Atlas of the Global Egg Industry

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International Egg Commission

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PART 1: A GLOBAL VIEW

PART 2: SELECTED COUNTRY FOCUS

OBJECTIVES

The main objectives of this atlas are:

- to present maps, graphs and tables showing the spatial patterns and dynamics of global egg production and egg trade,
- to present maps, graphs and tables of the spatial patterns and dynamics of the global production and trade of egg products,
- to present maps, graphs and tables on the development, regional patterns and dynamics of egg production and egg trade for Russia and selected emerging countries.

INTRODUCTION

In September 2010, the “Atlas of the European Egg Industry” was presented to the delegates at the IEC conference in Prague. Due to the very positive acceptance of the atlas, the senior author suggested to the Economics Committee an “Atlas of the Global Egg Industry”. This suggestion met the demand for a visualisation of the available statistical data at both continent and country level. A first concept was developed and successfully presented to the members of the Economics Committee. It was soon realised that preparing an atlas of global patterns and dynamics would be a difficult task due to the immense volume of data and the lack of detailed and reliable data for many countries. After decisions about the organisation of the atlas were made, data collection began. Without the co-operation of the IEC Rapporteurs, colleagues and friends from industry and research, the second part of the atlas, which gives an overview about the egg industry in Russia and selected emerging countries, would not have been possible.

To enrich the database and the related world maps, IEC data was merged together with data from FAO keeping in mind that the data may differ from that provided by the industry. Nevertheless, the presented maps, graphs and tables give an excellent overview on the past dynamics, present pattern and future development of the global egg industry.

HOW THIS ATLAS WORKS

The atlas is organised in two parts.

The first part presents maps, graphs and tables of the laying hen population, egg production and the trade of eggs and egg products on a global scale.

The second part of the atlas deals with the patterns and dynamics of egg production and egg trade in Russia and selected emerging countries which are already ranked among the leading countries of egg production but in parallel have increasing prospects for an significant population increase and a correlated demand to nourish the growing population with egg proteins.

Due to the lack of available data for all relevant countries, we chose the following ones:

ABOUT THE AUTHORS

Professor Hans-Wilhelm Windhorst

Professor Windhorst is scientific director of the Science and Information Centre Sustainable Poultry Production (WING), University of Vechta, Germany and IEC Statistical Analyst.

Much of his work involves investigating regional and sectoral patterns in the egg industry. He studied at the University of Muenster and gained a PHD in 1969 and then gained a postdoctoral qualification in 1977.

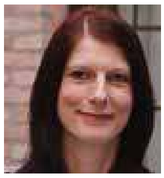
Professor Windhorst has had a long-standing involvement with the IEC, and together with Peter van Horne is developing the Economic and Statistical service that the IEC provides to members.

Dr Barbara Grabkowsky

Dr Barbara Grabkowsky is Solutions Director at Lohmann Animal Health, Cuxhaven. Her department provides preventive services for the livestock industry in the fields of zoonoses prevention, animal health and animal welfare optimisation.

Barbara graduated in environmental sciences (University of Vechta) and holds a PhD in livestock epidemiology. Her expertise lies in the fields of general supply chain management, communication, biosecurity, risk assessment as well as process and quality management.

Prior to her current position, Barbara successfully worked in several internationally recognised research projects on livestock epizootics such as Avian Influenza and was in charge of the cluster management for the food industry in Northwest Germany.



Anna Wilke

Anna Wilke graduated in environmental sciences with a special focus on vector borne diseases especially on habitat preferences of Malaria transmitting mosquitoes.

Since 2010 Anna has been a research associate of Prof. Dr. Windhorst at the University of Vechta. Her main research focuses on comparative and geographical analyses of the structure of global poultry production as well as the importance of bacterial infections and their introduction risk into poultry houses.

IEC ATLAS ON GLOBAL EGG PRODUCTION – DATA SOURCES

PART I: Analysis of global egg production patterns

- Nicolas Sakoff (FAO)
- FAOSTAT database *http://faostat.fao.org/*
- IEC rapporteur database *www.internationalegg.com*
- United Nations, Department of Economic and Social Affairs, Population Division (2011).
  World Population Prospects: The 2010 Revision, CD-ROM Edition. *http://esa.un.org/wpp/*
- The World Bank database (Data purchasing power) *http://data.worldbank.org/*

PART II: Analysis of Russia and emerging countries of egg production

1. Argentina: Juan Daniel Irigoyen, Cámara Argentina de Productores Avícolas
2. Brazil: Relatório Anual 2012 of UBABEF (Brazilian Poultry Association União Brasileira de Avicultura)
3. China: Lohmann Animal Health Beijing Representative Office, China
4. India: BSR Sastry, National Egg Coordination Committee Srinivasa Hatcheries Group, India
5. Mexico: Sergio Chavez, UNA-DEE / Investigación directa con nuestras asociaciones locales.
6. Russia: Norbert Mischke, LTZ
7. South Africa: Magda Prinsloo, South African Poultry Association
8. Thailand: Thanakrid Luupanyalerd, Lohmann Animal Health Thailand

PART 1: A GLOBAL VIEW

LAYING HEN POPULATION: SPLIT BY HOUSING SYSTEM

According to FAO, the global laying hen population has reached a volume of about 6.5 billion birds. One has to consider, however, that there is no exact data base for many developing countries, as the number of backyard flocks is very often only estimated. But even in developed countries the data base may differ considerably from country to country depending on the statistical methods. In some countries the number of layers is only counted from a particular flock size upwards, in others the number of layer places is counted and not the number of birds which are kept at a certain date.

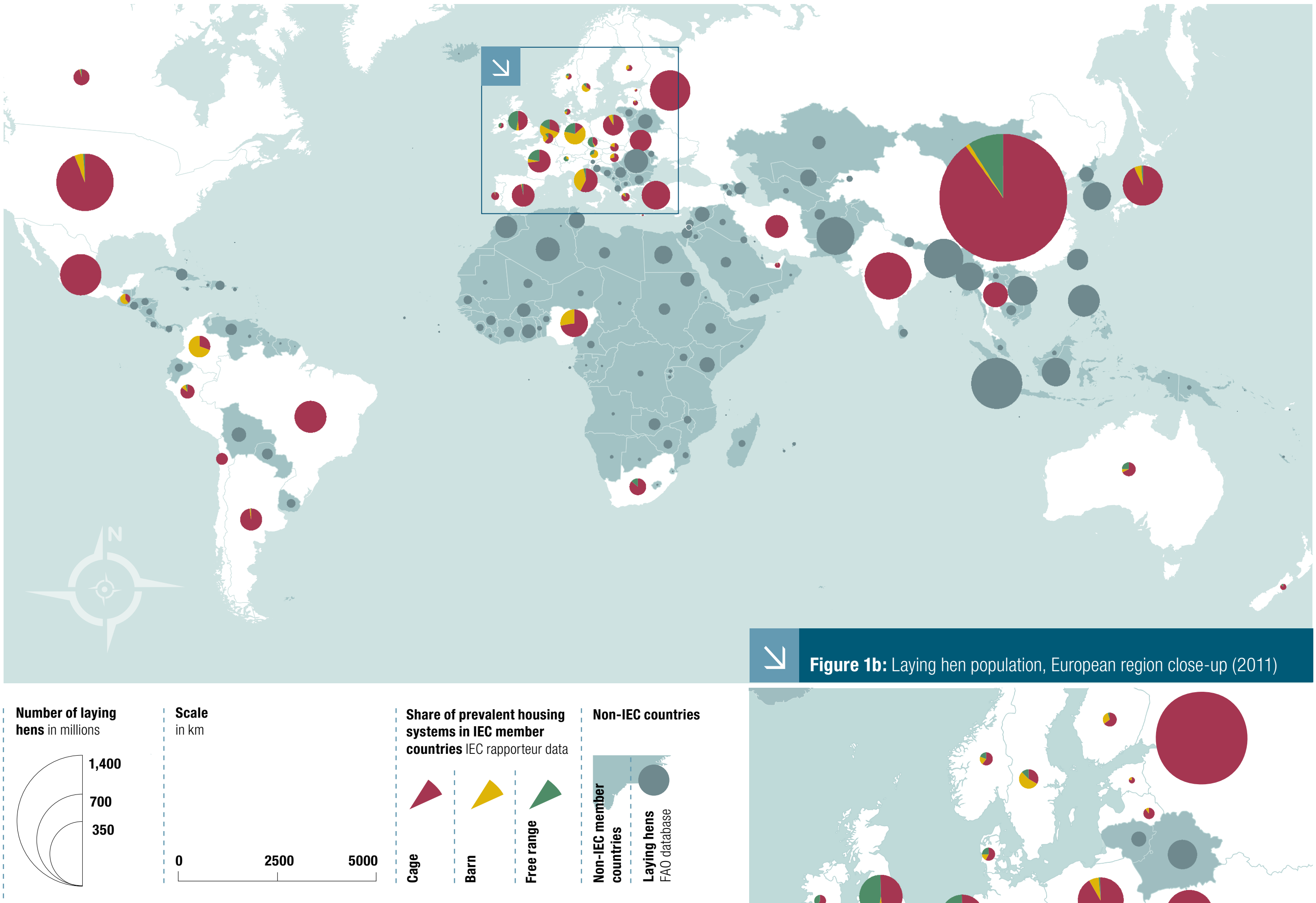
In Figure 1a, wherever data from IEC rapporteurs was available, that data set was used, for all other countries FAO data was used. For the IEC member countries the prevalent housing systems are documented as a percentage of the total number of layers.

One can easily see that there are several clusters. One is the agglomeration in Eastern, Southern and South Eastern Asia. A second is the agglomeration in Europe, a third the USA-Mexico cluster and a fourth Northern Africa and the Near East.

The dominance of cage systems (this includes enriched cages in EU member countries in Southern and Eastern Europe) in Asia, North and South America, Africa as well as in Eastern and most Southern European countries is obvious.

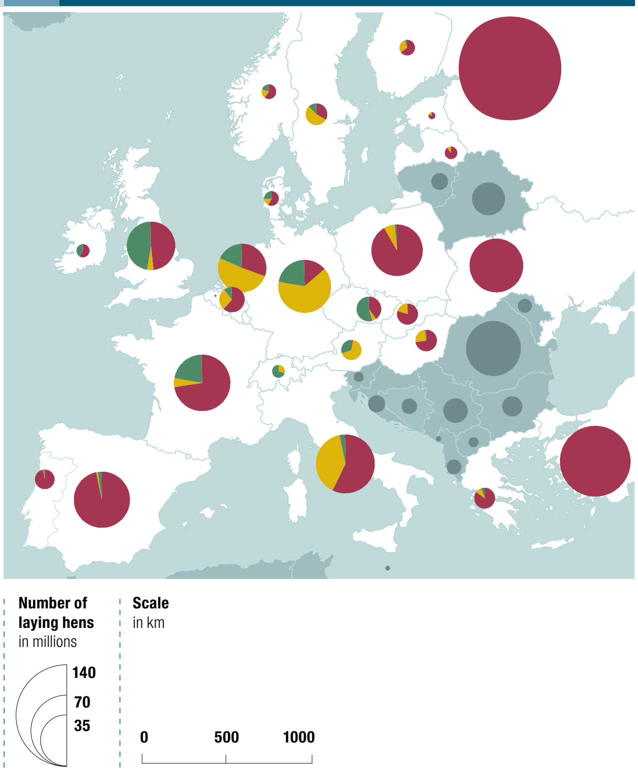
In Europe, the prevalent housing systems differ considerably as can be seen from Figure 1b. In the EU, the banning of conventional cages thoroughly changed the prevalence of housing systems. In some countries, such as Austria, Germany, the Netherlands and Sweden, the barn system reached the highest percentage. In the United Kingdom, Ireland and the Czech Republic free range systems were favoured. In contrast, in most of the Southern and Eastern European countries, conventional and enriched cages are still the dominant housing system.

Figure 1a: Laying hen population (2011)



Source: FAO-database and IEC Rapporteurs

Figure 1b: Laying hen population, European region close-up (2011)



LAYER POPULATION: CONTINENTAL

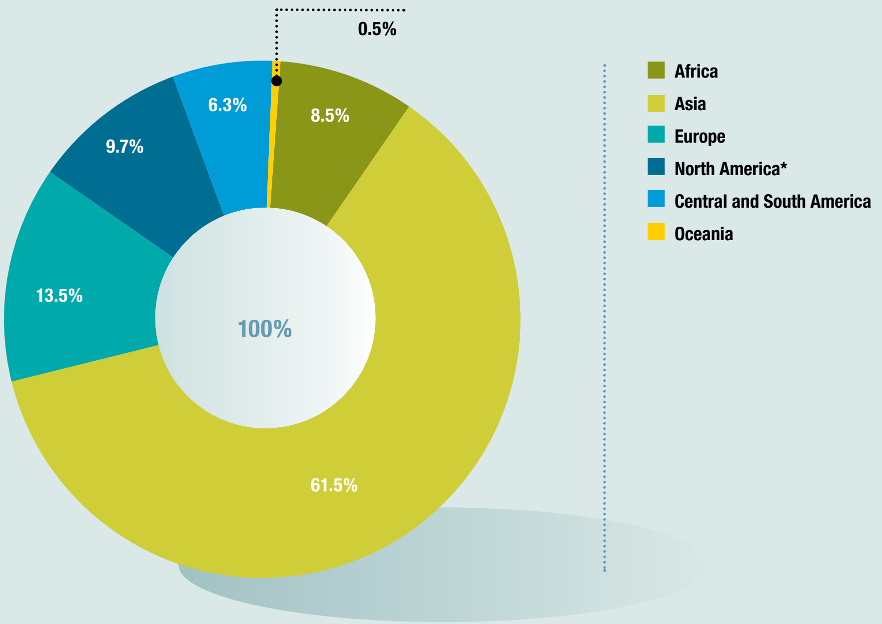
Figure 2 shows the contribution of the continents to the global laying hen population in 2011. According to our data analysis, about 4.7 billion laying hens were in production. To this Asia contributed almost 2.9 billion birds or 61.5% of the global layer population. It was followed by Europe with 631 mill. layers (13.5%), North America with 454 mill. (9,7%) and Africa with 397 mill. (8.5%). For the IEC member countries we used the data given by the rapporteurs, for all other countries FAO data.

Figure 2: Laying hens continental distribution (2011)

Share of laying hens by continent

* Canada, Mexico, USA

Source: FAO-database



CONSUMPTION, SELF SUFFICIENCY AND FEED COSTS

Figures 3a, 3b and 3c document the per capita consumption of shell eggs per year, the self sufficiency rate and the market price for layer feed in IEC member countries. The data refer to the year 2011, however, for some countries older data had to be used.

The average per capita consumption of shell eggs was 200 pieces/year. With over 350 eggs, Mexico showed the highest value, followed by Japan, the Ukraine and China. In Europe, Denmark and Hungary had the highest consumption, the lowest was found in the United Arab Emirates, Nigeria and India (57 eggs per capita).

In 2011, the Netherlands had the highest self sufficiency rate with 328%, followed by Poland (127%), Turkey (125%), Belgium (114%) and Spain (114%). The lowest self sufficiency rates were found in Germany (66%), Switzerland (52%) and the United Arab Emirates (50%).

Between 60% and 70% of the production costs for shell eggs are feed costs. Due to the lack of reliable and comparable data for production costs, data for layer feed was used to document the broad variety of costs on a country basis. When comparing the data one has to consider that the quality of feed may differ considerably. Feed costs were very high in Japan (715 US-$/t) and Switzerland (689 US-$/t). The lowest costs were to be found in Argentina (267 US-$/t), Thailand (264 US-$) and India (257 US-$).

Figure 3a Egg consumption by country (2011)

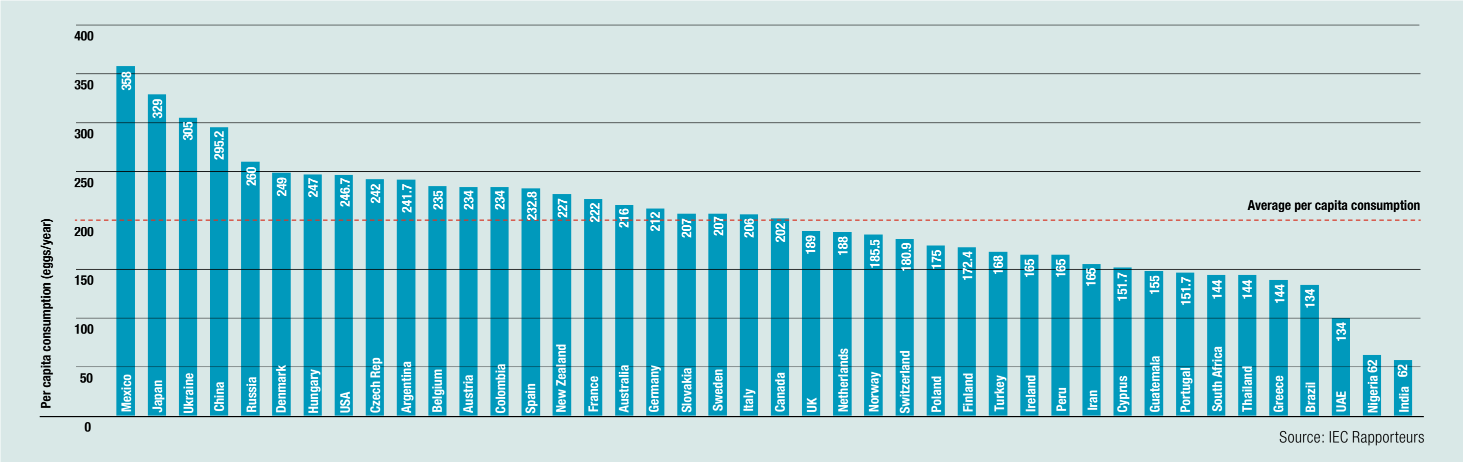


Figure 3b Self sufficiency rate (2011)

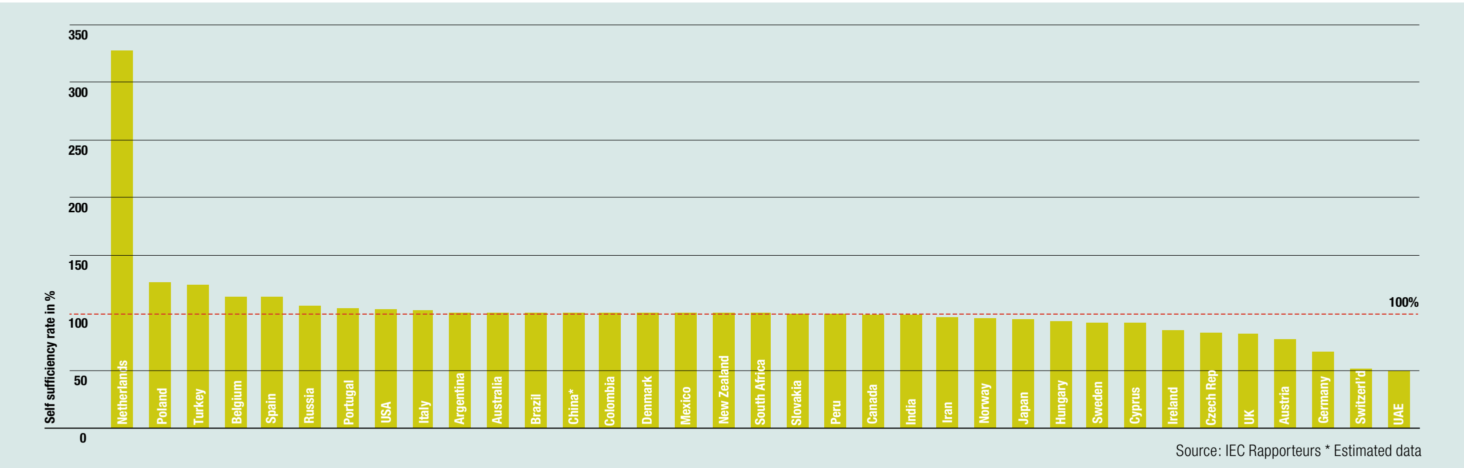


Figure 3c Layer feed cost (2011)

HUMAN POPULATION: PROJECTED GROWTH AND PURCHASING POWER

Between 2010 and 2025, the global population is projected to increase from 6.9 billion to 8.0 billion or by 16.1%. Figure 4a shows that with the exception of several Central, Eastern and South Eastern European countries and Japan, all other countries show an increase in population. The population cluster in Eastern and Southern Asia is obvious. A high increase in population will also take place in the USA, Mexico and Brazil as well as in several Eastern and Western African countries and in the Near East.

Figure 4b shows the annual per capita purchasing power in 2011 on a country basis. The values differ from 86,435 US-$ in Qatar to 343 US-$ in the Democratic Republic of Congo. Clusters of countries with a high purchasing power are located in Central, Western and Northern Europe, the USA and Canada, the United Arab Emirates, Japan, South Korea and Singapore. The purchasing power in Southern and South Eastern Asia is very low, with the exception of Singapore. This is also true for nearly all African and most of the South American countries. The discrepancy between population development and purchasing power is obvious. In most countries with a high per capita purchasing power, the population is either low or slowly growing, possibly even decreasing. In countries with a high population and/or high growth rates, the purchasing power is mainly low. An increasing empowerment of the local industries and a related increased availability of money in these countries to buy food will result in a significant rise of demand for animal protein and necessitate its production or import.

