Current State and Future Prospects of the Egg Sector – an International Outlook

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Summary

The aim of this study is to present and analyse the global and EU egg sector, its main trends and main factors of influence. The study used industry analysis as a market assessment tool. The data and information needed were provided by secondary sources: sectoral reports, articles, and international databases. Data processing was performed using descriptive statistics and time series analysis. Egg production and consumption have developed dynamically over the last 10 years both globally and in the European Union. This trend is projected to continue over the next decade. Self-sufficiency in the EU-28 is between 102% and 104%, which poses a serious challenge to the EU egg sector, especially considering that, due to the related EU regulations, the unit cost of eggs and egg products and their selling prices are relatively higher in the EU than in competing countries. Table egg production in the EU is highly concentrated regionally and it is projected to further increase. The proportion of different housing technologies within the EU has changed significantly over the last decade. In 2019, more than half of the hen population was already kept in non-cage housing, and the proportion of these systems is expected to increase in the future. Recently, the egg industry has been facing a challenge, as several international retail chains are planning to cease the sale of cage-based eggs by 2025 and the implementation of such measures causes market disruptions similar to the 2012 technology change.

Key words

production, consumption, trade, housing technology, competitiveness, trends

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Introduction

Although the effects of global processes are not always immediate, they always spill over into the food economy of the European Union and that of individual member states, often with a small delay. For this reason, it is of paramount importance to review these global trends and the associated challenges. The current environmental, social and economic processes in the world and their related projections show our century characterised by a growing resource crisis in moral / ethical, physical, biological and ecological terms (MRD, 2012). Key issues include arable land and water resources, the ecosystem, proper employment opportunities and conditions, food security and the expected effects of climate change. The main factors behind the current changes include, among others, transforming demand (e.g., growing demand for animal products, significantly increasing demand for safe, healthy food globally); the growing social sensitivity to our environment; increasing ethical concerns about animal welfare, and more severe animal health problems (or even human health risks), which could significantly reorganise international markets and affect the structure of production areas; growing rural unemployment and accelerated emigration; the increasing importance of integrated vertical product paths; concentration and liberalisation of international food trade and the acceleration of climate change, which makes environmental problems more severe and agricultural policy reforms inevitable (MRD, 2012; EC, 2019d).

The poultry sector (meat and eggs) will play a key role in providing the Earth's population with sufficient food in a way that also takes sustainability considerations into account (Horn, 2014; Vaarst et al., 2015; Mottet and Tempio, 2017). Eggs play an important role in human nutrition and are part of a balanced diet, even in economically advanced countries with a high quality of life. Eggs are low in fat and especially rich in vitamins (A, D, E, B_1, B_2, B_3, B_5, B_6, B_9, B_{12}), minerals (Fe, Zn, Cu, Mg, I, Se, Ca, P, K) and contain 18 different amino acids, despite being one of the cheapest sources of animal protein. Because of these properties, eggs are associated with factors such as "the most perfect thing in the universe" or "food miracle" (Ruxton et al., 2010; Pllana et al., 2015; Griffin, 2016; Szőllősi et al., 2017).

Material and Methods

The aim of this paper is to present and evaluate the international (global and EU) situation and main trends of egg production, consumption and trade, as well as the main factors of influence. The study used industry analysis as a market assessment tool. The data and information needed to prepare the study were provided by secondary sources: sectoral reports, articles, and international databases (Food and Agriculture Organization of the United Nations, European Commission DG Agriculture and Rural Development, European Egg Processors Association). Data collection covered the production, consumption, trade and housing technology data in the hen egg sector, in addition to cost and price tendencies over the last 10-15 years, as well as future forecasts. Data processing was performed using descriptive statistics and time series analysis.

Results and Discussion

Production and Consumption

World hen egg production has increased by about 60% over the past two decades, from 46.4 million tonnes to 76.8 million tonnes, which is a 3% average yearly increase in production. The largest quantity of shell eggs is produced in China, where production volume increased from 23.3 million tonnes to 27.0 million tonnes between 2008 and 2018, bringing the Asian country to 35% of global production in 2018. China is followed by the USA (8.4%) and India (6.8%). The latter was able to increase its production significantly over the last decade, from 3.0 to 5.2 million tonnes. The share of production in the three highest producing countries in global production exceeds 50%, while the total production in the ten highest producing countries is close to 70% (Table 1) (FAO, 2020).

