 2010. Compared to 2009 the foreign trade with America increased from 17 to 21% and with Asia from 13 to 17%. Europe still remains the most important foreign trade partner with a share of 59%, compared to 2009, the share by 8% has decreased.
- In Bremen there are wholesalers for the Daimler factory, Airbus production and Space technology (EADS, OHB Technology)
- Strength
 - Increase in demand for import and export
 - Variety of products from food, fishery and car producing industry
- Weakness
 - Still existing reliance on road transport
 - Lack of specialist equipments and facilities
 - Imbalance of trade
- Opportunity
 - Use of rail and sea freight
 - Use of intermodal infrastructure
 - Building of skills and competences in the logistic sector
- Threat
 - Competition from other low-cost countries
 - Economic recession



The Interreg IVB North Sea Region Programme



European Union



The European Regional Development Fund