Figure 4a Projected population (2025)

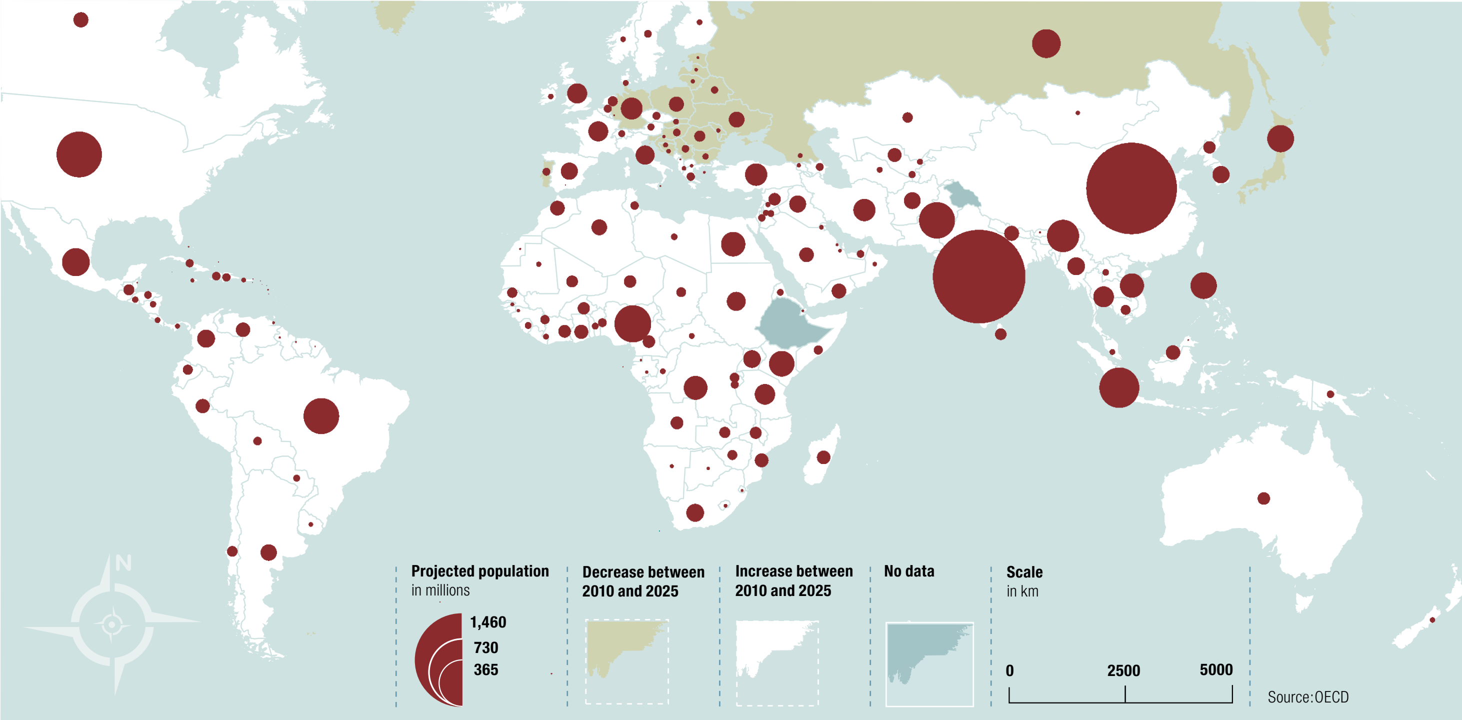
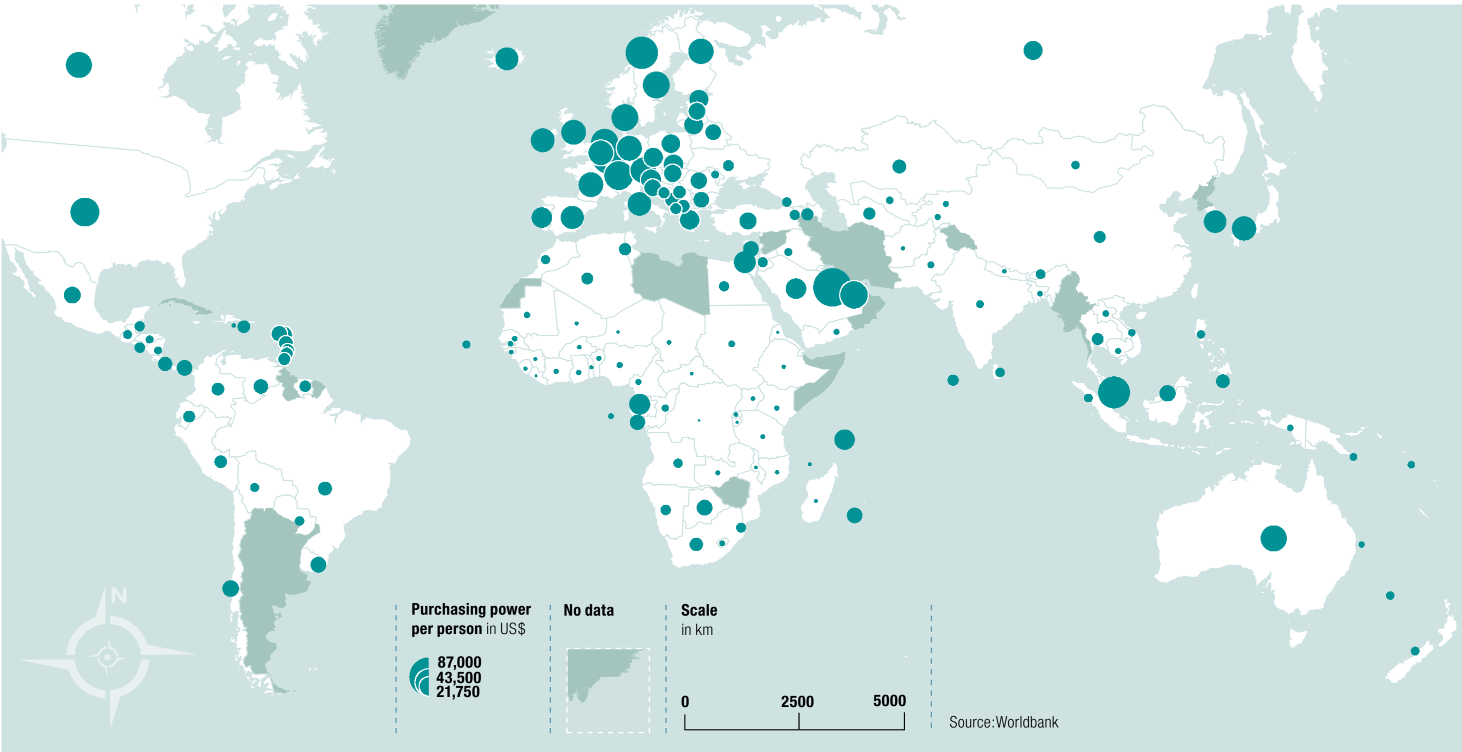


Figure 4b Purchasing power (2011)



HUMAN POPULATION: DYNAMICS

A more detailed overview of the dynamics and the distribution of the population in the continents and their sub-regions for the years 2010, 2025 and 2050 is documented in Figure 5a. One can easily see that the population dynamics differ considerably between the regions. It is worth mentioning that Africa shows the highest absolute (+ 1.17 billion) and relative (+ 114.4%) population increase between 2010 and 2050. In Asia, the population is projected to grow by another billion. In contrast, the population figure in Europe will decrease by 19 million or 2.6%.

The differences in the dynamics of population development will result in a changing contribution of the single continents to global population (Figure 5b). The share of Asia will decrease from 60.4% in 2010 to 55.3% in 2050. In contrast, the contribution of African countries will grow from 14.8% to 23.6%. Europe will lose 3%, Northern America 0.3% and Central and South America 0.4%. The share of Oceania will increase by 0.1% because of the high relative growth rate of 50.9%.

Figure 5a Human population distribution detail

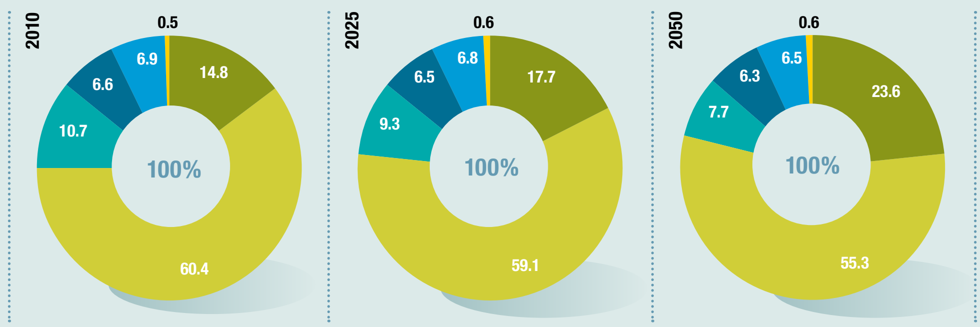
MAJOR AREA OR REGION		2010 TOTAL POPULATION 000s	2025 TOTAL POPULATION 000s	2050 TOTAL POPULATION 000s	POPULATION INCREASE/DECREASE 2010-2025 IN%	POPULATION INCREASE/DECREASE 2010-2050 IN%
WORLD		6,895,889	8,002,978	9,306,128	16.1	35.0
	More developed regions	1,235,900	1,286,739	1,311,731	4.1	6.1
	Less developed regions	5,659,989	6,716,239	7,994,397	18.7	41.2
AFRICA		1,022,234	1,417,057	2,191,599	38.6	114.4
	Eastern Africa	324,044	471,034	779,613	45.4	140.6
	Middle Africa	126,689	180,581	278,350	42.5	119.7
	Northern Africa	209,459	260,320	322,458	24.3	53.9
	Southern Africa	57,780	62,788	67,327	8.7	16.5
	Western Africa	304,261	442,334	743,850	45.4	144.5
ASIA		4,164,252	4,730,130	5,142,220	13.6	23.5
	Eastern Asia	1,573,970	1,629,474	1,511,963	3.5	-3.9
	South-Central Asia	1,764,872	2,118,563	2,475,684	20.0	40.3
	Central Asia	60,726	71,382	81,799	17.5	34.7
	Southern Asia	1,704,146	2,047,181	2,393,885	20.1	40.5
	South-Eastern Asia	593,415	682,694	759,207	15.0	27.9
	Western Asia	231,995	299,398	395,367	29.1	70.4
EUROPE		738,199	743,890	719,257	0.8	-2.6
	Eastern Europe	294,771	284,941	256,946	-3.3	-12.8
	Northern Europe	99,205	107,010	114,036	7.9	14.9
	Southern Europe	155,171	158,789	155,227	2.3	0.0
	Western Europe	189,052	193,150	193,048	2.2	2.1
CS AMERICA		476,659	547,744	607,031	14.9	27.4
	Caribbean	41,646	45,457	47,314	9.1	13.6
	Central America	42,458	54,457	71,644	28.3	68.7
	South America	392,555	447,830	488,073	14.1	24.3
N AMERICA*		457,952	519,506	590,787	13.4	29.0
OCEANIA		36,593	44,651	55,233	22.0	50.9
	Australia/New Zealand	26,637	31,607	37,063	18.7	39.1
	Melanesia	8,748	11,655	16,585	33.2	89.6
	Micronesia	536	634	726	18.2	35.4
	Polynesia	673	756	859	12.4	27.7

- Population increase ≥ 50%
- Population increase 20 - < 50%
- Population increase 10 - < 20%
- Population increase 5 - < 10%
- Population stagnation 0-5%
- Population decrease

* Canada, Mexico, USA

Source: OECD

Figure 5b Contribution of continents to global population (in %)



- Africa
- Asia
- Europe
- North America *
- Central and South America
- Oceania

* Canada, Mexico, USA

Source: OECD

LAYER POPULATION: BROWN/WHITE EGG RATIO

Figure 6 shows the number of laying hens in IEC member countries and the brown to white ratio. The figure again documents the clusters of the laying hen population in Asia, Europe and Northern America.

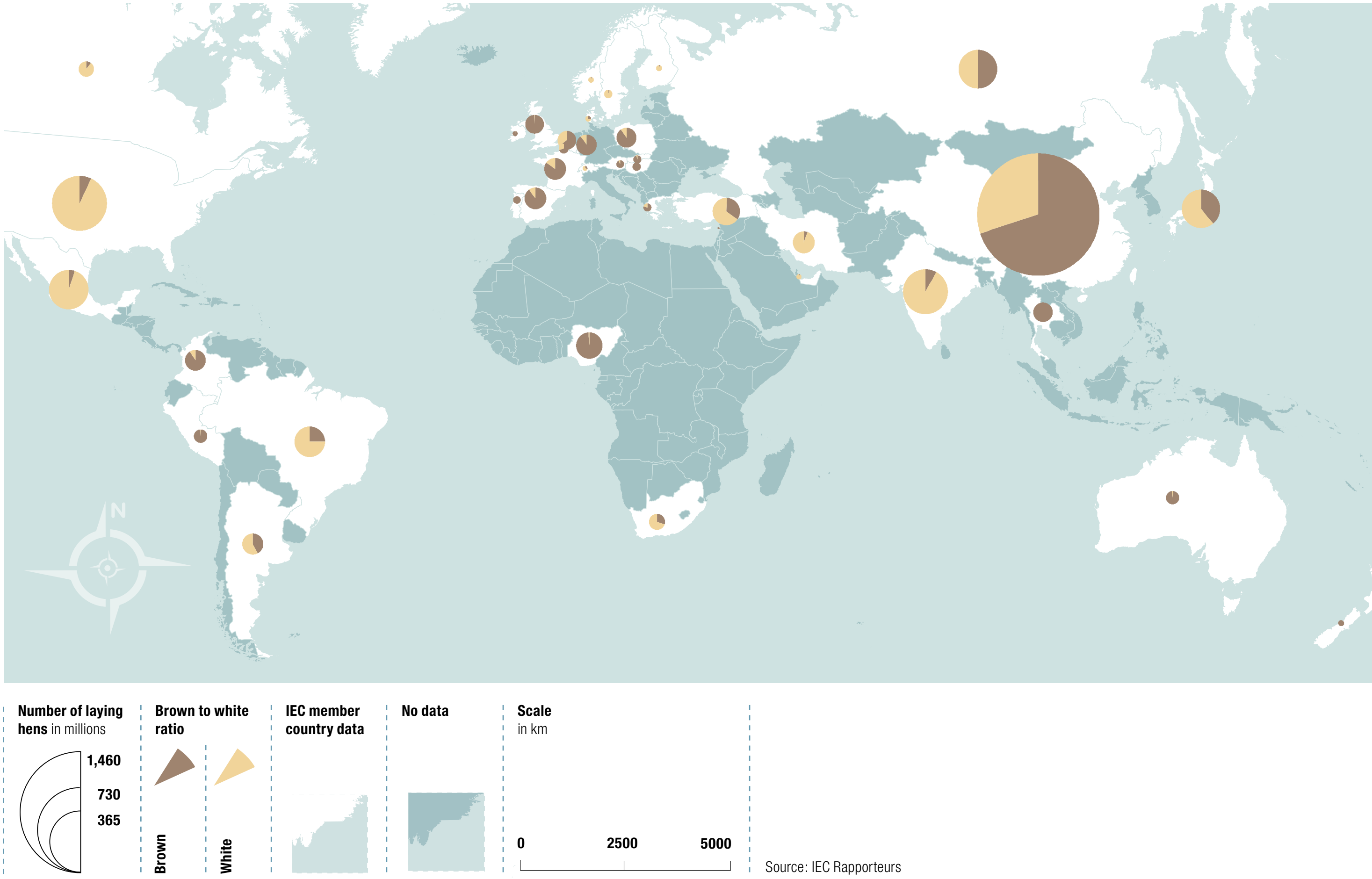
One can easily see that the preference for brown or white eggs differs considerably from country to country and also from continent to continent. In the Americas, white eggs dominate. In Mexico, 95% of produced eggs are white, in the USA 93%, in Canada 90% and in Brazil 75%.

Brown eggs dominate in Europe; the highest percentages are found in the United Kingdom (99%), Germany, Spain and Poland (90% each). Only in Russia, the ratio is 50% to 50%.

In Asia, white eggs are preferred, in Iran (95%), India (92%) Turkey (66%) and Japan (61%); on the other hand, brown eggs have a share of 70% in China and 100% in Thailand.

In Nigeria 99% of produced eggs are brown, in South Africa 70% of eggs are white. In Oceania, brown eggs also dominate; in New Zealand no white eggs are produced, in Australia white eggs only contribute 2% to the total production volume.

Figure 6 Laying hens and brown to white ratio (2011)



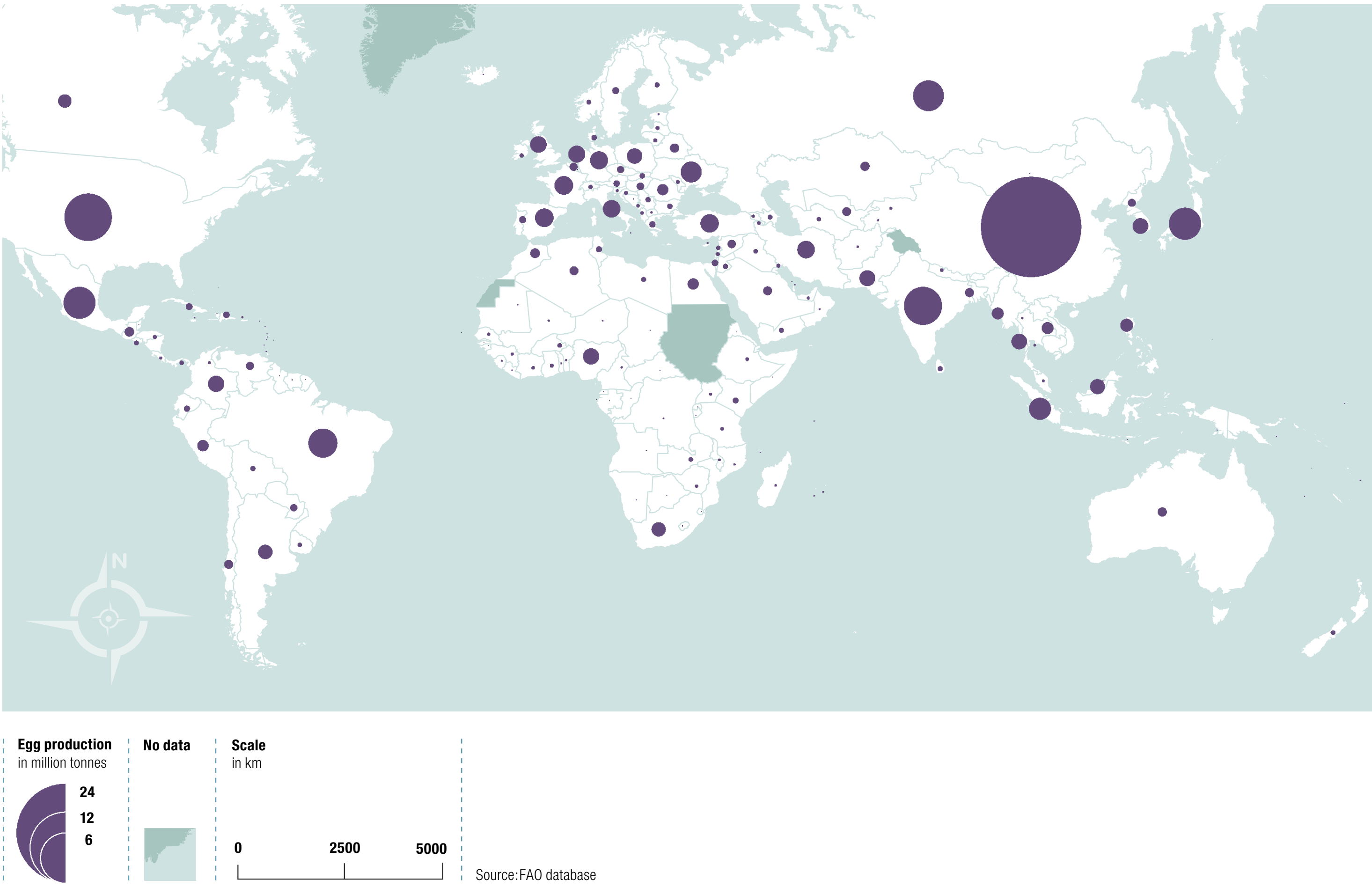
Source: IEC Rapporteurs

GLOBAL EGG PRODUCTION

In 2011, global egg production reached a volume of 65.0 mill. t. Figure 7 shows the spatial pattern on a country basis. One can easily see that several clusters have developed over the past decades (see also Figures 8a and b). One cluster includes Eastern Asian countries (China, Japan and South Korea), a second is represented by Southern and South Eastern Asia with India, Indonesia, Malaysia and Thailand. A new cluster is under development in the Near East with Turkey and Iran. Then there is the European cluster which dominated global egg production in the 1970 and early 1980s. On the American continent there is a cluster in Northern America (USA, Mexico) and another cluster under development in South America with Brazil and Colombia.

The leading egg producing country in 2011 was China with 24.1 mill. t or 37.2% of the global production volume. It was followed by the USA with 5.4 mill. t (8.3% of global egg production), India with 3.5 mill. t (5.4%) as well as Japan and Mexico with 2.5 mill. t each (3.8%). In Africa, the leading egg producing countries were Nigeria (640,000 t) and South Africa (490,000 t); in Europe Russia (2.3 mill. t), France (840,000 t) and Spain (830,000 t).

Figure 7 Egg production (2011)



Source: FAO database

The regional concentration in global egg production has been very high over the past four decades as can be seen from Figure 8a. Between 76% and 78% of the global production was concentrated in only 15 countries. China alone contributed 37.2% to the global production volume in 2011, followed by the USA, India and Japan. In 1971, the USA ranked as number one, followed by the USSR, Japan, China and Germany. In 1991, China already ranked as number one, followed by the USSR, USA, Japan and Brazil.

Of the fifteen leading egg producing countries in 2011 six were located in Europe (this includes Russia), six in Asia and three in the Americas. In 1971, seven European countries were found among the fifteen leading egg producing countries.

The remarkable spatial shift which occurred in world egg production is documented in Figure 8b. In 1971, Europe was still the dominant continent with a contribution of 42.5% (20.2 mill t) to the global production volume, followed by Asia and Northern America with 23.8% each. Twenty years later, Asia had already surpassed Europe and shared 40.9% of global egg production (36.5 mill. t), Europe ranked second, but had already lost 11.3% of its former share. A similar development can be found in Northern America with 8.5%, on the one hand because of the dynamic development in Asia but also because of the high growth rates in several countries in South America. In 2011, Asian countries dominated global egg production with a share of 58.8% (38.2 mill. t). This continent was the big winner whereas Europe lost another 14.8% and Northern America 2.5%. The data documents the globalisation of egg production which has shifted from Europe to Asia, the new unchallenged centre.