In parallel with production, the yearly egg consumption per person also increased, exceeding 9 kilograms in 2013 and approaching 10 kilograms in 2017. However, there is a significant difference in consumption between countries. In 2017, most eggs were consumed in Japan (19.6 kg capita^{-1} year^{-1}). In contrast, annual per capita egg consumption in the US was 21% lower (FAO, 2020).

The eggs produced by the EU-28 countries accounted for 9.3% of global production in 2018. It should be emphasised that the EU is the only region in the world where the use of traditional cage systems has been banned. As a result of the withdrawal and banning of traditional cages in the EU until 2012, hen and egg production decreased during this period (2010-2012), because not all (especially southern European) Member States were able to meet the new standards on time. However, in the following year, the EU faced overproduction. In the following years, the sector has stabilised, and egg production has since exceeded previous levels and the level of consumption. Table egg production in the EU-28 countries grew from 6.7 million tonnes in 2008 to 7.1 million tonnes in 2019, which is a 5.4% increase. In addition, hatching egg production in 2019 amounted to about 662 thousand tonnes. The volume of table eggs produced in the EU-28 countries is projected to increase by 8.6% over the next decade. Nearly 78% of current production comes from the EU-15, where growth has been around 11% over the past decade, but growth in these countries will slow. In contrast, in the EU-13, where there has been a decline in production in recent years, production could increase by just over 16%, and potentially exceed 1.7 million tonnes by 2030 (Table 2) (EC, 2019a). However, in addition to the long-term forecasts of EC (2019a), the COVID-19 pandemic impacts on the sector and on egg consumption in short term. In the opinion of the author, the egg market is expected to decline in 2020, then a quick recovery and continuing growth is forecast.

EU-28 egg consumption has increased by 4% over the last 11 years and a further increase of 8% is projected by 2030. The rate of growth in consumption in the EU-15 is in line with the EU trend. However, changes in the EU-13 are smaller, i.e., consumption has grown by 3.2% in the last decade, while an increase of 4.7% is forecast until 2030 (Table 2) (EC, 2019a). There are significant differences between EU Member States in terms of egg consumption. In 2017, most eggs were consumed in Denmark (15.79 kg capita^{-1} year^{-1}) and Luxembourg (15.58 kg capita^{-1} year^{-1}),

i.e. about twice as many as in Poland (6.77 kg capita^{-1} year^{-1}) and Croatia (8.06 kg/capita/year). Hungary (13.61 kg/capita/year) is in the middle rank with its consumption around the EU average. The yearly egg consumption of most EU Member States reaches or exceeds the world average (FAO, 2020).

Looking at the EU-28 egg trade, while the volume of imported eggs decreased from 24 thousand tonnes to 19 thousand tonnes between 2008 and 2019 (-21%), the volume of exports increased by 60% to 248 thousand tonnes. In the next 11 years, the volume of both exports and imports may increase significantly, and while exports may exceed 300 thousand tonnes, the volume of imports may reach the 11-year-old level again (Table 2) (EC, 2019a).

Table 1. Global hen egg production (2008-2018) (1000 tonnes)

Denomination	2008	2013	2018	Change (%)		
				2008-2013	2013-2018	2008-2018
China	23 292	24 787	26 956	6.42	8.75	15.73
USA	5 344	5 778	6 466	8.12	11.91	21.00
India	3 047	3 835	5 237	25.87	36.55	71.87
Mexico	2 337	2 516	2 872	7.65	14.14	22.88
Brasil	1 845	2 172	2 666	17.72	22.75	44.50
Japan	2 554	2 522	2 628	-1.24	4.19	2.91
Russian Federation	2 119	2 284	2 486	7.79	8.88	17.36
Indonesia	1 123	1 224	1 644	9.01	34.38	46.48
Turkey	824	1 031	963	25.06	-6.64	16.75
Ukraine	855	1 121	922	31.13	-17.75	7.85
World	61 729	68 685	76 770	11.27	11.77	24.37