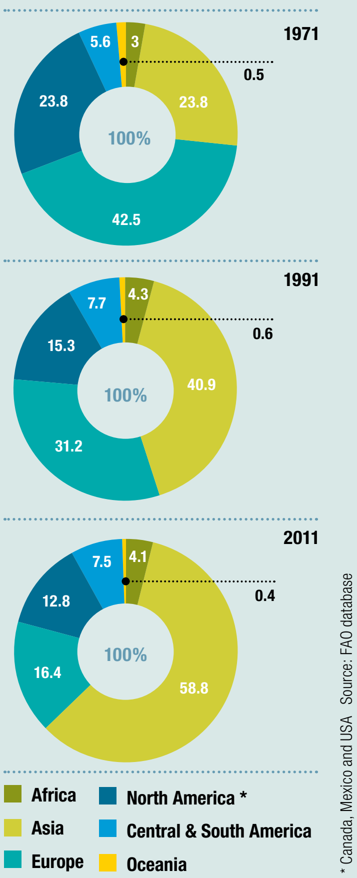
Figure 8a The 15 leading egg producing countries in 1971, 1991 and 2011

1971 COUNTRY	PRODUCTION (1,000 T)	SHARE (%)	1991 COUNTRY	PRODUCTION (1,000 T)	SHARE (%)	2011 COUNTRY	PRODUCTION (1,000 T)	SHARE (%)
USA	4,126	20.4	China	7,589	20.8	China	24,149	37.2
USSR	2,486	12.3	USSR	4,478	12.3	USA	5,419	8.3
Japan	1,800	8.9	USA	4,114	11.3	India	3,490	5.4
China	1,584	7.8	Japan	2,498	6.9	Japan	2,483	3.8
Germany	1,165	5.8	Brazil	1,315	3.6	Mexico	2,459	3.8
United Kingdom	879	4.3	India	1,210	3.3	Russia	2,284	3.5
France	647	3.2	Mexico	1,141	3.1	Brazil	2,037	3.1
Italy	588	2.9	Germany	922	2.5	Indonesia	1,166	1.8
Spain	494	2.4	France	918	2.5	Ukraine	1,064	1.6
Poland	396	2.0	Italy	715	2.0	France	840	1.3
Brazil	355	1.8	Netherlands	646	1.8	Spain	830	1.3
Mexico	350	1.7	Spain	641	1.8	Turkey	810	1.2
Canada	333	1.6	United Kingdom	634	1.7	Germany	777	1.2
India	308	1.5	Thailand	482	1.3	Iran	741	1.1
Netherlands	265	1.3	Republic of Korea	422	1.2	Italy	737	1.1
15 countries	**15,776**	***78.1**	**15 countries**	**27,724**	***76.0**	**15 countries**	**49,286**	**75.8**
World	20,206	100.0	World	36,453	100.0	World	65,003	100.0

* sum does not add because of rounding

Source: FAO database

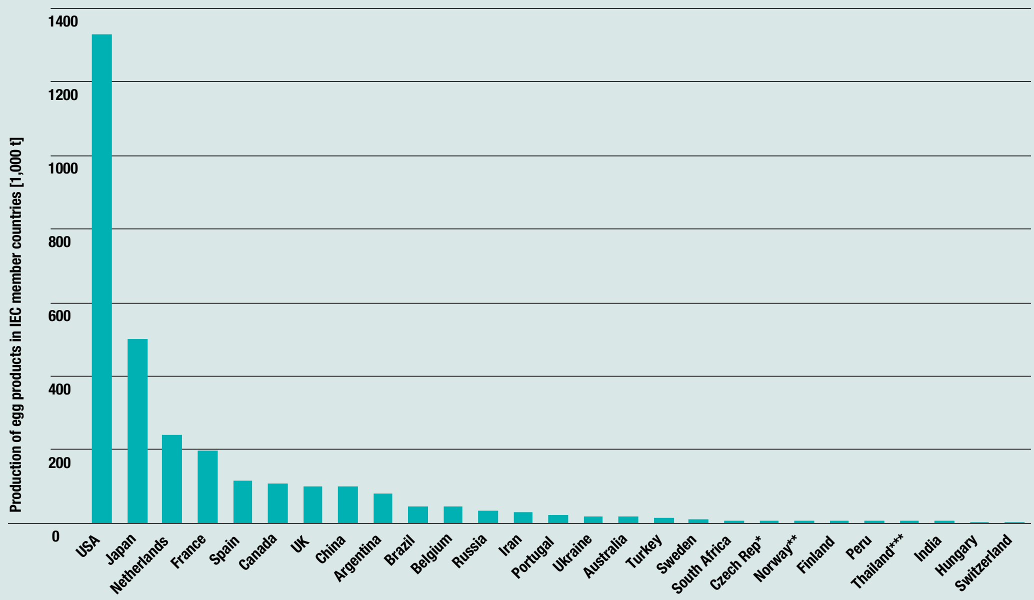
Figure 8b Egg production share by continent



* Canada, Mexico and USA Source: FAO database

Figure 9 Liquid egg production (2011)

The data base for the production of liquid and dried egg products is very poor. This makes it impossible to present a reliable overview on the global situation. Figure 9 is a compromise again. In the diagram, the data received from the IEC rapporteurs were used. One can easily see that the USA dominated egg processing in 2011. Of the 1.4 mill. t which were produced in this country, 1.3 mill. t were liquid egg products, mainly for the domestic market. Japan ranked in second place with 503,000 t, followed by the Netherlands (240,000 t), France (197,000 t) and Spain (116,000 t). In many developing and threshold countries, but also in developed countries, egg processing is comparatively unimportant in so far as these countries have to import liquid and dried egg products. A more detailed overview on the exports and imports of these products as well as the trade balance of dried and liquid eggs is shown in Figures 11 to 15.



* year 2010 ** year 2007 *** year 2006

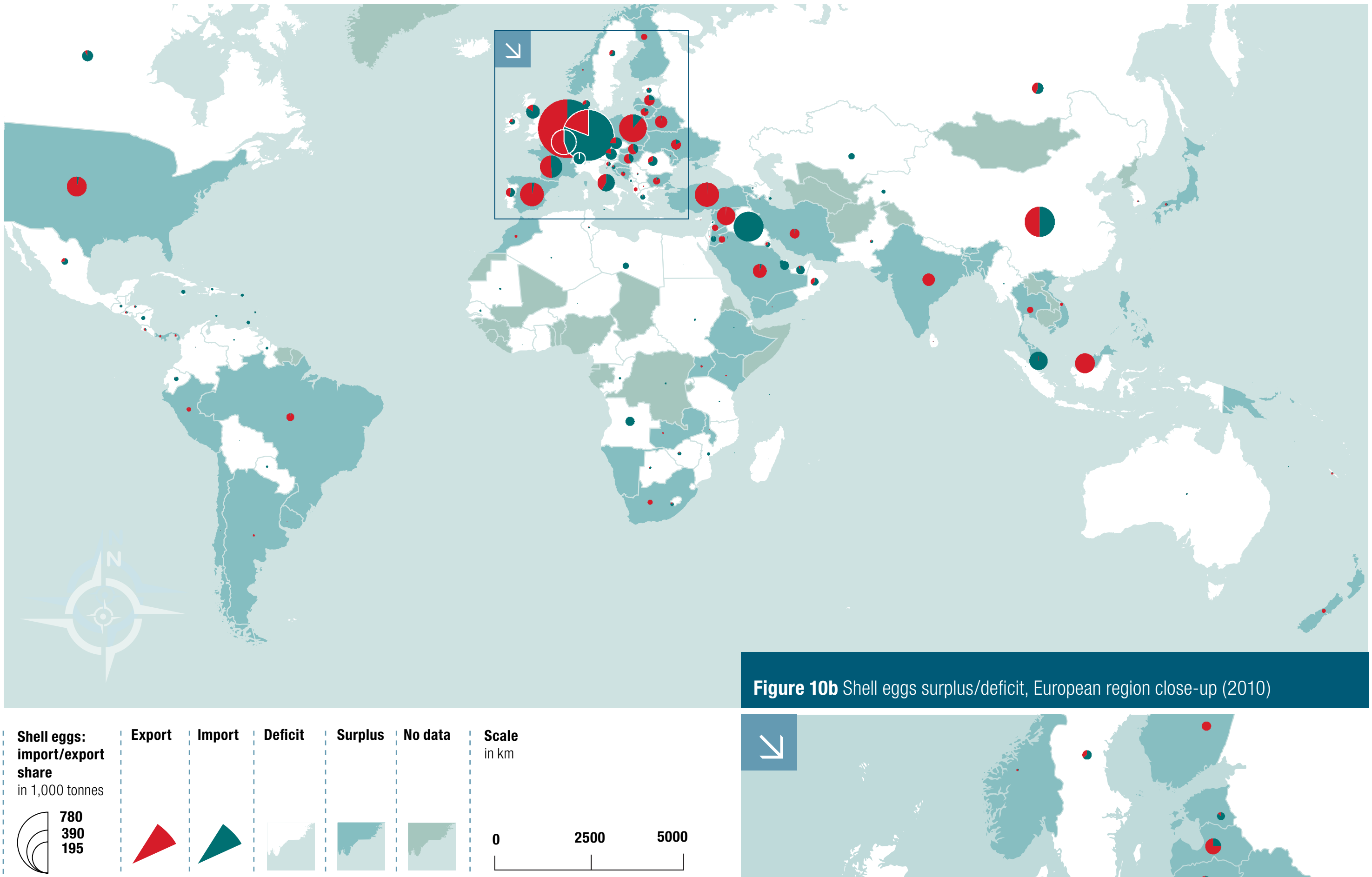
Source: IEC Rapporteurs

SHELL EGGS: GLOBAL TRADE

Global trade of shell eggs grew only slowly between 1970 and 1990, from then onwards the trade volume increased rapidly in Europe and Asia. In 2010, about 2 mill. t of shell eggs were exported, to which European countries contributed 67.0% and Asian countries 26.5%. In all other continents trade of shell eggs was of minor importance. The fact that shell eggs cannot be frozen results in comparatively short transportation distances for table eggs. From the map one can easily see that there are three main clusters of the egg trade. One is located in Europe, a second in the Near East and in a third in South Eastern Asia between Singapore and Malaysia.

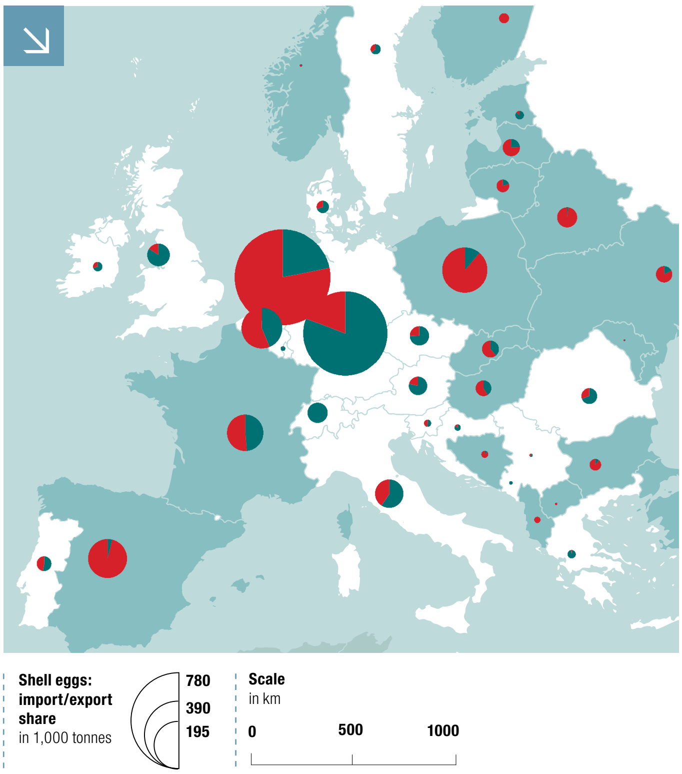
Figure 10a shows the countries with a surplus or deficit in the trade of shell eggs. In the Americas, the United States and Brazil have a considerable surplus even though the trade volume is much lower than in Europe. In Europe, the Netherlands, Spain, Poland and several Eastern European countries have a positive balance of trade whereas Germany, Switzerland, Austria and the Czech Republic have a negative trade balance (Figure 10b). In the Near East, Iraq has to import almost all eggs for consumption; on the other hand Turkey, Syria, Saudi Arabia and Iran have a high surplus. In Southern Asia, India shows a high trade surplus, this results in considerable export to the United Arab Emirates. A close trade relationship exists between Malaysia and Singapore. Singapore imports almost all eggs for consumption from Malaysia and Singapore is the most important country of destination for Malaysia´s egg exports.

Figure 10a Shell eggs surplus/deficit (2010)



Source:FAO database

Figure 10b Shell eggs surplus/deficit, European region close-up (2010)

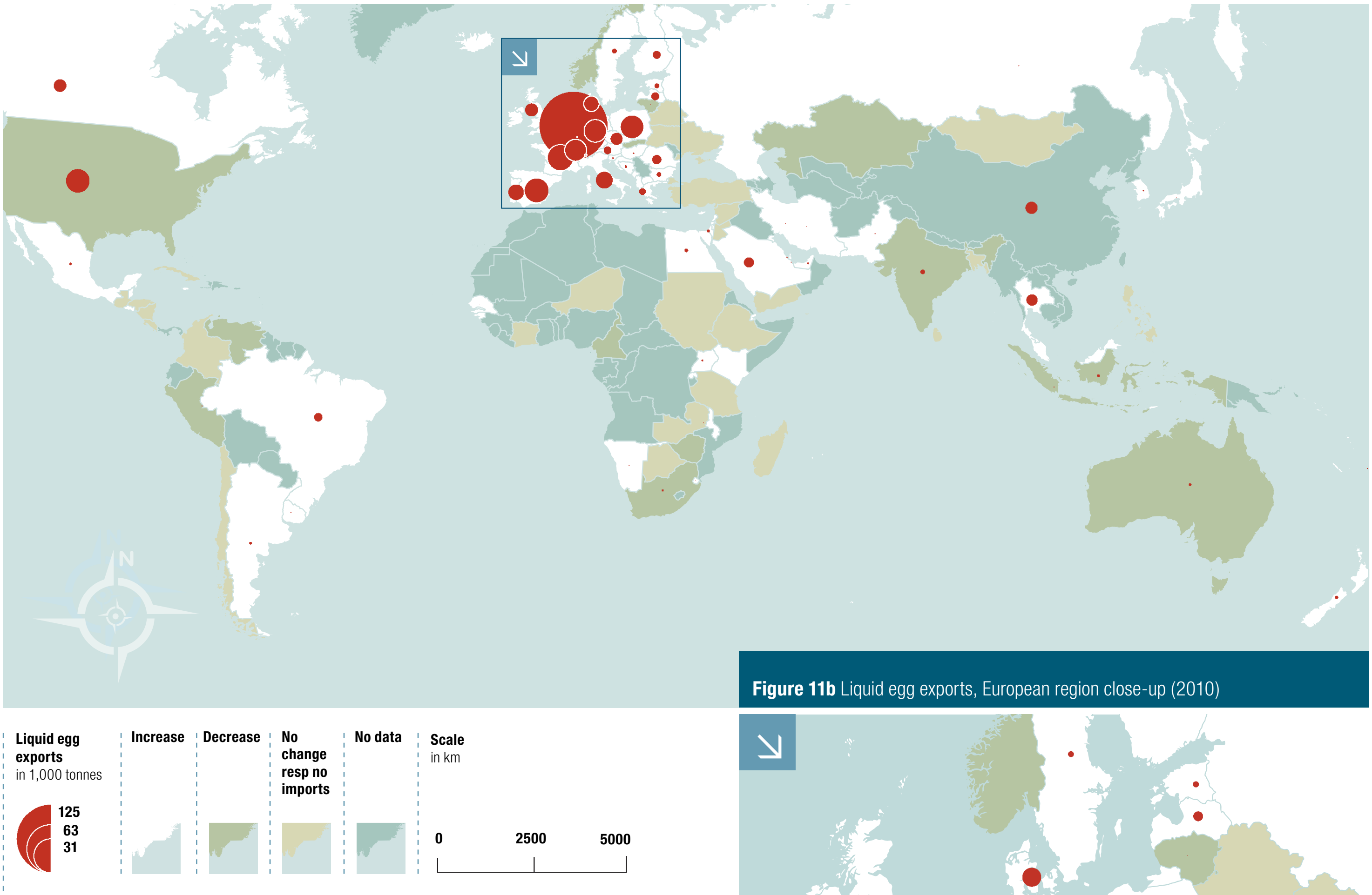


LIQUID EGG PRODUCTS: EXPORT VOLUME

In 2010, 273,000 t of liquid egg was exported. Figure 11a shows that on a global scale European countries dominated the trade of this product. They contributed 87% to the global trade volume, followed by North American countries, this includes Mexico, with a share of 7%. Compared to 2000, the export volume decreased in several countries, such as the USA, India, Malaysia and Australia. Trade of liquid eggs in the other continents was of minor importance. The steering factor behind the spatial pattern of trade of this commodity is the fact that liquid egg products can only be transported over relatively short distances to maintain the quality and safety of the products.

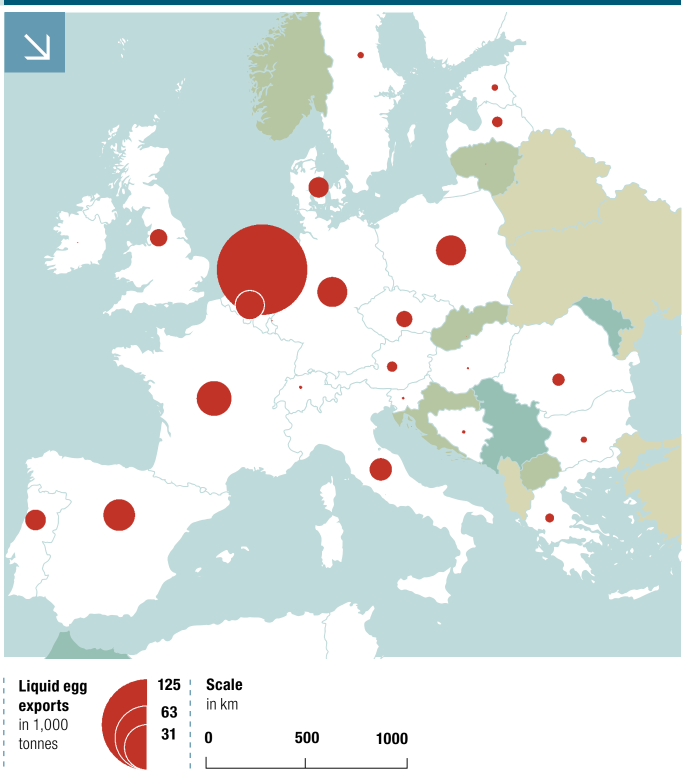
In order to get a more detailed impression of the situation in the European cluster, Figure 11b documents the export volumes for the single countries in 2010. The Netherlands exported about 125,000 t of liquid egg, i.e. 45% of the global export volume, followed by France (18,000 t), Spain (15,000 t), Poland and Germany (14,000 t each). From the map one can easily see that in most countries the export volume increased.

Figure 11a Liquid egg exports (2010)



Source: FAO database

Figure 11b Liquid egg exports, European region close-up (2010)



LIQUID EGG PRODUCTS: IMPORT VOLUME

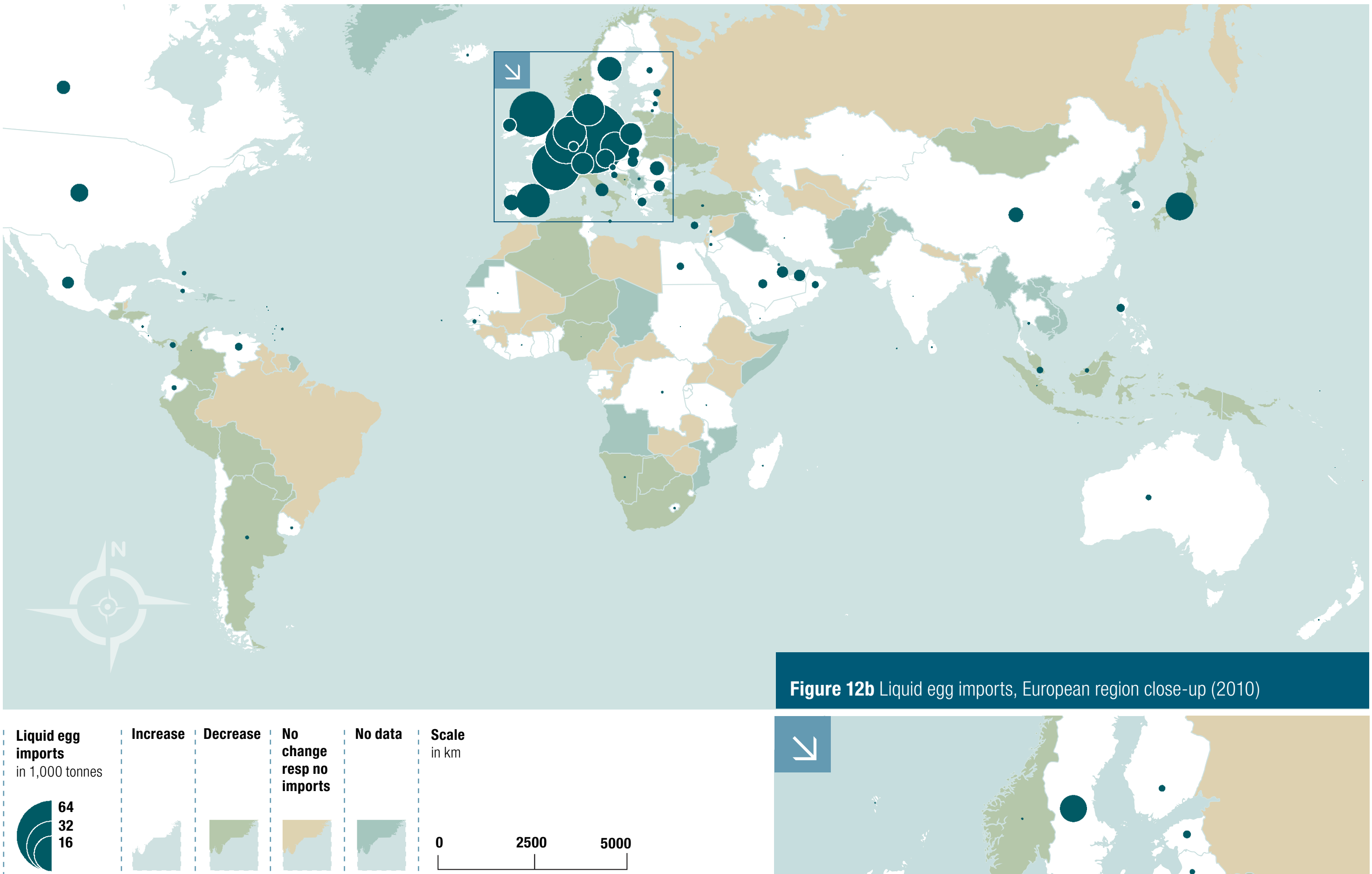
Global liquid egg imports reached a volume of 271,000 t in 2010. Figure 12a shows that the spatial pattern is very similar to that of exports. Nevertheless, there are some obvious differences. Japan, the United Arab Emirates, Saudi Arabia, Oman, China, the three NAFTA member countries and Singapore as well as South Korea are found among the major importing countries even though their import volume is much lower than that of the leading European countries.

Europe shared 85% of the global imports, followed by Asia with 7% and North America with 3%.

With an import volume of almost 64,000 t, Germany shared 24% of the global liquid egg imports, followed by France (30,000 t), the United Kingdom (26,000 t) and Belgium (22,000 t). Japan, the only non-European country among the ten leading importing countries, ranked as number 9 with an import volume of 9,700 t.

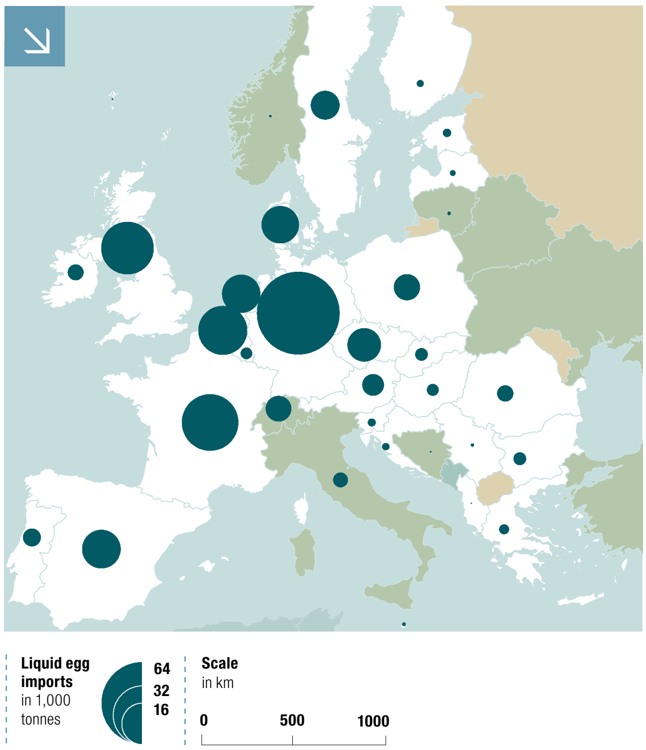
From Figure 12b one can see that in most European countries the imports of liquid egg increased between 2000 and 2010. Of the major egg producing countries, the import volume only decreased in Italy.

Figure 12a Liquid egg imports (2010)



Source:FAO database

Figure 12b Liquid egg imports, European region close-up (2010)



DRIED EGG PRODUCTS: EXPORT VOLUME

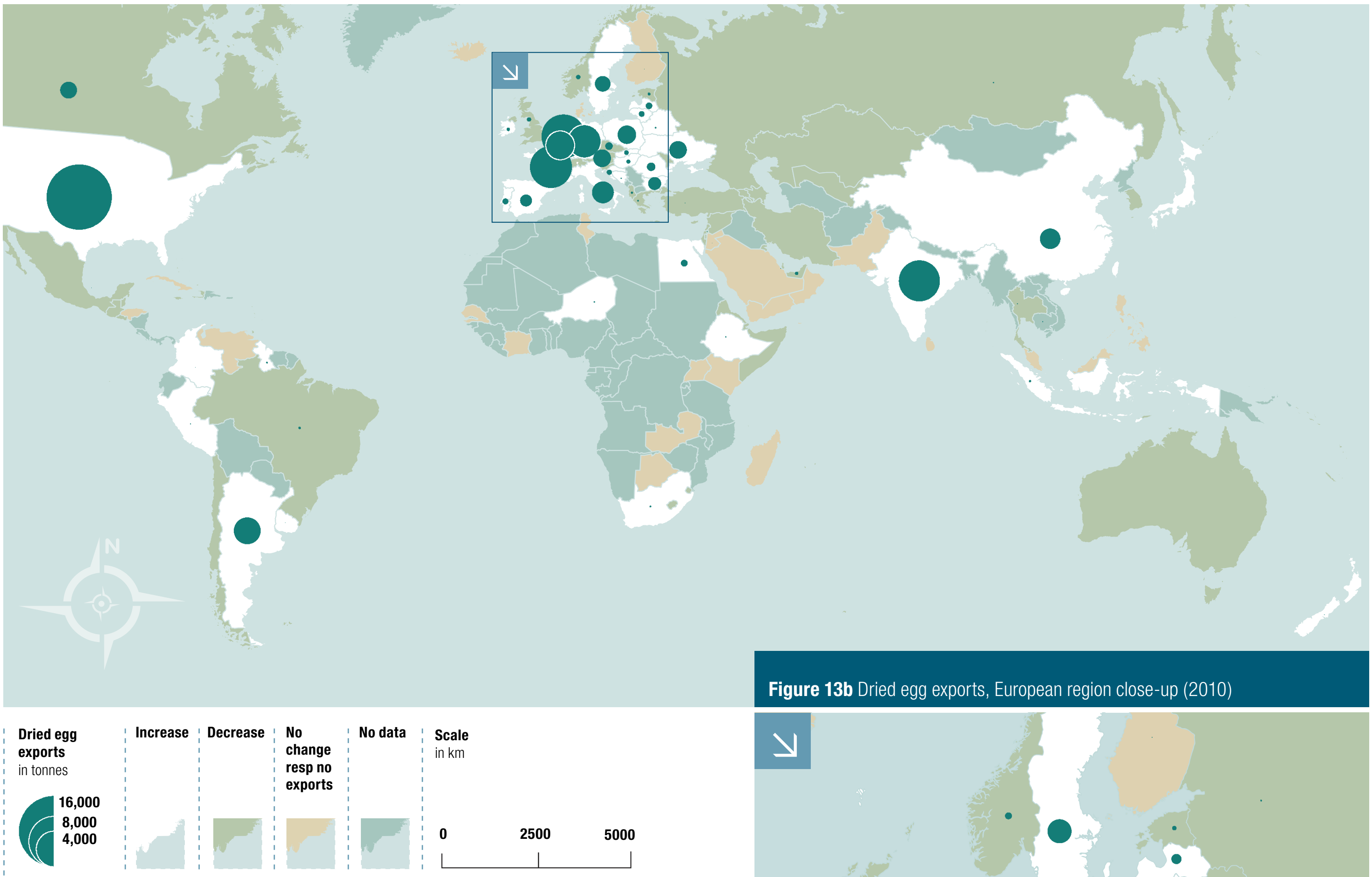
In contrast to liquid egg, dried egg products can be shipped over long distances due to their longer durability. So it is not surprising that the spatial patterns of trade with these products differs considerably from those of liquid egg. But it is worth mentioning that the export volume of dried egg is much lower than that of liquid egg. This is due to the fact that the production process for dried egg requests less technical installations and know how.

In 2010, almost 56,000 t of dried egg products were exported, of which Europe contributed 52%, North America 29%, Asia 14% and South America 5% (Figure 13a). Of the ten leading exporting countries, six were located in Europe, two in Asia, one in North and one in South America. The USA ranked in first place with an export volume of 15,400 t, i. e. 27.5% of the global export volume, followed by the Netherlands, France and India.

The dynamic development in India over the past years is remarkable and it has become one of the major exporting countries.

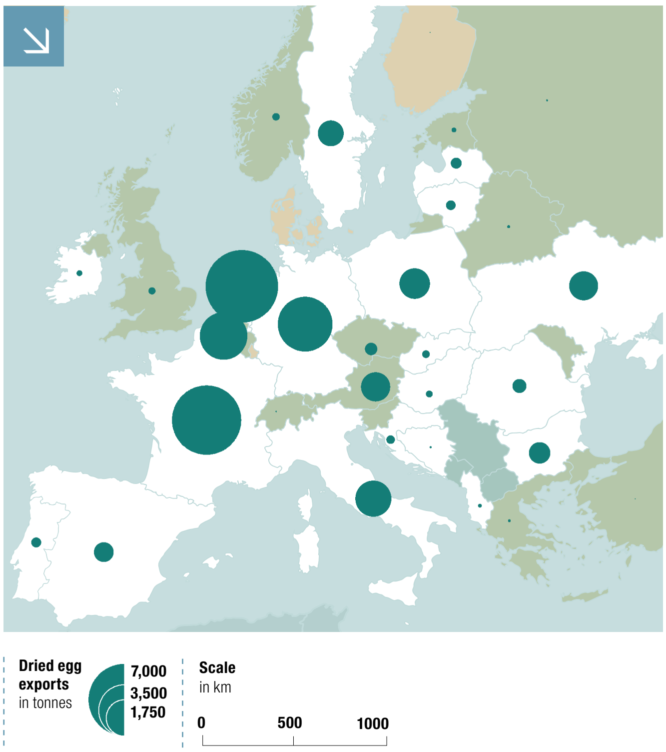
In Europe, the Netherlands, France, Germany and Belgium were the leading exporting countries (Figure 13b). In most European countries the export volume increased between 2000 and 2010.

Figure 13a Dried egg exports (2010)



Source: FAO database

Figure 13b Dried egg exports, European region close-up (2010)

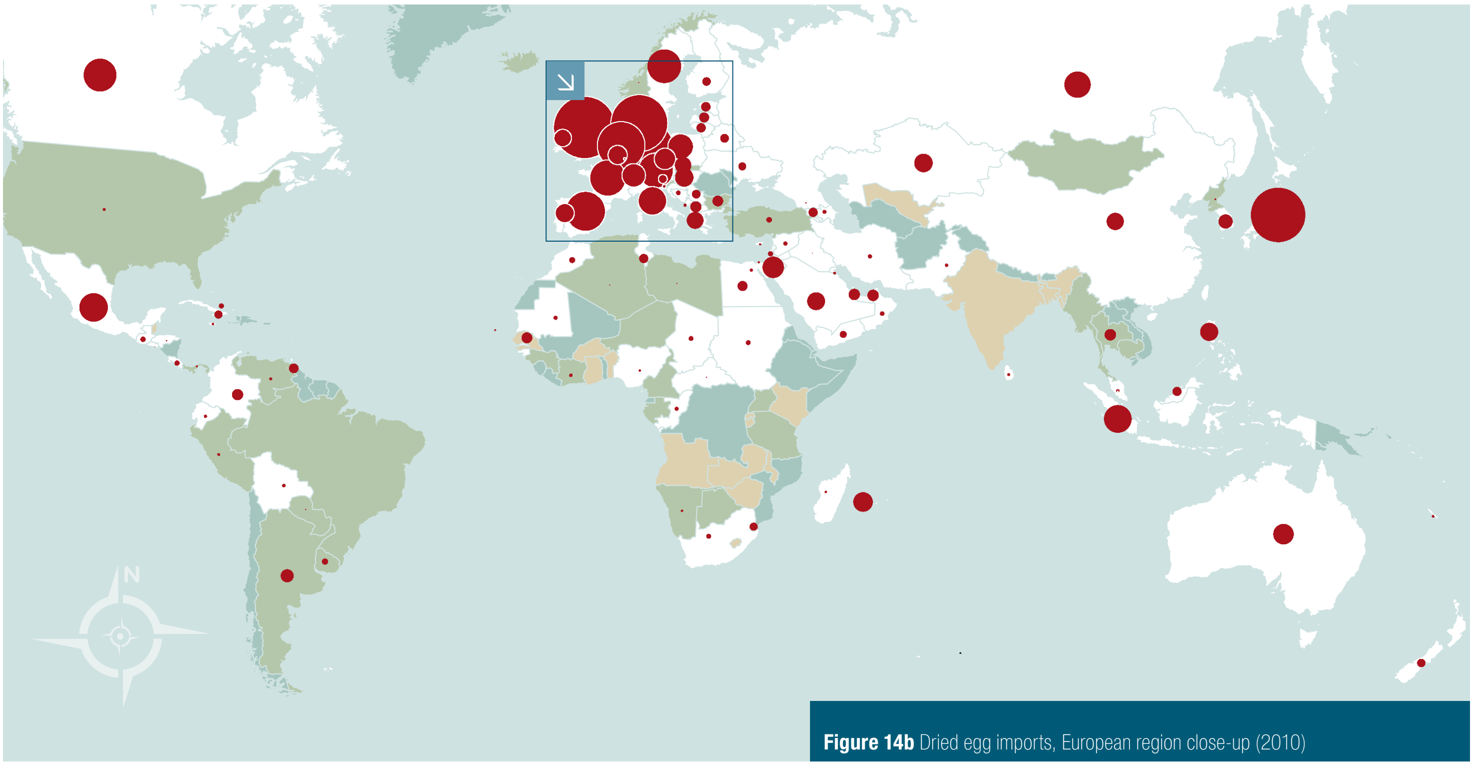


DRIED EGG PRODUCTS: IMPORT VOLUME

The longer durability of dried egg products which allows longer transport distances explains the spatial pattern of the imports of this commodity (Figure 14a). In 2010, the imports reached a volume of 59,200 t, of which Europe shared 71%, Asia 19% and North America 5%. It is worth mentioning that besides the European cluster several other countries imported dried egg, such as Japan, Canada, Mexico, countries on the Arabian Peninsula, Indonesia, Russia and Australia. Of the ten leading countries eight were located in Europe, one in Asia and one in North America.

As can be seen from Figure 14b, the import volume of dried egg increased in almost all European countries between 2000 and 2010. Germany, the United Kingdom and Denmark were not only the three leading importing countries in Europe, but also on a global scale. Together they shared 31% of the global import volume. A comparison of Figure 13b and 14b reveals that many Central and Western European countries, with the exception of the United Kingdom, are to be found among the leading dried egg exporting and importing countries.

Figure 14a Dried egg imports (2010)



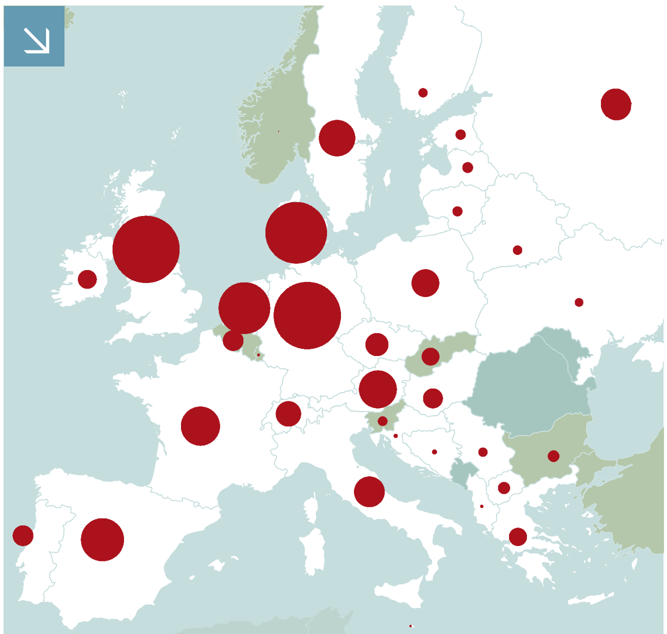
Dried egg imports in tonnes: 6,600; 3,300; 1,650

Increase | **Decrease** | **No change resp no imports** | **No data**

Scale in km: 0, 2500, 5000

Source: FAO database

Figure 14b Dried egg imports, European region close-up (2010)



Dried egg imports in tonnes: 6,600; 3,300; 1,650

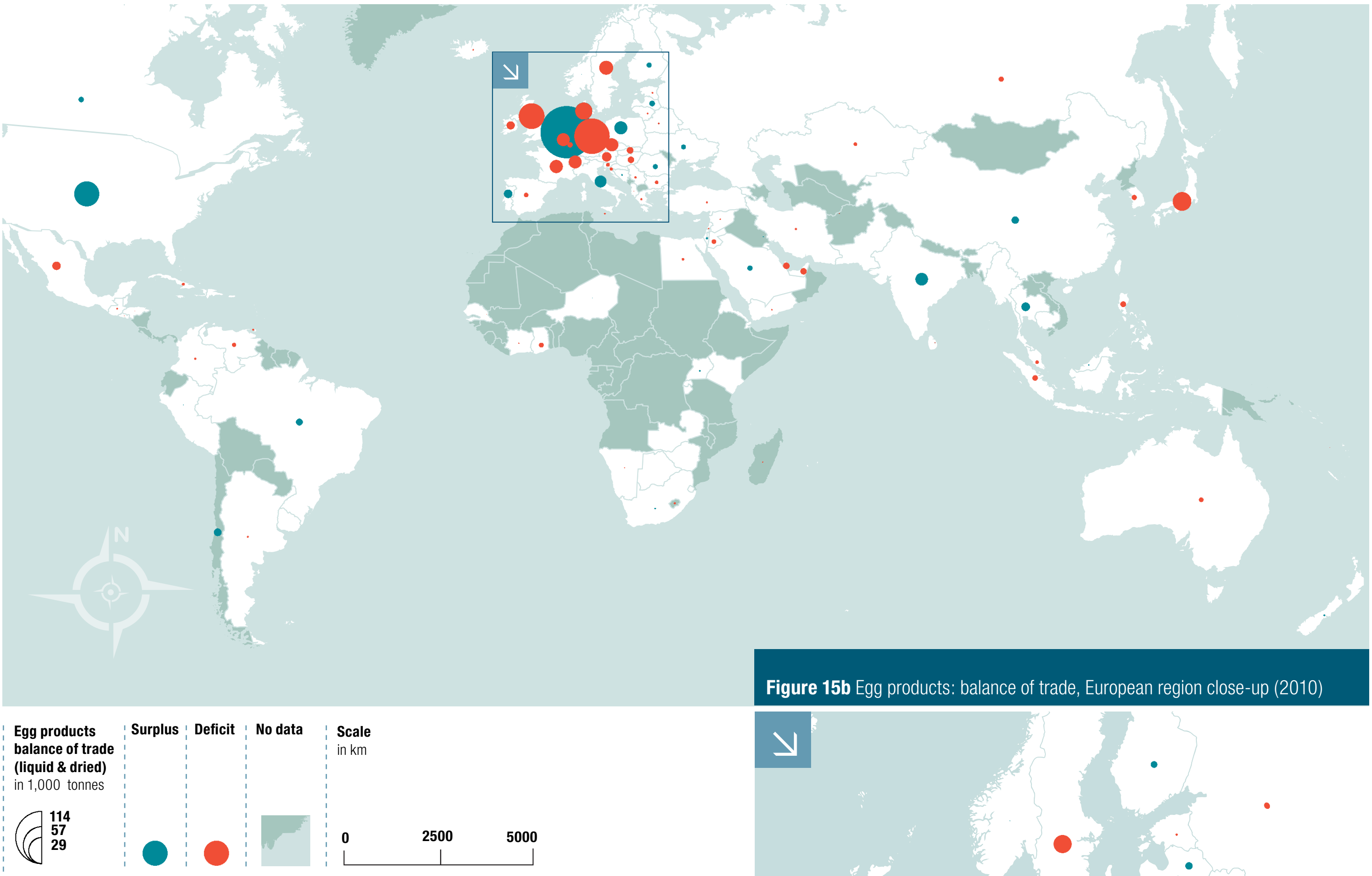
Scale in km: 0, 500, 1000

EGG PRODUCTS: BALANCE OF TRADE

Figure 15a shows the balance of trade with egg products on a country basis for 2010. The European cluster with high surplus and high deficit countries is obvious. In North America, the USA and Canada had a trade surplus of 28,000 t, Mexico a deficit of 3,000 t. In South America, Brazil and Argentina had a combined surplus of 4,500 t. All other countries either did not trade in egg products or had a negligible deficit. In Asia, India, Thailand, China and Saudi Arabia showed a trade surplus, Japan, South Korea, the Philippines and Indonesia a deficit. For most of the African countries, no data was available; trade with egg products is of minor importance.

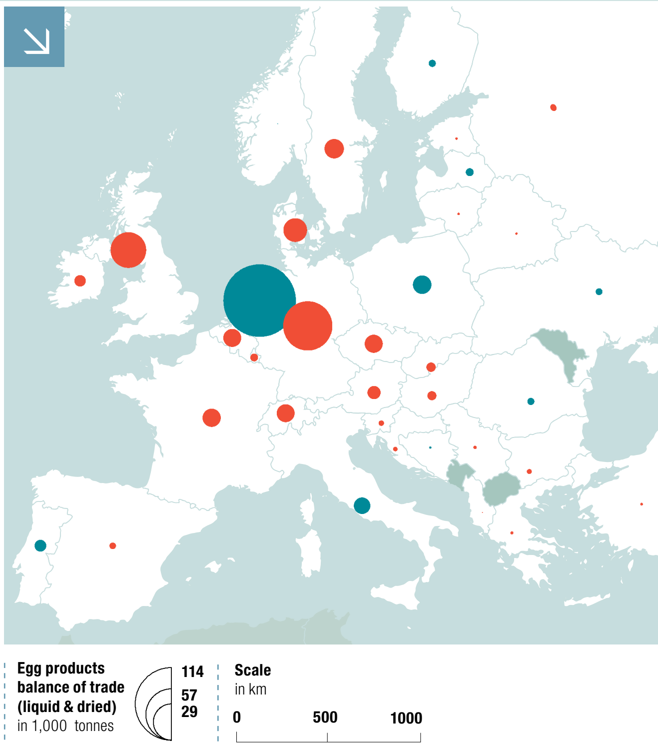
Most of the European countries showed a negative balance of trade for egg products (Figure 15b). The Netherlands had the highest surplus with almost 132,000 t, followed by Poland (7,500 t), Italy (6,000 t) and Portugal (3,000 t). The highest negative balance of trade for egg products was found in Germany with 52,500 t, followed by the United Kingdom (27,600 t), Japan (14,700 t) and Denmark (12,200 t).