Source: FAO (2020)

Table 2. Production, consumption and trade of table eggs in the EU-28

Denomination	2008	2013	2019	2025	2030	Change (%)	
						2008-2019	2019-2030
Production (1000 tonnes)	6 704	6 509	7 065	7 418	7 674	5.4	8.6
EU-15	4 982	5 121	5 546	5 773	5 907	11.3	6.5
EU-N13	1 722	1 388	1 520	1 645	1 766	-11.7	16.3
Consumption (1000 tonnes)	6 573	6 329	6 836	7 153	7 380	4.0	8.0
EU-15	5 320	5 090	5 543	5 821	6 025	4.2	8.7
EU-N13	1 253	1 239	1 294	1 332	1 355	3.2	4.7
Consumption (kg/capita/year)	13.1	12.5	13.3	13.9	14.3	1.4	7.7
EU-15	13.5	12.7	13.5	14.1	14.5	0.3	7.5
EU-N13	11.8	11.8	12.5	13.0	13.5	5.7	8.2
Import (1000 tonnes)	24	21	19	22	24	-20.9	26.4
Export (1000 tonnes)	155	201	248	286	318	59.7	28.4

Source: EC (2019a)

Self-sufficiency in the EU-28 has ranged between 102-104% in recent years. It is a very serious challenge for the EU's egg sector that if surplus production cannot be exported to non-EU markets as shell eggs or egg products, persistently low egg prices are expected to develop, which is a fundamental rule of economy. To eliminate this phenomenon, it is recommended to increase the added value of eggs and egg products.

Of the EU-28 Member States, France is considered to be the largest producer, accounting for 13% of EU-28 table egg production in 2019 and is projected to increase by 4% in 2020. Germany is ranked second with a share of 12% in 2019, followed by Spain with an 11.8% share, which showed a 5% increase in production from 2018 to 2019, but forecasts for this year show no change. Other Member States important from the production aspect include Italy (10.7%), the United Kingdom (10.0%) (not a member of the European Union as of 31 January 2020), the Netherlands (8.8%) and Poland (7.9%). Of these countries, the production in Poland is expected to grow the most in 2020 (2.3%), while Italy's production is expected to increase by 1.3%. As a result, it can be concluded that table egg production in the EU is highly regionally concentrated, with the seven highest-producing Member States accounting for almost three quarters of the total EU-28 production. According to the related forecasts, the current process of concentration will continue, as the largest increase in production is expected in these Member States (Table 3) (EC, 2020a).

Great differences are shown in the self-sufficiency of the individual member states. The self-sufficiency of the Netherlands was exceptionally high, i.e., around 280% in 2017. Poland also has a very significant (170-180%) surplus production. This figure is around 110-120% for Portugal and Spain and around 100% for France and Italy. The self-sufficiency of the other member states does not reach 100% (Beck, 2019).

Housing Technology

The proportion of housing technologies used within the EU has changed significantly over the last decade. This tendency can be explained on the one hand by the ban on conventional cage housing in 2012, and on the other hand by changes in consumer expectations and pressure from retail store chains. As a result of the latter, the proportion of enriched (EU-conform) cage technology is steadily declining (Table 4). In 2019, less than half (47.8%) of hens in the EU were kept in enriched cages, almost a third (29.3%) were kept in alternative housing (multi-level aviary, single-level barn), and the rest (22.9%) were kept in free-range and organic housing systems. At the same time, the proportion of housing technologies used varies considerably among Member States (Figure 1). Enriched cage technology is used in the majority (over 75%) of Member States, including Poland, Spain, Portugal, Slovakia, Latvia, Lithuania, Estonia, Greece and Malta. In contrast, non-cage housing is the standard housing technology in Germany (94.0%), the Netherlands (85.9%), Sweden (91.6%), Austria (99.8%), Denmark (87.0%) and Luxembourg (100%) (EC, 2020c).