Figure 15a Egg products: balance of trade (2010)



Source: Own calculations

Figure 15b Egg products: balance of trade, European region close-up (2010)



PART 2 COUNTRY FOCUS

Patterns of the egg industry in Russia and selected emerging countries

ARGENTINA

With a volume of 721,393 t, Argentina ranked as number 16 among the egg producing countries and contributed 1.1% to global shell egg production.

Of the 1,642 market-oriented layer farms which were counted in 2011, 875 were located in the province of Buenos Aires and 394 in Entre Rios. In addition to the high regional concentration of farms, a similar concentration of layer flocks can be observed. Of the 42.5 mill. layers, 25.9 mill. were held in the Buenos Aires province and 9.9 mill. in Entre Rios. In contrast, the sectoral concentration was comparatively low. The five leading companies contributed only 14.7% to the overall production volume.

With a per capita consumption of 242 eggs, this includes egg products, the total demand reached 9.9 billion eggs or 630,800 t meaning that Argentina would have been able to export shell eggs. However, the export volume of 6,935 tonnes was relatively low; egg imports were not registered in 2011.

The value of egg production in 2010 was as high as 543 mill. US-$ or 1.0% of the total value of agricultural production, ranking in 15th place.

Argentina´s egg industry is confronted with several challenges. The major topics are high labor and feed costs, followed by environmental problems which demand reactions. Animal health is ranked number four, whereas animal welfare is ranked sixth.

General data (2011)

Production data

Number of commercial layer farms	1,642
Number of laying hens (in millions)	42.5
Feed consumption per laying hen to produce one egg (in grams)	175
Average laying rate per hen and year	243
Production shell eggs (metric tonnes)	721,393
Consumption eggs total (eggs+egg products/year)	242
Average egg weight (in grams)	63.5
Total population (in millions)	41.0

Main egg producers

Ovobrand	24,700 t
Codepra	24,200 t
A. de Plata	20,900 t
Rothex	19,000 t
Roth	17,100 t
Sum top 5	105,900 t
Contribution of top 5 companies to overall production	14.7%

Challenges

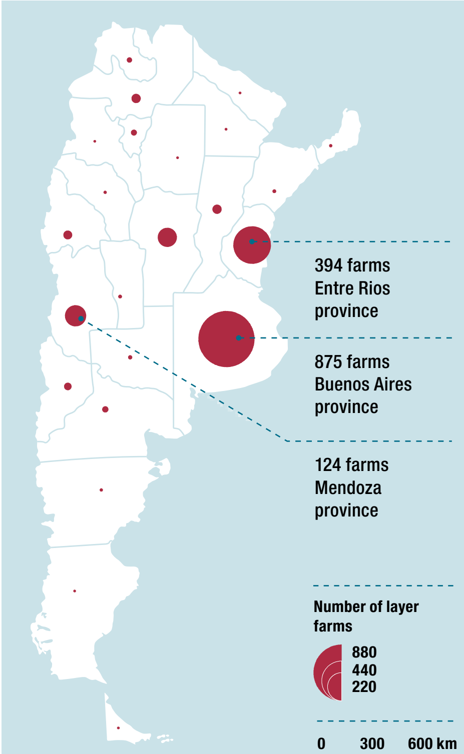
Main challenges for the domestic egg industry in Argentina, ranked in order of importance 1-7, 1 being most important

Animal welfare	6
Animal health	4
Environ. challenges	3
Rising feed costs	2
Qualified personnel	7
Trade barriers	5
Labour costs	1

Source: IEC Rapporteur

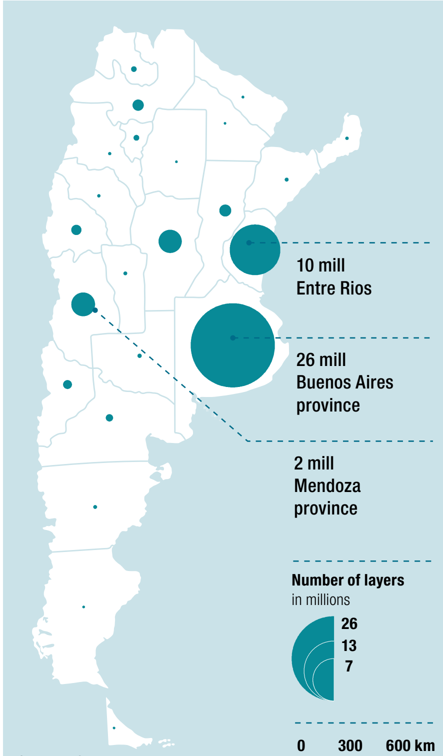
Juan Daniel Cámara, Argentina de Productores

Layer farms by region (2011)



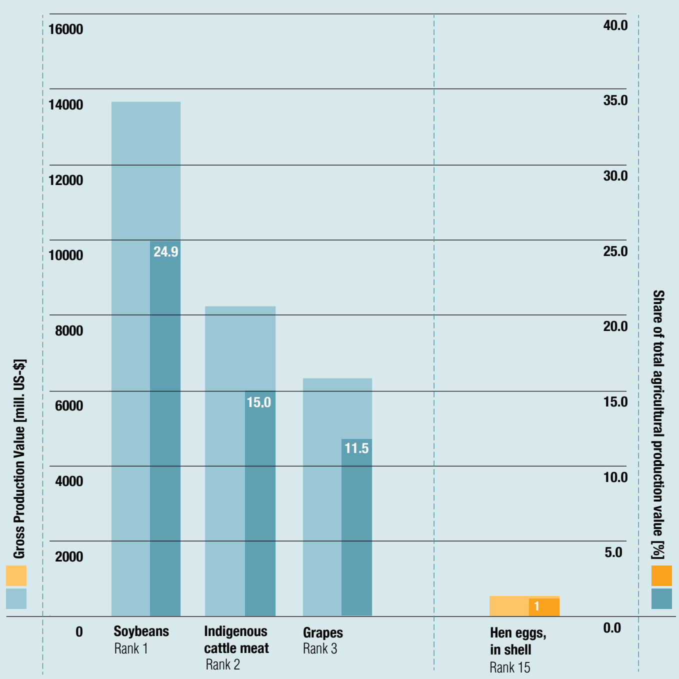
Source: IEC Rapporteur

Laying hens by region (2011)



Source: IEC Rapporteur

Agricultural commodities ranking (2010)



Source: FAO database

BRAZIL

With a volume of 1.9 mill t, Brazil ranked as number seven among the egg producing countries and contributed 3.1% to global shell egg production. In 2012, 85.6 mill. hens were held in approximately 1,700 commercial layer farms which are defined by more than 10,000 hen places. The leading state in egg production was Sao Paulo with 28 mill. hens, followed by Minas Gerais with 9 mill. layers and Espiritu Santo with 6 mill. hens. All states are located in the Southeast region and represent the major cluster of egg production in Brazil. Together, these three states contributed 50.2 % to Brazil´s total shell egg production.

With two billion US-$, hen egg production contributed 1.3% to the total value of agricultural production and ranks 15 among the agricultural commodities in 2010.

The main three challenges for Brazil´s egg industry are rising feed costs, lack of qualified personnel and sustaining animal health. Environmental problems, trade barriers and animal welfare are currently of less importance to the egg industry.

General data (2012)

Production data

Number of commercial layer farms	1,641*
Number of laying hens (in millions)	85.6
Feed consumption per laying hen to produce one egg (in grams)	105
Average laying rate per hen and year	300
Production shell eggs (metric tonnes)	1,893,000
Consumption eggs total (eggs+egg products/year)	163
Average egg weight (in grams)	60
Total population (in millions)	194

*2006 data

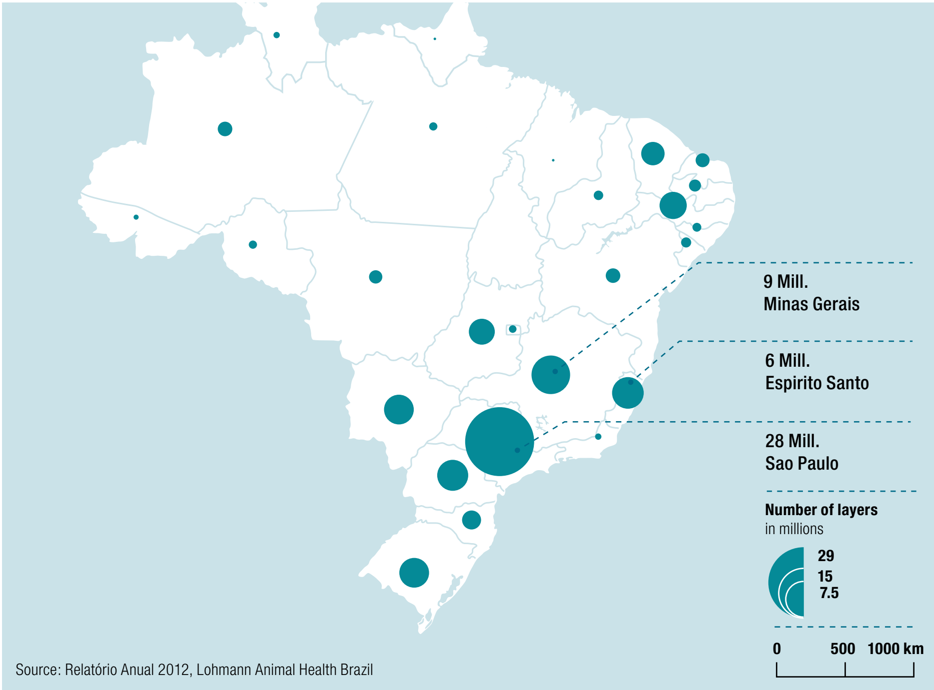
Challenges

Main challenges for the domestic egg industry in Brazil, ranked in order of importance 1-7, 1 being most important

Animal welfare 6	Animal health 3	Environ. challenges 4	Rising feed costs 1
Qualified personnel 2	Trade barriers 5		

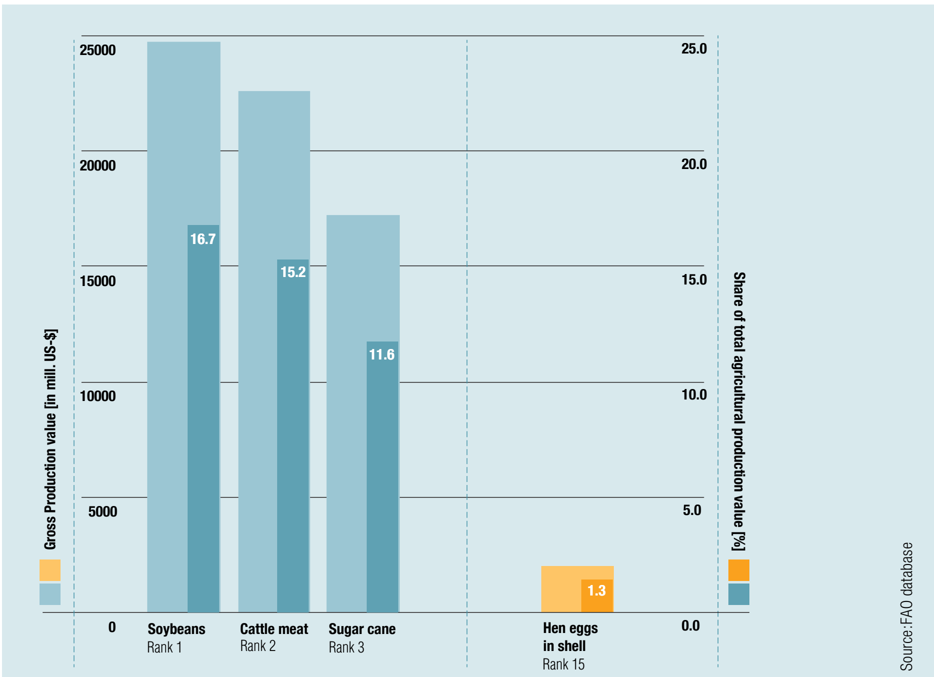
Source: Relatório Anual 2012, Lohmann Animal Health Brazil

Laying hens by region (2012)



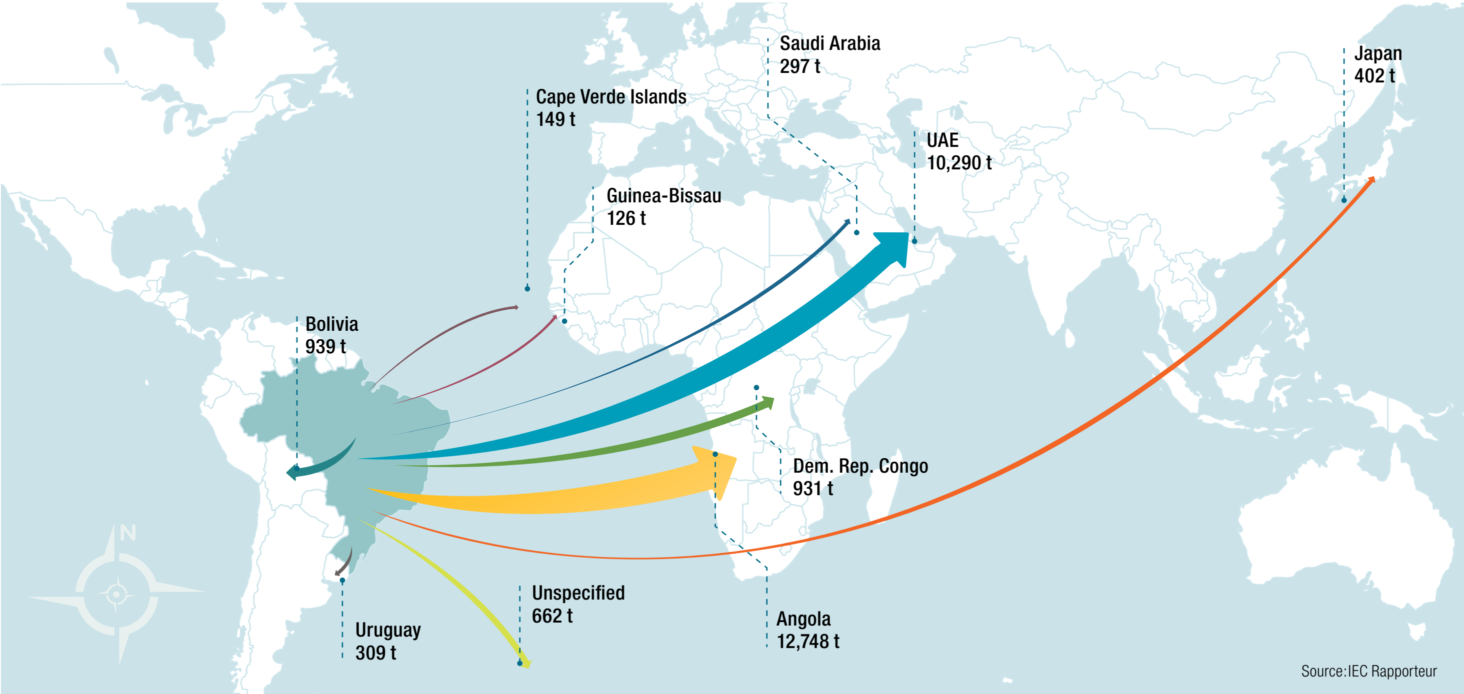
Source: Relatório Anual 2012, Lohmann Animal Health Brazil

Agricultural commodities ranking (2010)



With a per capita consumption of 163 eggs, the total demand reached 31.6 billion eggs or 1.893 mill t so most of the produced eggs were needed to meet the domestic demand. The self-sufficiency rate in 2012 was 101%. Therefore, only insignificant import volumes can be stated. Brazil´s egg exports reached 26,853 t in 2012. The top five countries of destination were Angola, UAE, Bolivia, Democratic Republic of Congo and Japan.

Egg exports: principal countries (2012)



Source: IEC Rapporteur

CHINA

With a volume of 24.2 mill. t, or 37.2% of the global production volume, China dominated global egg production in 2011.

The maps showing the distribution of layers and layer farms visualise the cluster of egg production in Eastern China. Over 80% of all layer farms were concentrated there. 28,000 farms were located in the province of Shandong, 27,000 in Henan, 23,000 in Hebei and 19,000 in Liaoning; they shared 61.3% of the 1.4 billion layers which were counted in China in 2011.

The value of agricultural production reached a volume of almost 840 billion US-$ in 2010. To this, shell eggs contributed 23.9 billion US-$ or 2.9% of the total value of all agricultural commodities, ranking 12th.

The main challenges which the Chinese egg industry has to cope with are animal health, environmental challenges and rising feed costs. Animal welfare is ranked in seventh place of the main challenges for the Chinese egg industry.

As another major challenge China placed low egg prices at farm gate at rank four since major Chinese egg producers currently have difficulties to realise adequate margins.

General data (2011)

Production data

Number of commercial layer farms	190,000
Number of laying hens (in millions)	1,400
Feed consumption per laying hen to produce one egg (in grams)	150
Average laying rate per hen and year	300
Production shell eggs (metric tonnes)	24,000,000
Consumption eggs total (eggs+egg products/year)	295
Average egg weight (in grams)	63
Total population (in millions)	1,360

Main egg producers

Producer 1	36,000 t
Producer 2	18,000 t
Producer 3	14,400 t
Producer 4	14,400 t
Producer 5	9,000 t
Sum Top 5	91,800 t
Contribution of top 5 companies to overall production	0.4%

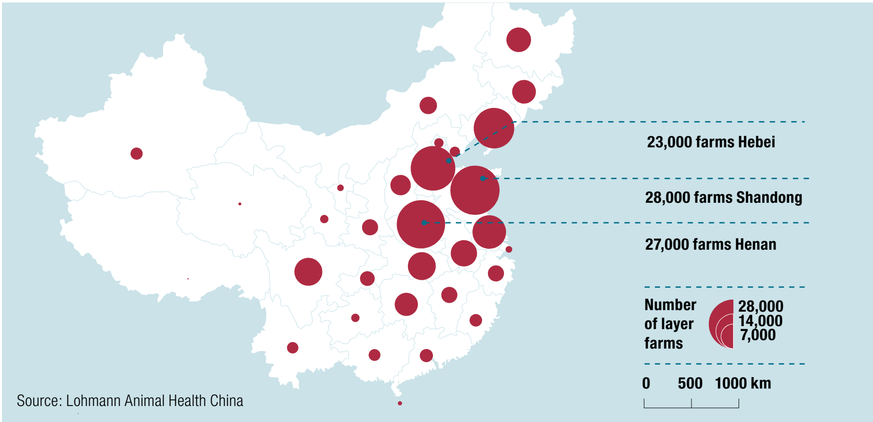
Challenges

Main challenges for the domestic egg industry in China, ranked in order of importance 1-7, 1 being most important

- Animal welfare 7
- Animal health 1
- Environ. challenges 2
- Rising feed costs 3
- Qualified personnel 5
- Trade barriers 6
- Low egg prices at farm gate 4

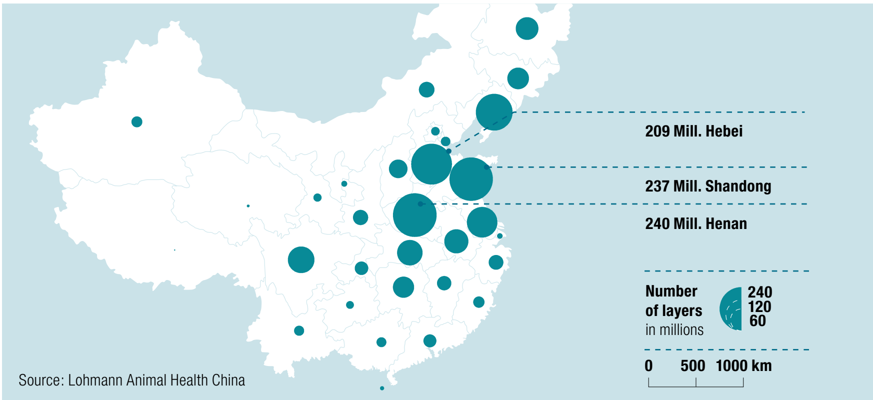
Source: Lohmann Animal Health China

Layer farms by region (2011)



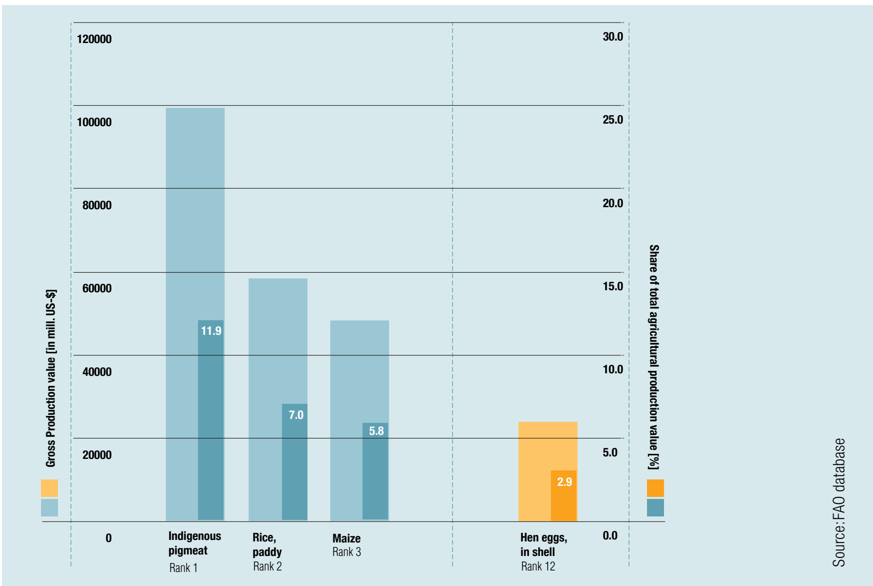
Source: Lohmann Animal Health China

Laying hens by region (2011)