Examining the size of the hen population and the technology used in each Member State (EC, 2020c), it should be noted that the number of hens kept in enriched cage housing is the highest in Spain, France, Poland and Italy. In 2019, 59% of the total amount of eggs produced in caged housing in the EU originated from these four countries. Alternative housing technology is used in Germany, the Netherlands and Italy to the highest extent. In 2019, these three countries produced 57% of the total number of eggs originating from all alternative technologies in the EU. Following the United Kingdom, France and Germany are the most dominant in free range egg production. In 2019, the production of these three countries accounted for 68% of the total egg production from free range housing in the EU. As regards organic housing, the most notable countries are Germany and France, whose production from organic housing accounts for 49% of the EU's production using this technology.

It is important to note that the recent period has brought new challenges to the European Union's egg sector. Tesco has repeatedly announced in previous years that it will completely stop marketing caged eggs in Central Europe and switch to alternative, free-range and organic products by 2025, referring to consumer demand, sustainability, and animal welfare considerations. Other international retail chains have also joined this initiative. In parallel, in September 2018, the European Commission registered a European Citizens' Initiative called "End the Cage Age", which aims to eradicate caged housing completely. The collection of signatures in support of the initiative was successfully completed in September 2019 and is expected to be submitted to the European Commission in September 2020, which will thus have to formally intervene. This initiative can potentially have a significant impact on the situation of egg sectors in countries where enriched caged technology is widespread. In the opinion of the author, which meets the results of Molnár and Szőllősi (2020), non-caged production is not the best solution for a sustainable egg supply, but at the same time, social pressure is too big, which will fundamentally determine the future.

Demand for "happy animals" has also emerged in Spain, which has the largest population of caged hens in production, through supermarket chains (Lidl, Mercadona, El Corte Inglés, Aldi, Carrefour, Eroski) and, due to the immense pressure, it is planned that only non-caged eggs will be taken over and caged eggs will be shipped to processors and to non-EU countries (mainly North African countries) by 2025. This shift has hit the Spanish egg sector hard, and producers are urged to switch to non-caged systems as soon as possible. Barn housing is a solution for larger producers, while free-range housing could be a proper alternative for medium-sized farms. In this context, alternative systems are gaining ground in production, while cage technology is still very significant. Small and medium-sized producers are affected the most, as larger ones are much more capital-intensive and perform technology transfer more easily. The result is a 5% increase in hen population and production in 2019. Eggs are most exported to other EU countries, but trade to third countries is also gaining ground.

In recent years, there has been a growing interest in alternative housing in Poland, which is also a dominant producer, mainly using enriched cage technology (Sokołowicz et al., 2018). Even in France, which has the second largest enriched caged laying hen population, the proportion of the enriched cage system is steadily declining, while the share of alternative technologies is increasing. Although production in enriched cage housing is also high in Italy, most of the produced eggs is taken up by the processing industry.

Table 3. Production of eggs for consumption in the EU-28 (2018-2020) (tonnes, %)

	Quantity (tonnes)			Change (%)	
	2018	2019	2020e	2019/2018	2020e/2019
FR	888 600	924 000	960 000	4.0	3.9
DE	832 000	851 000	860 000	2.3	1.1
ES	793 000	833 000	833 000	5.0	0.0
IT	770 000	760 000	770 000	-1.3	1.3
UK	679 530	710 790	696 570	4.6	-2.0
NL	625 000	625 000	625 000	0.0	0.0
PL	535 000	557 000	570 000	4.1	2.3
RO	340 000	350 000	350 000	2.9	0.0
BE	153 200	145 000	157 500	-5.4	8.6
CZ	151 200	150 000	150 000	-0.8	0.0
SE	148 000	149 000	149 000	0.7	0.0
HU	131 300	130 500	131 000	-0.6	0.4
PT	119 740	120 000	121 000	0.2	0.8
AT	114 000	114 500	114 500	0.4	0.0
EL	100 000	100 000	100 000	0.0	0.0
BG	88 000	88 000	88 000	0.0	0.0
DK	77 000	78 000	79 000	1.3	1.3
FI	76 100	76 000	78 000	-0.1	2.6
IE	73 200	75 000	76 000	2.5	1.3
SK	63 900	63 900	63 900	0.0	0.0
LT	50 000	50 000	50 000	0.0	0.0
LV	41 100	41 100	41 100	0.0	0.0
HR	39 000	41 000	41 000	5.1	0.0
SI	21 500	22 000	22 000	2.3	0.0
CY	8 910	9 920	9 950	11.3	0.3
EE	9 200	9 200	9 200	0.0	0.0
MT	6 900	6 900	6 900	0.0	0.0
EU	6 935 380	7 080 810	7 152 620	2.1	1.0