Source: Lohmann Animal Health China

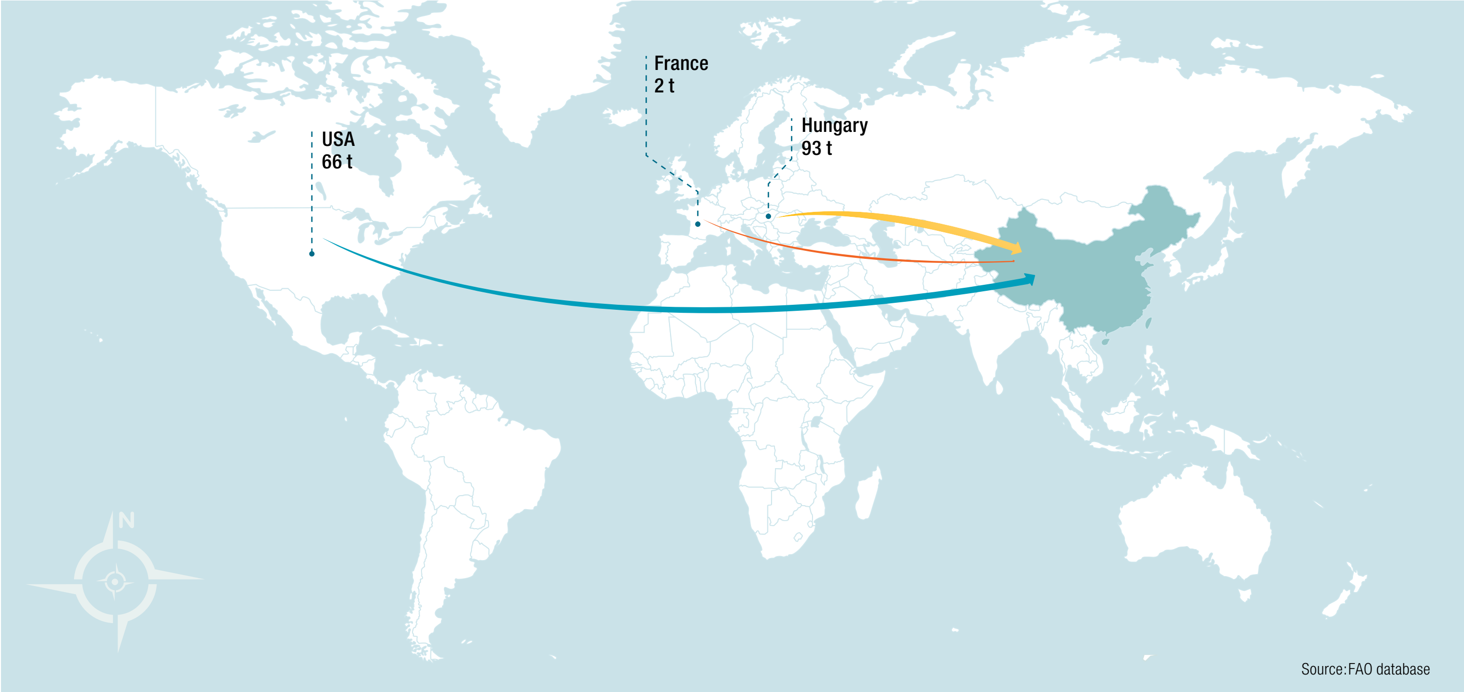
Agricultural commodities ranking (2010)



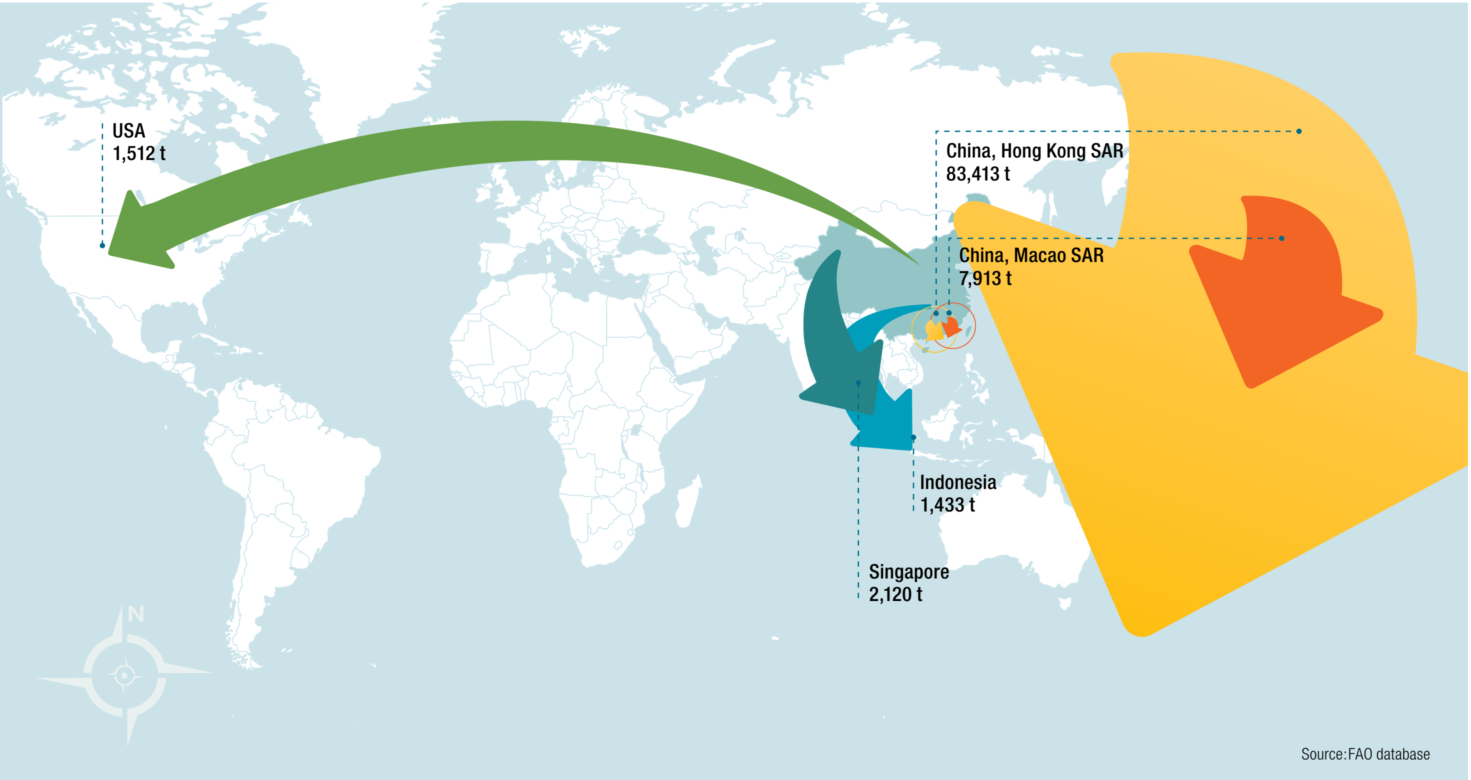
Source: FAO database

With a per capita consumption of 295 eggs, the annual demand reached a volume of 401 billion pieces or 25.3 mill. t. Despite the calculated deficit of 1.3 mill. t., China exported considerable amounts of shell eggs to Hong Kong, Macao and Singapore. This shows that the production or the consumption data may be incorrect, due to estimated production in backyard flocks and the per capita consumption in rural areas.

Egg imports: principal countries (2010)



Egg exports: principal countries (2010)



INDIA

With a production volume of 3.5 mill. t or 5.4% of global shell egg production, India ranked as number three among the egg producing countries in 2011.

The number of market oriented layer farms was estimated at 13,000. As can be seen from the two maps, the regional concentration of layer farms is very high, for 8,458 farms were located in Andhra Pradesh. Of the 187 mill. commercial layers 73 mill. were located in Andhra Pradesh, 40 mill. in Tamil Nadu and 19 mill. in Haryana. These three states shared 71% of India´s layer flocks.

The value of agricultural production reached a volume of 245 billion US-$ in 2010. To this, shell eggs contributed 2.5 billion US-$ or 1.0% of the total value of all agricultural commodities, ranking in 24th place. The five leading egg producing companies contributed about 958,000 t or 28% to India´s shell egg production.

The main challenges which egg producers in India are confronted with are rising feed costs, health of the layer flocks and the recruitment of a qualified and sufficient work force. Animal welfare is the least relevant topic for the Indian egg industry and can be found on rank 7.

General data (2011)

Production data

Number of commercial layer farms	13,000
Number of laying hens (in millions)	187
Feed consumption per laying hen to produce one egg (in grams)	123
Average laying rate per hen and year	315
Production shell eggs (metric tonnes)	3,490,000
Consumption eggs total (eggs+egg products/year)	62
Average egg weight (in grams)	55
Total population (in millions)	1,210

Main egg producers

Sakku Agro India Pvt. Ltd.	492,750 t
Sun Foods	197,100 t
Jhansi Laxmi Poultry Farm	131,400 t
Parameswari Poultry Farm	82,125 t
Sivian & Shivika Poultry Farm	82,125 t
Sum top 5	985,500 t
Contribution of top 5 companies to overall production	28.2%

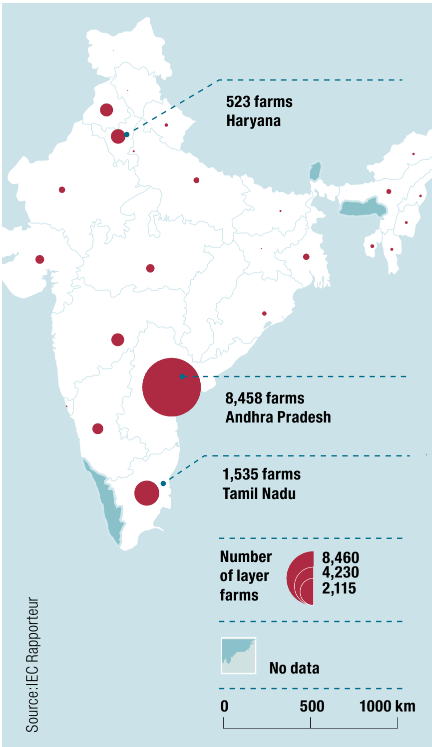
Challenges

Main challenges for the domestic egg industry in India, ranked in order of importance 1-7, 1 being most important

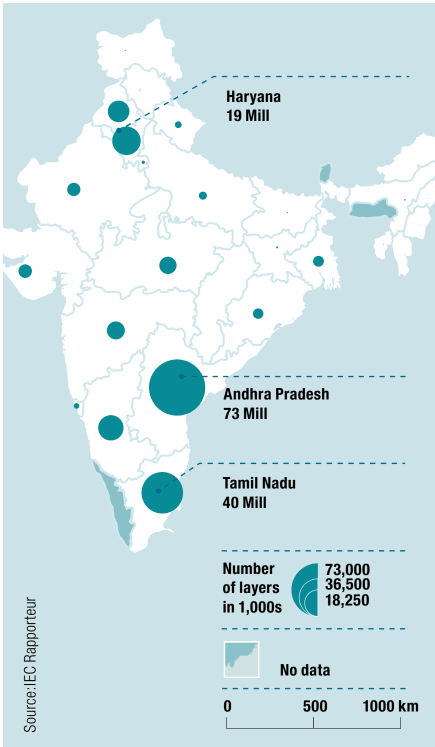
Animal welfare	7
Animal health	2
Environ. challenges	4
Rising feed costs	1
Qualified personnel	3
Trade barriers	6
Lacking workforce	=5
Unorganised trading	=5

Source: IEC Rapporteur: BSR Sastry, National Egg Coordination Committee; Srinivasa Hatcheries Group, India

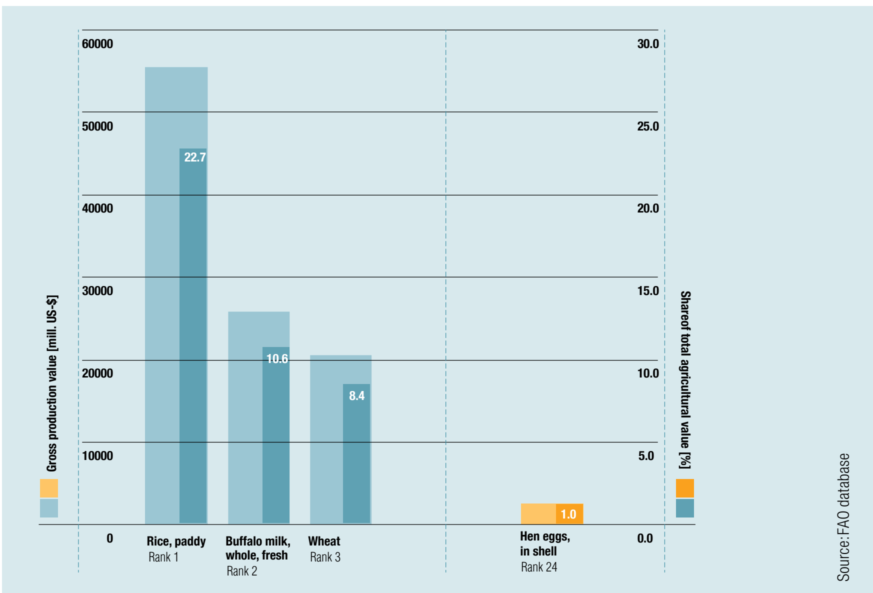
Layer farms by region (2011)



Laying hens by region (2011)

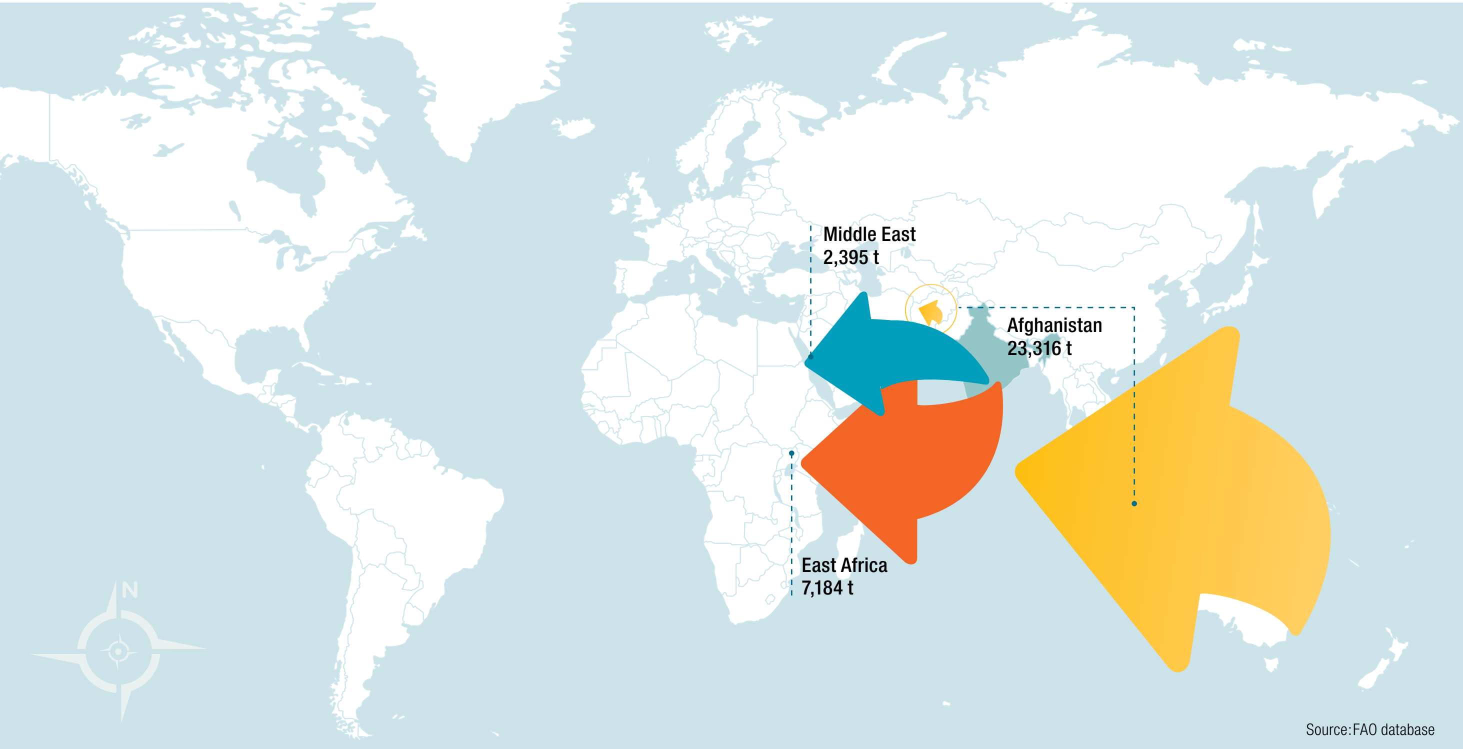


Agricultural commodities ranking (2010)



With a per capita consumption of 62 eggs and a population of 1.21 billion, the annual egg demand was as high as 68.9 billion eggs or 3.8 mill. t. Despite the calculated deficit, India exported 23,300 t of shell eggs to Afghanistan in 2011. The difference in the calculation of the demand and the official production data may be due to an estimate of egg production in small backyard flocks.

Egg exports: principal countries (2010)



MEXICO

According to official data from the Unión Nacional de Avicultores, 145.7 mill. laying hens were held by Mexican egg farmers in 2011. With a laying rate of 310 eggs per hen per year in commercial farms, the layers produced 2.54 mill. t of shell eggs. Mexico ranked as number four among the leading egg producing countries and contributed 4.4% to global egg production.

The regional concentration of the laying hen population in Mexico is very high. Almost 80 mill. layers were concentrated in the state of Jalisco, and 25 mill. in Puebla. These two states shared 79% of the hen flocks. This is also reflected in the number of laying flocks in production owned by the five leading egg producing companies. As these companies keep 40.2% of the overall layer population of Mexico, the sectoral concentration is comparatively high.

The value of agricultural production reached a volume of 22.8 billion US-$ in 2010. To this, egg production contributed 2.4 billion US-$ or 5.7%, which ranked it in seventh position amongst the agricultural commodities.

Due to the severe economic losses which resulted from avian influenza outbreaks in the main producer states, Jalisco in 2012 and Aguascalientes in 2013, the Unión Nacional de Avicultores ranked animal health as the major issue for the domestic egg industry. As a consequence, the industry is currently working on a decentralisation concept for the densely populated poultry areas and implementing prevention programs for epizootic diseases.

General data (2011)

Production data

Number of commercial layer farms	900
Number of laying hens (in millions)	145.7
Feed consumption per laying hen to produce one egg (in grams)	110
Average laying rate per hen and year	310
Production shell eggs (metric tonnes)	2,538,137
Consumption eggs total (eggs+egg products/year)	358
Average egg weight (in grams)	62
Total population (in millions)	113

Main egg producers (layers in production)

Proteina Animal	25,200,000
Bachoco	11,100,000
El Calvario	8,800,000
Empresas Guadalupe	7,470,000
Socoro Romero Sánczez	6,000,000
Sum layers of top 5	58,570,000
Share of top 5 companies of total layer population	40.2%

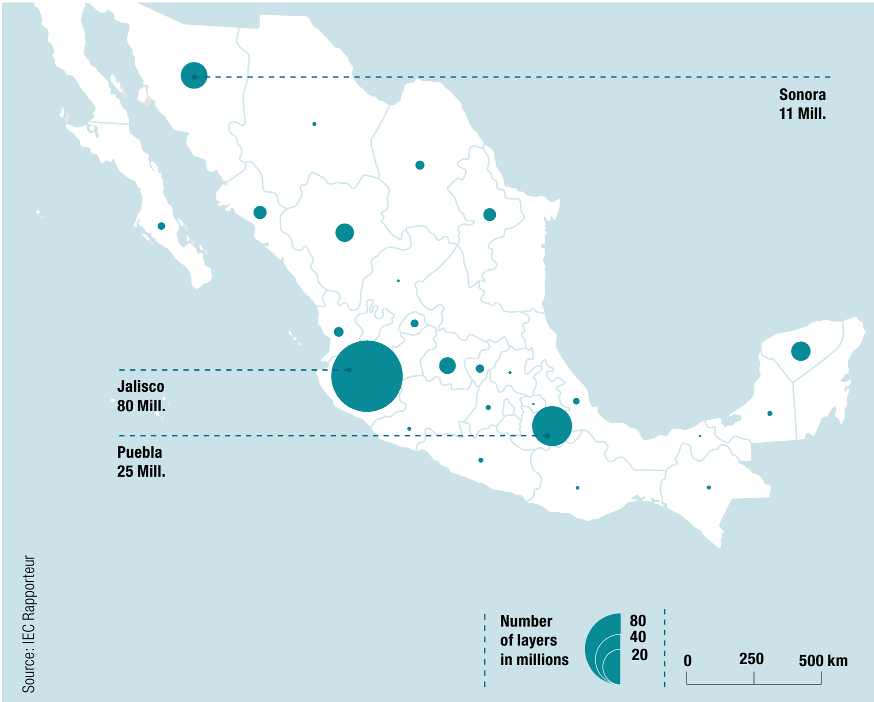
Challenges

Main challenges for the domestic egg industry in Mexico, ranked in order of importance 1-7, 1 being most important

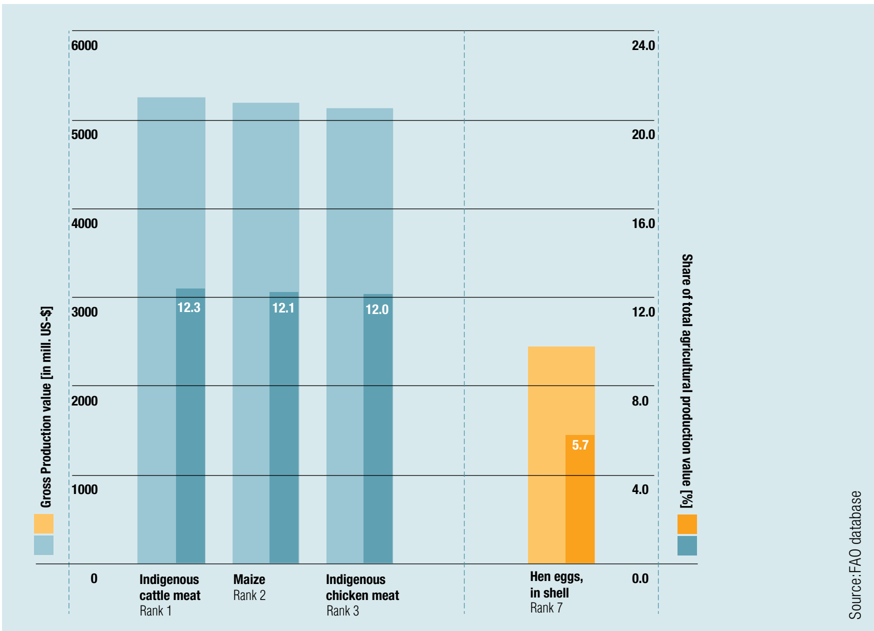
Animal welfare	7
Animal health	1
Environ. challenges	6
Rising feed costs	2
Qualified personnel	5
Trade barriers	4
Feed quality	3

Source: IEC Rapporteur Sergio Chavez, UNA-DEE

Laying hens by region (2011)



Agricultural commodities ranking (2010)

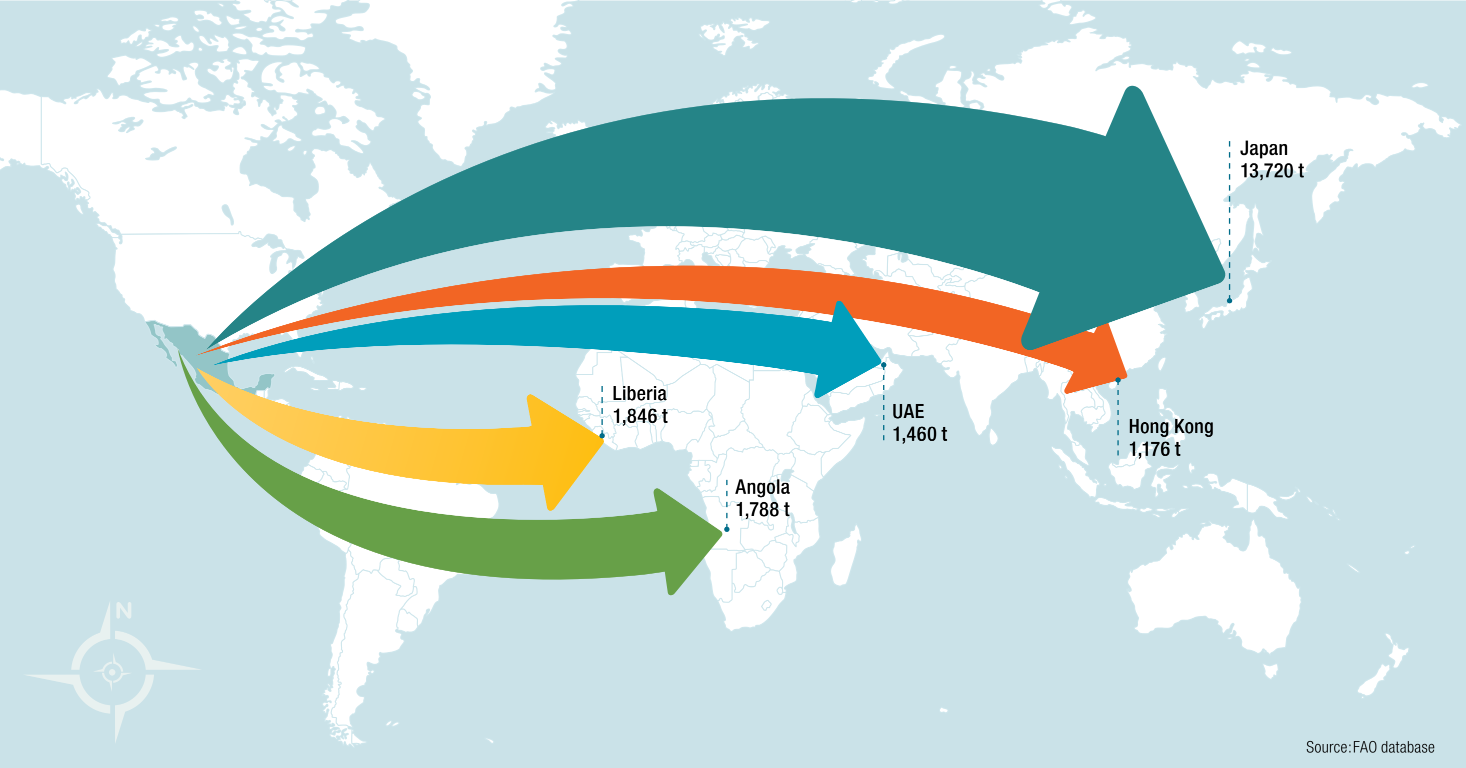


With 358 eggs, Mexico had the highest per capita consumption worldwide. This resulted in an egg demand of 2.5 mill t which was directly covered by domestic egg production. Therefore, the export volume of 19,990 t was relatively low. With 69%, the major share of the Mexican export volume was distributed to Japan. Shell egg imports amounted to 11,406 t and originated from the United States only.

Egg imports: principal countries (2010)

Source:FAO database

Egg exports: principal countries (2010)



Source:FAO database

RUSSIAN FEDERATION

According to FAO data, 2.3 mill. t of shell eggs were produced in the Russian Federation in 2011, i. e. 3.5% of the global production volume. Among the leading egg producing countries Russia ranked as number six.

The number of market-oriented layer farms is estimated at about 250. Of these 72 were located in the Volga District, 59 in the Central District and 37 in the Siberian District. The spatial pattern reflects the distribution of the population as well as the centres of feed production which are both located in the western part of Russia.

Of the 83.4 mill. layers which were counted in 2011, 23 mill. were held in the Volga District, 19 mill. in the Central District, 13 mill. in the Northwest District and 10 mill. in the Urals District. Despite quite large egg farms, the sectoral concentration in the Russian egg industry is rather low, for only 11.4% of the total production volume was concentrated in the leading five companies. The value of shell egg production in 2010 reached 3.1 billion US-$ or 4.4% of the total value of all agricultural commodities, ranking eighth.

The per capita consumption in 2011 was 260 eggs. This resulted in a shell egg demand of 36.9 billion pieces or 2.3 million tonnes.

The Russian egg industry is confronted with similar challenges as in European countries, but the recruitment of qualified personnel and the supply of high-quality feed are special problems for this country.

General data (2011)

Production data

Number of commercial layer farms	252
Number of laying hens (in millions)	83.4
Feed consumption per laying hen to produce one egg (in grams)	130-150
Average laying rate per hen and year	291
Production shell eggs (metric tonnes)	2,283,600
Consumption eggs total (eggs+egg products/year)	260
Average egg weight (in grams)	63
Total population (in millions)	142

Main egg producers

Seniavinskaya	63,000 t
Borowskaya	54,000 t
Sverdlowskaya	52,200 t
Roskar	50,700 t
Chelybinskaya	41,400 t
Sum top 5	261,300 t
Contribution of top 5 companies to overall production	11.4%

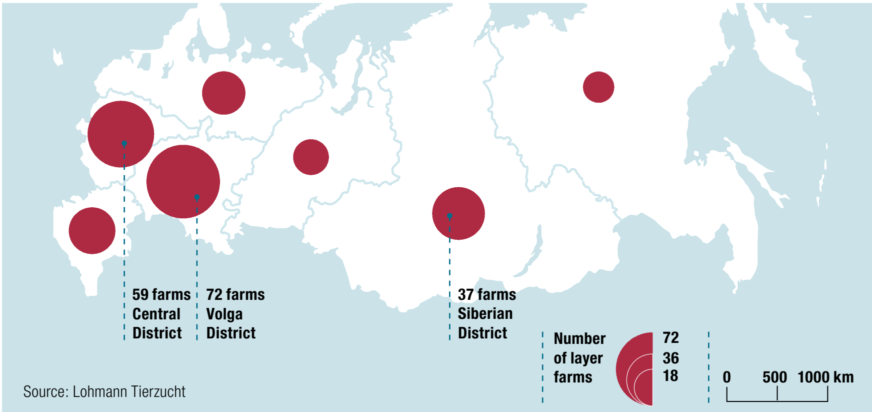
Challenges

Main challenges for the domestic egg industry in Russia, ranked in order of importance 1-7, 1 being most important

Animal welfare 7	Animal health 2	Environ. challenges 5	Rising feed costs 1
Qualified personnel 3	Trade barriers 6	Feed quality 4	

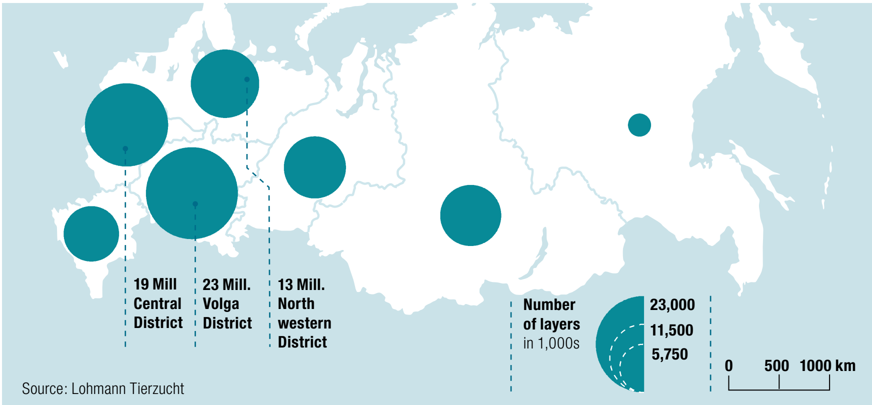
Source: Lohmann Tierzucht

Layer farms by region (2011)



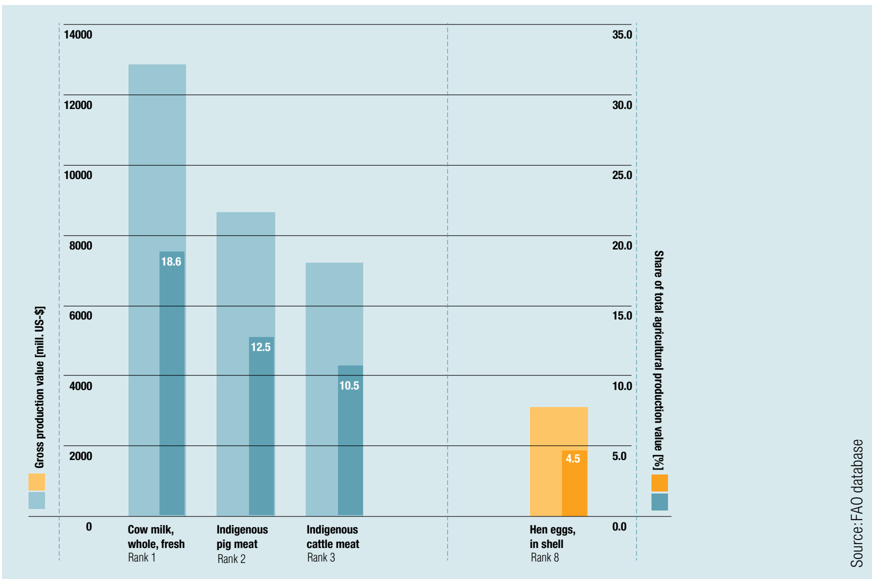
Source: Lohmann Tierzucht

Laying hens by region (2011)



Source: Lohmann Tierzucht

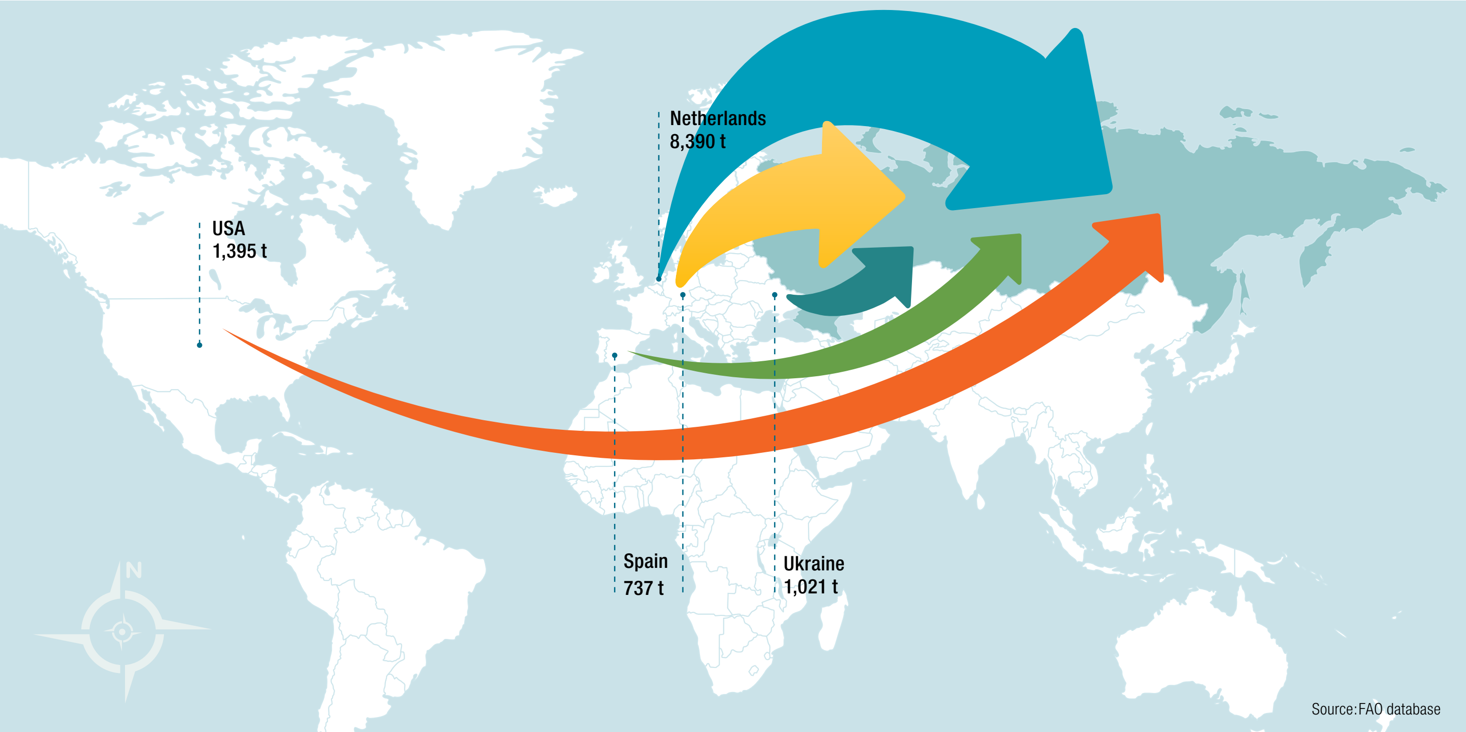
Agricultural commodities ranking (2010)



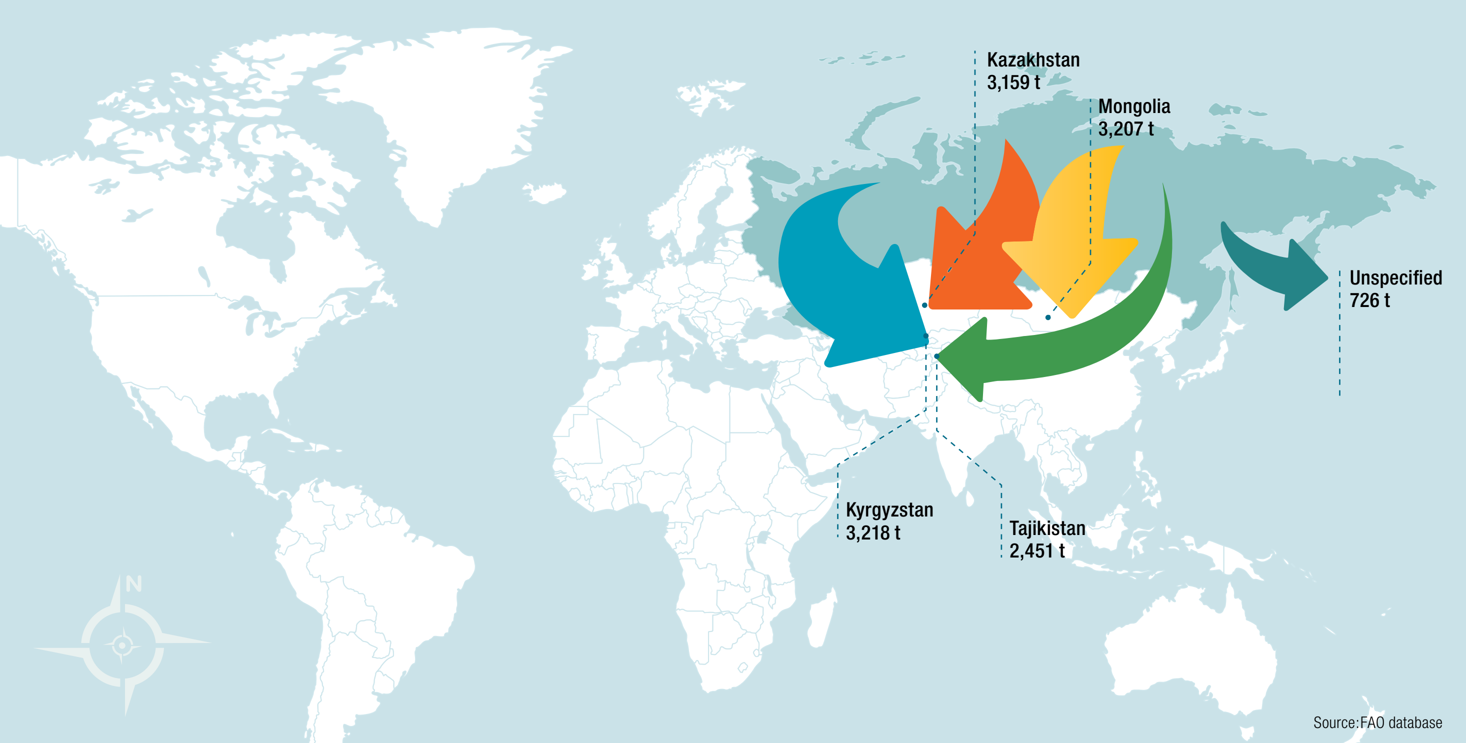
Source: FAO database

The trade volume of shell eggs was comparatively low in relation to the production volume. In 2010, about 12,890 t of shell eggs were exported and 16,740 t imported. The main countries that Russia imported shell eggs from were the Netherlands, Germany, the United States, Ukraine and Spain. The major destinations for shell egg exports were Kyrgyzstan, Mongolia, Kazakhstan and Tajikistan. Whereas, the exports were mostly destined to Central Asian countries, imports came from European countries and the USA.

Egg imports: principal countries (2010)



Egg exports: principal countries (2010)



SOUTH AFRICA

South Africa ranked as number 26 among the egg producing countries with a production volume of 467,100 t. According to official data from the South African Poultry Association, 26.3 million layers were held in 333 commercial egg farms. As can be seen from the two maps, egg farms and layer flocks were more or less evenly distributed with the exception of the Northern Cape Province. The spatial pattern reflects the distribution of the population.

The value of agricultural production reached a volume of 19.3 billion US-$ in 2010. To this, egg production contributed 574 million US-$ or 4.6 %, which resulted in its ranking at number 7 amongst the agricultural commodities.

The top three challenges for egg farmers in South Africa are rising feed costs, animal health and the recruitment of qualified personnel, followed by environmental problems in rank four and feed quality. Labour unrests are a crucial challenge for South Africa and expressed by strikes for higher wages in a struggling economy.