Note: expert forecast for 2020

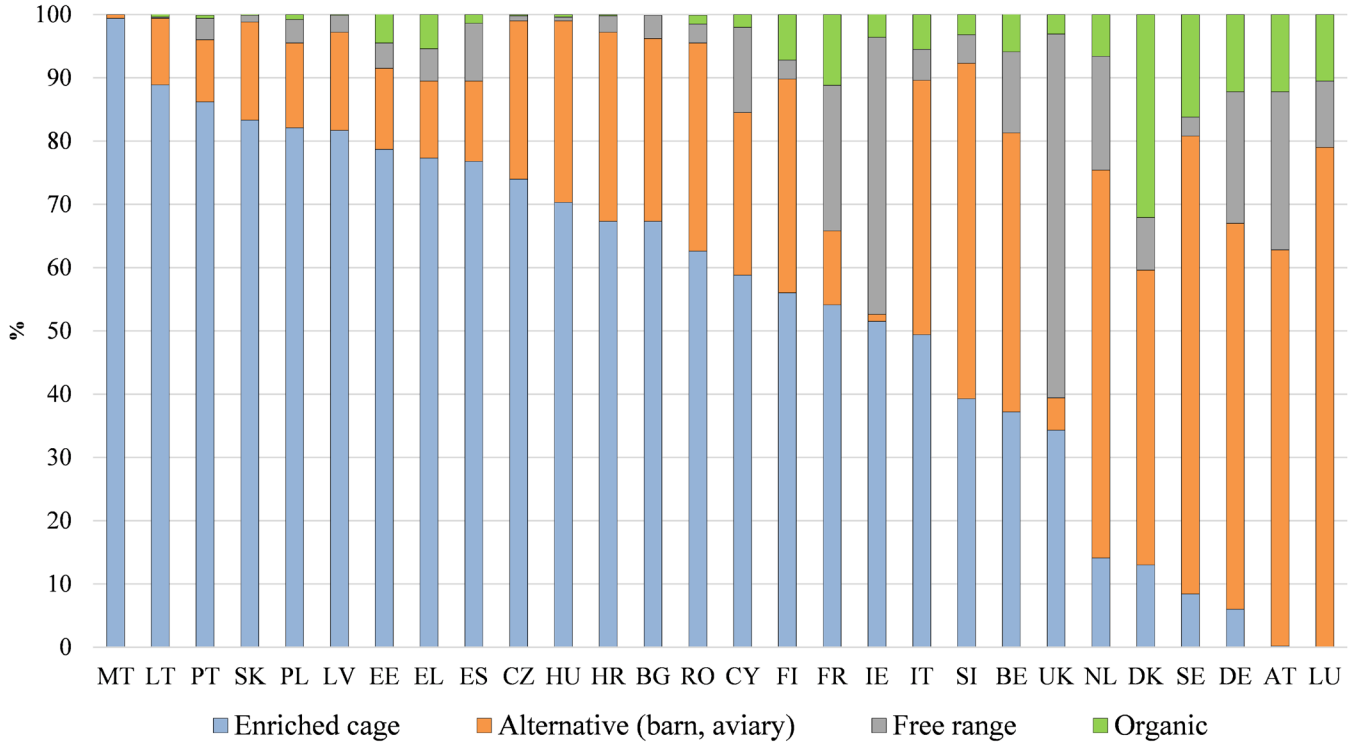
Source: EC (2020a)

Table 4. Changes in the share of different housing systems for laying hens in the EU-28 (2011-2019) (%)

Housing technology	2011	2015	2016	2017	2018	2019
Enriched cage	*66.1	56.0	55.9	53.2	50.4	47.8
Alternative (barn, aviary)	19.8	26.2	25.6	26.5	27.8	29.3
Free range	11.3	13.6	13.9	15.3	16.3	17.0
Organic	2.8	4.2	4.5	5.1	5.4	5.9

Note: *Conventional and enriched together

Source: Aliczki (2012); EEPA (2017); McDougal (2017); EC (2018); EC (2019b); EC (2020c)



Source: EC (2020c)

Figure 1. The share of housing systems for laying hens in the EU-28 (2019) (%)

The role of alternative technology is therefore expected to continue to increase in the future. At the same time, referring to prof. Hans-Wilhelm Windhorst, McDougal (2017) writes that there is a potential economic trap regarding the move towards cage-free technology by 2025, since it is a risky question whether consumers are willing to pay a higher price for eggs produced in cage-free technology. Furthermore, he notes that the construction of new large-scale cage-free systems is expected to slow in the coming years.

In a focus group survey in Missouri in the United States, the majority of participants stated that price is the most important factor when buying eggs. In this context, according to expert opinions, although the cage-free egg market in the US will also grow, it will never reach the majority market share (Kállay, 2019).

An increasing number of consumers are buying eggs from cage-free production in the belief that doing so their health, animals, and the planet will also benefit (Bejaei et al., 2011), even if this is not entirely true. One of the most important considerations for egg buyers when buying eggs is value for money, but more conscious consumers with deeper pockets are increasingly looking for eggs from non-caged egg production, mainly in western European countries. The egg market contains different market segments with different characteristics in each country, and even though the number of consumers buying eggs from non-cage systems is increasing, a significant proportion of consumers decide which eggs to buy mostly based on their price (Bejaei et al., 2015; Żakowska-Biemans and Tekień, 2017; Yeh et al., 2020).

Previous research (Damme, 2011; Bessei, 2011; Dekker et al., 2011; Stadig et al., 2016; van Horne, 2019; Sütő and Horn, 2019; Philippe et al., 2020) proved that, from cage housing to alternative technologies (barn, aviary, free range and organic), not only

production efficiency (stocking density, egg yield per hen, feed consumption, average cost) deteriorates, but there is also higher specific labour utilisation and forage area demand, as well as less favourable energy use and greenhouse gas emissions (carbon dioxide, ammonia, methane, nitrogen oxide). Moreover, animal health problems, and the resulting veterinary interventions, as well as the use of medicines are increasing in non-caged systems.

International Trade

Examining the international trade data on eggs (FAO, 2020), it can be seen that, due to the shorter transport distances resulting from product characteristics, only 3.5% of the eggs produced are traded internationally, most of which is concentrated in relatively small areas. About 85% of this amount is shell eggs, while 15% are egg products. Between 2007 and 2017, the volume of shell eggs exported worldwide increased by about 54%, to 2,179 thousand tonnes, while the volume of egg products increased by 58% to 431 thousand tonnes, a change in which European countries had a significant role. Trade growth will therefore outpace output expansion, which is expected to continue in the future. The largest volume (540 thousand tonnes) of eggs and egg products was exported by the Netherlands in 2017, which accounted for 21% of global exports. The second largest exporter was Turkey in 2017, which has significantly increased the volume of its exports of eggs and egg products from 47 thousand tonnes to 348 thousand tonnes in the last 10 years. Poland's exports of eggs and egg products also increased significantly, as it sold 97 thousand tonnes of eggs and egg products abroad in 2007, and 307 thousand tonnes in 2017. It should be noted that the share of intra-EU trade is significant among EU Member States, with the Netherlands playing a key role, followed by Germany, France and Spain. Apart from intra-EU trade, the EU-28 is the second largest exporter of eggs and egg products in the world (exporting 209 thousand tonnes in 2017), following Turkey. The US is the third biggest player, exporting 178 thousand tonnes in 2017. The strengthening of Ukraine's role as an exporter should also be emphasised, as the country exported only 92 thousand tonnes of eggs and egg products in 2017, but significantly increased its export volumes in 2018 and 2019.

Based on EC (2020d) data, Table 5 shows that the non-EU egg exports of the EU-27 countries (i.e., excluding UK) decreased by about 11% from 362 thousand tonnes in 2016-2017 to 321 thousand tonnes, followed by a 2% increase in 2018 to 326 thousand tonnes, which continued to increase by 4% in 2019.