General data (2012)

Production data

Number of commercial layer farms	333
Number of laying hens (in millions)	26.3
Feed consumption per laying hen to produce one egg (in grams)	144.7
Average laying rate per hen and year	303
Production shell eggs (metric tonnes)	467,100
Consumption eggs total (eggs+egg products/year)	153
Average egg weight (in grams)	58.1
Total population (in millions)	52.4

Main egg producers

Sum top 5 producers	156,270 t
Contribution of top 5 companies to overall production	36.2%

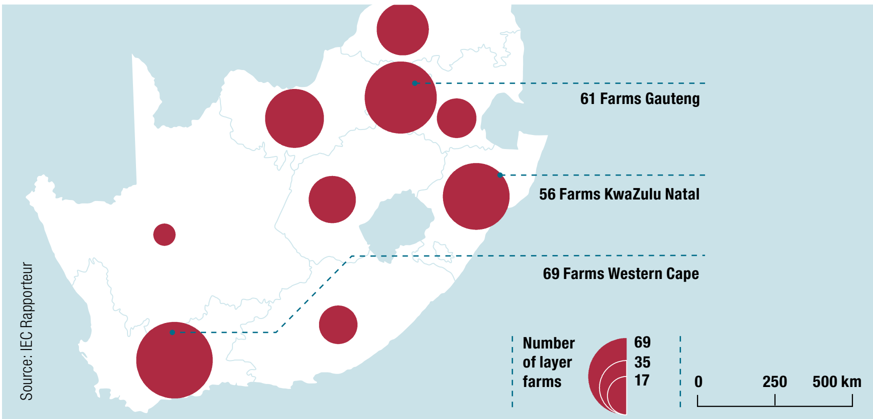
Challenges

Main challenges for the domestic egg industry in South Africa, ranked in order of importance 1-7, 1 being most important

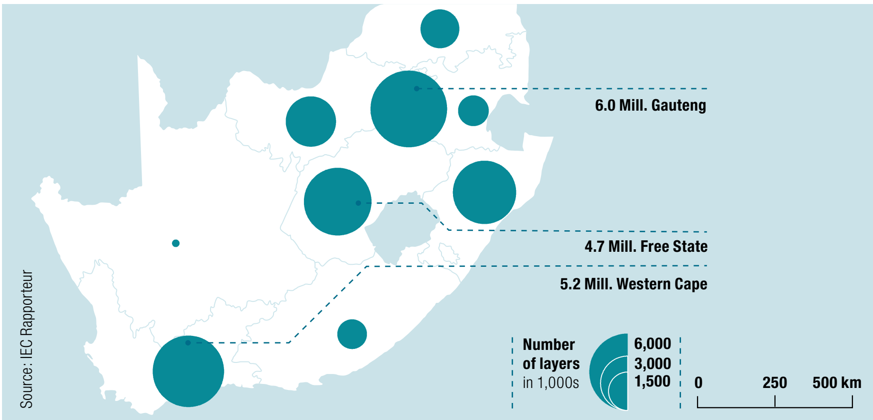
Animal welfare	6
Animal health	2
Environ. challenges	4
Rising feed costs	1
Qualified personnel	3
Trade barriers	7
Labour unrest	5

Source: IEC Rapporteur Magda Prinsloo, South African Poultry Association

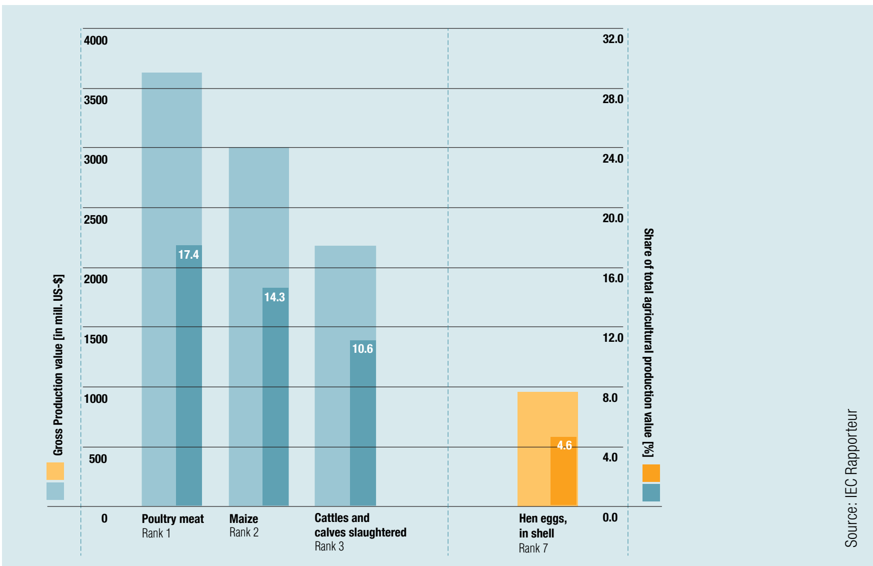
Layer farms by region (2012)



Laying hens by region (2012)

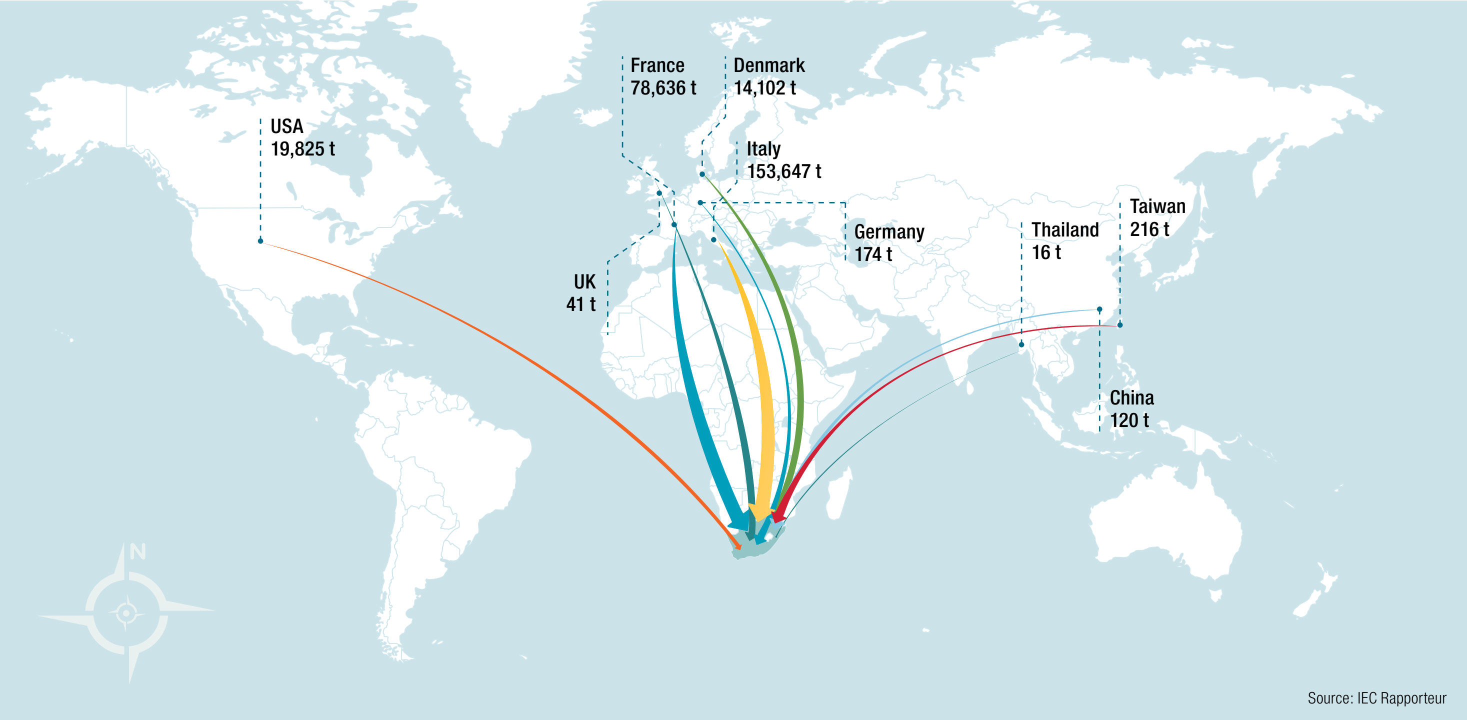


Agricultural commodities ranking (2012)



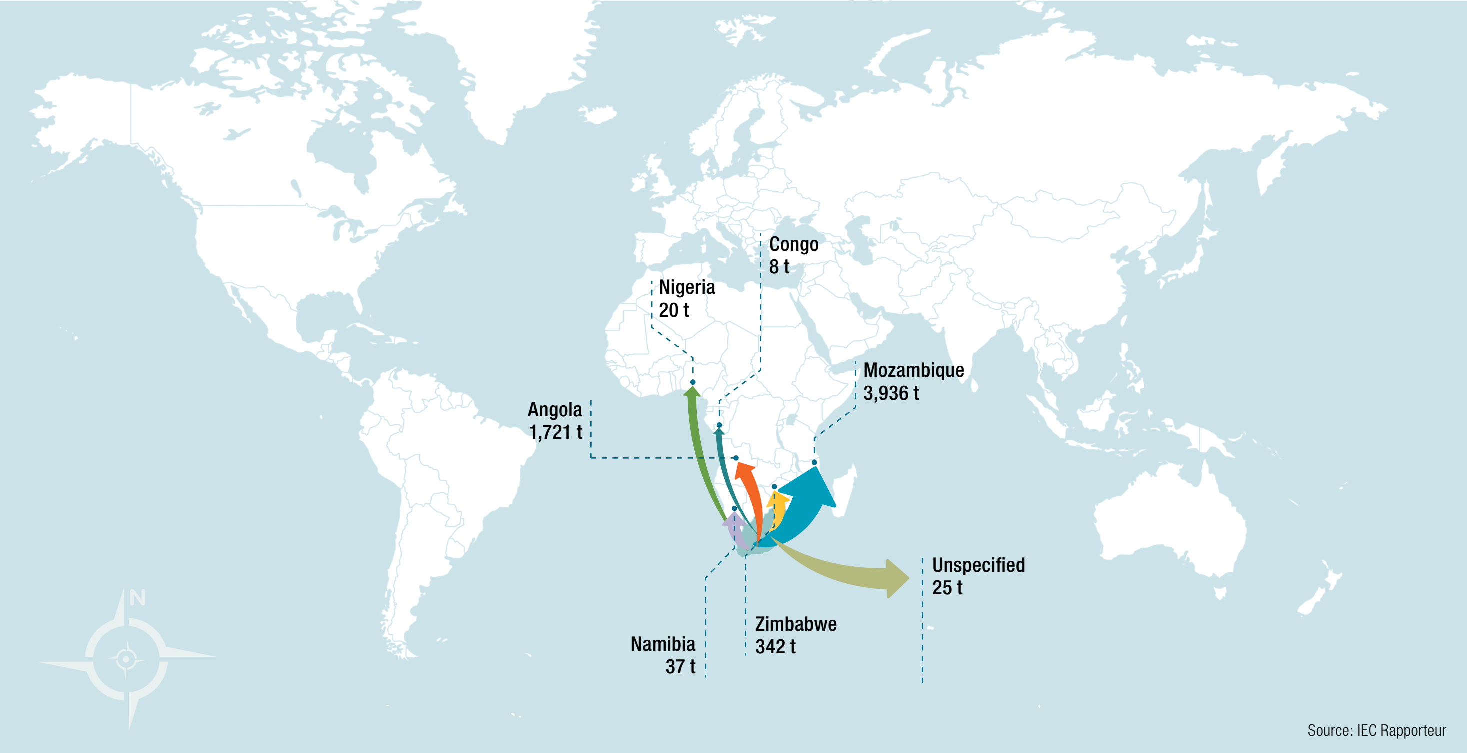
With a per capita consumption of 153 eggs, including egg products, the domestic demand reached a volume of 8.0 billion pieces or 465,580 t in 2012. South Africa exported and imported shell eggs to a small extent. The countries of origin of the egg imports were EU member countries, the USA and Thailand; all export destinations were located in Southern and Eastern Africa.

Egg imports: principal countries (2012)



Source: IEC Rapporteur

Egg exports: principal countries (2012)



Source: IEC Rapporteur

THAILAND

In 2011, Thailand produced 10.7 billion shell eggs in 1,948 commercial farms which held 39.5 mill. layers. With a production volume of 585,500 t, it ranked as number 22 among the leading egg producing countries. The regional as well as the sectoral concentration is quite high as can be seen from the two maps. However, the spatial patterns differ considerably. Whereas most of the egg farms are located in the provinces Chiang Mai, Khon Kaen and Chiang Rai, the layers are concentrated in the provinces adjacent to Bangkok, Chon Buri and Chachoengsao.

The five leading egg producing companies held 15.3 mill. layers or 34.5% of the total layer flock of Thailand. They produced 261,000 t or 44.6% of the overall Thai shell egg production volume in 2011.

The value of agricultural production reached a volume of 47.1 billion US-$ in 2010. To this, egg production contributed 892 million US-$ or 1.9%, which resulted in it ranking at number 11 amongst the agricultural commodities.

The main challenges for the egg farmers in Thailand are rising feed costs, sustaining animal health and trade barriers.

General data (2011)

Production data

Number of commercial layer farms	1,952
Number of laying hens (in millions)	41.5
Feed consumption per laying hen to produce one egg (in grams)	146
Average laying rate per hen and year	290
Production shell eggs (metric tonnes)	585,500
Consumption eggs total (eggs+egg products/year)	144.1
Average egg weight (in grams)	59
Total population (in millions)	69.5

Main egg producers

CP	109,620 t
Laemthong	45,675 t
Betagro	36,540 t
Saeng thong	36,540 t
Fah sai	32,886 t
Sum Top 5	261,261 t
Contribution of top 5 companies to overall production	44.6%

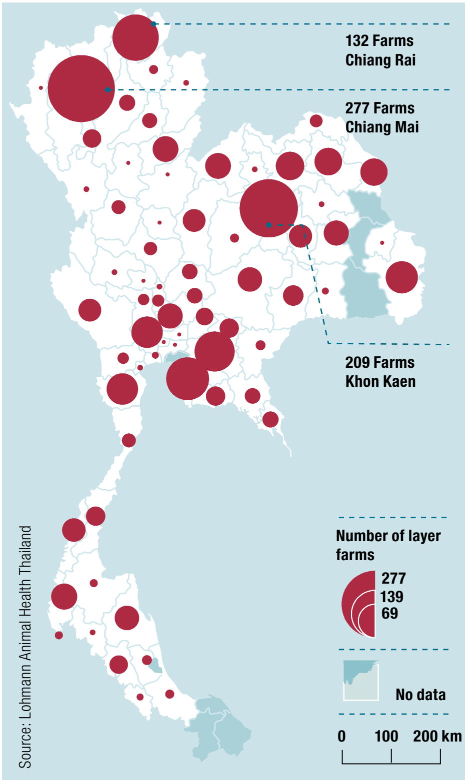
Challenges

Main challenges for the domestic egg industry in Thailand, ranked in order of importance 1-7, 1 being most important

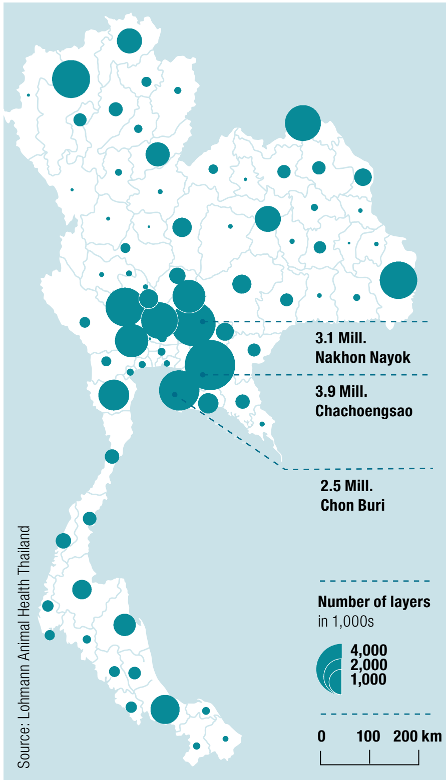
Animal welfare	4
Animal health	2
Environ. challenges	6
Rising feed costs	1
Qualified personnel	5
Trade barriers	3
Feed quality	7

Source: Lohmann Animal Health Thailand

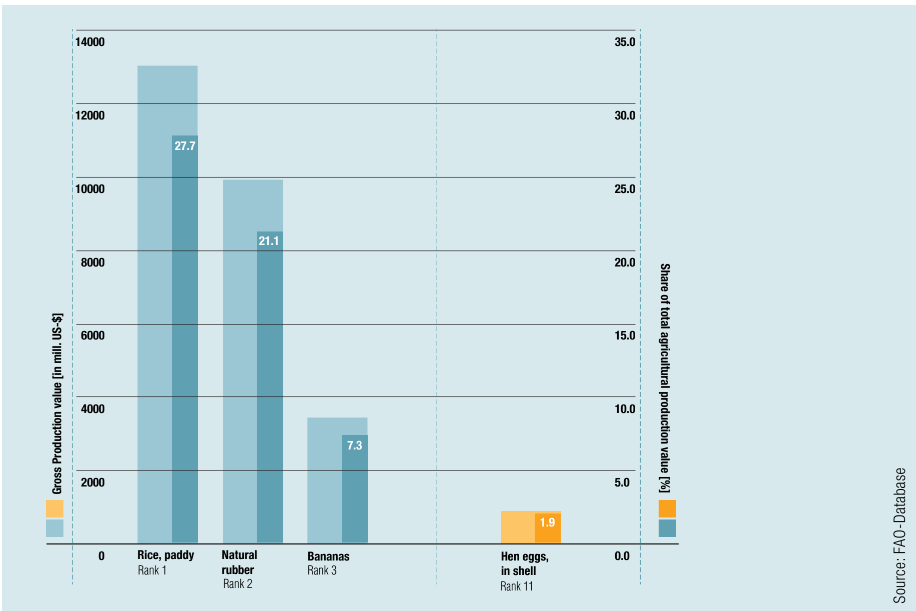
Layer farms by region (2011)



Laying hens by region (2011)

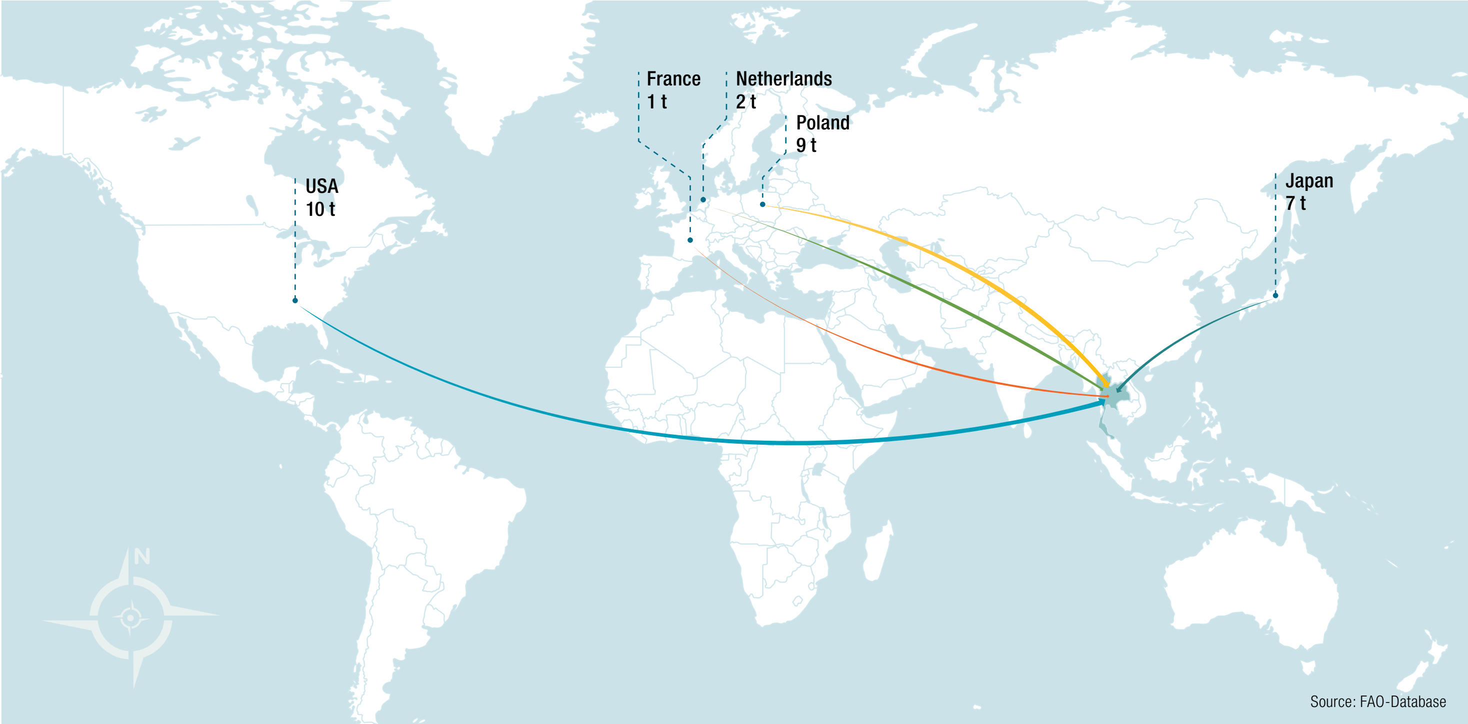


Agricultural commodities ranking (2010)

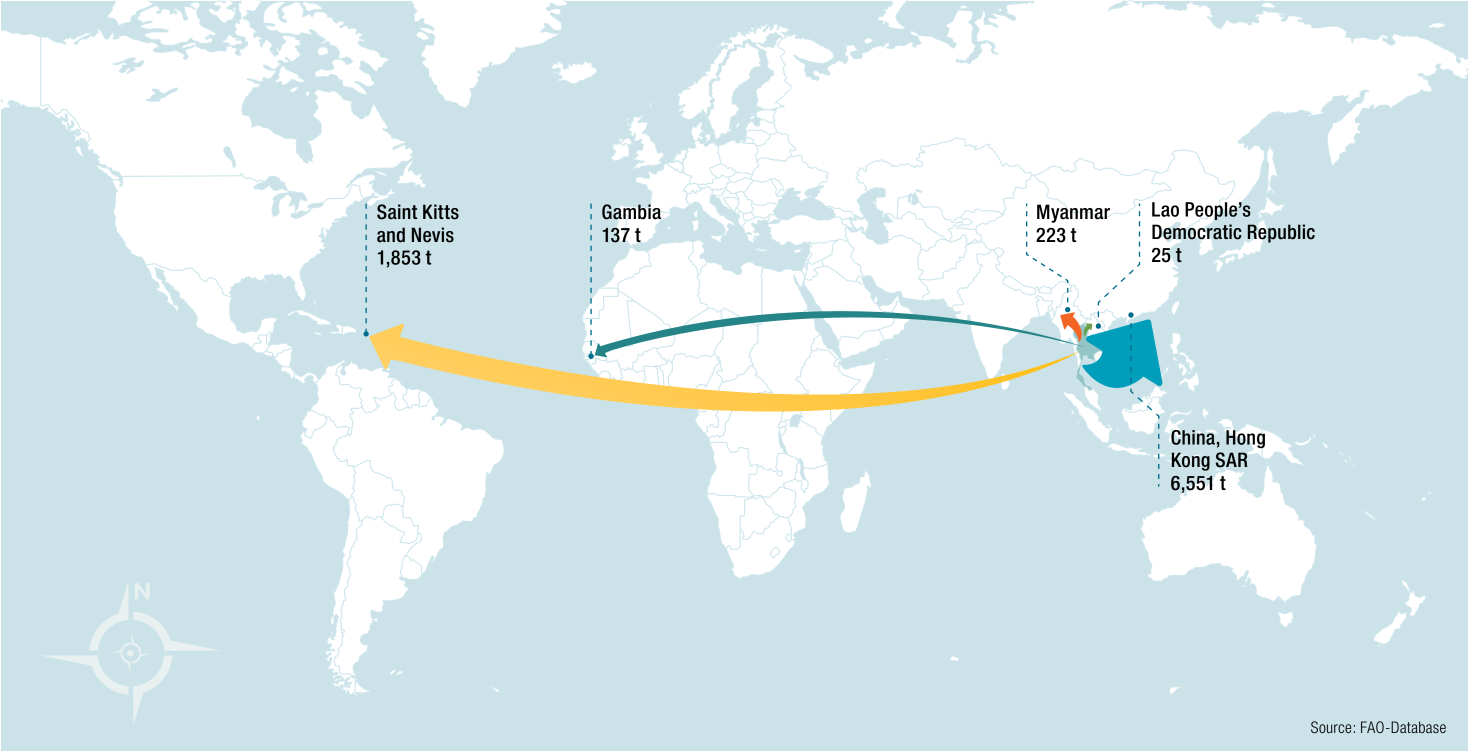


With a per capita consumption of 144 eggs per year, the domestic demand reached a volume of 10.1 billion pieces or 591,000 t in 2011. Despite the calculated deficit, Thailand exported about 8,800 t of shell eggs, of which 74% were destined for Hong Kong.

Egg imports: principal countries (2010)



Egg exports: principal countries (2010)



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