Table 5. EU-27 exports of table eggs and egg products (2016-2020)

Denomination	2016		2017		2018		2019		2020 Q1		Compared to 2019 Q1
	tonnes	%	tonnes	%	tonnes	%	tonnes	%	tonnes	%	
United Kingdom	120 894	33.4	111 754	34.8	106 495	32.7	100 189	29.4	24 275	23.7	-38.6%
Japan	46 088	12.7	53 212	16.6	62 367	19.1	77 850	22.9	21 651	21.1	-10.3%
Switzerland	40 334	11.1	40 533	12.6	39 580	12.1	40 652	11.9	14 712	14.3	+1.9%
Israel	12 554	3.5	10 680	3.3	19 090	5.9	12 175	3.6	6 966	6.8	-5.1%
Thailand	5 729	1.6	9 875	3.1	10 722	3.3	10 567	3.1	3 560	3.5	-5.7%
Taiwan	6 482	1.8	7 339	2.3	7 685	2.4	6 892	2.0	2 754	2.7	+28.2%
Mauritania	4 096	1.1	1 856	0.6	4 886	1.5	7 674	2.3	2 552	2.5	-8.0%
South Korea	5 162	1.4	7 911	2.5	4 100	1.3	8 267	2.4	2 545	2.5	-1.6%
Turkey	2 971	0.8	4 313	1.3	3 566	1.1	5 085	1.5	1 969	1.9	-2.0%
Malaysia	3 295	0.9	2 226	0.7	3 000	0.9	4 595	1.4	1 713	1.7	+27.9%
Australia	2 180	0.6	2 053	0.6	3 295	1.0	4 430	1.3	1 386	1.4	+0.0%
Others	112 236	31.0	68 963	21.5	60 996	18.7	61 845	18.2	18 509	18.0	+0.0%
EU total	362 023	100.0	320 714	100.0	325 782	100.0	340 221	100.0	102 592	100.0	-
% change	-	-	-11%	-	+2%	-	+4%	-	-18%	-	-
EU total without UK	241 129	-	208 960	-	219 287	-	240 032	-	78 317	-	-
% change	-	-	-13%	-	+5%	-	+10%	-	-	-	-

Note: not include hatching eggs

Source: EC (2020d)

However, in the first quarter of 2020, there was an 18% decline compared to the same period of the previous year. In addition to the United Kingdom, the main markets for the EU-27 countries were Japan and Switzerland. While quantities exported to the UK are on a declining trend, a significant expansion is experienced on the Japanese market. Israel, Thailand, Taiwan, and North Korea account for 10-11% of total exports. The volume of eggs and egg products exported to these countries shows an increase, which can be attributed to the outbreak of bird flu in the US in 2014, resulting in a market reorganisation in this region. Mostly dried eggs without shells are exported to third countries. In addition, smaller quantities of dried egg yolk and shelled frozen eggs were sold by EU Member States to the above-mentioned countries.

Imports of eggs and egg products in 2007 were dominated by Germany, France and the Netherlands, accounting for 21, 12 and 11% of global imports, respectively. By 2017, this tendency has changed, with Germany still in first place (490 thousand tonnes, 19%), followed by Iraq (327 thousand tonnes, 13%), which is more than a five-fold increase of the imported quantity in 10 years. The Netherlands was the third largest importer in 2017 with a 10% share (251 thousand tonnes). However, France decreased its imports by 51% (from 206 to 101 thousand tonnes) during the examined period. It should be noted that, similarly to exports, EU Member States account for a significant share of intra-EU trade. Apart from intra-EU trade, the volume of eggs and egg products imported from EU to third countries was only 22 thousand tonnes in 2017. As a result, China (169 thousand tonnes), Singapore (97 thousand tonnes), Mexico (63 thousand tonnes) and Canada (41 thousand tonnes) were among the largest importers in global trade in 2017 (FAO, 2020).

The imports of eggs and egg products in the EU-27 countries are less significant than exports. Between 2016 and 2019, imports from third countries increased by 56%, from 36 thousand tonnes to 56 thousand tonnes. 50-60% of this quantity originates from the UK. Egg powder accounts for a significant share of imports. In recent years, there has been a realignment between countries supplying the EU, with Ukraine (22% share in 2019) replacing the US (8% share in 2019), i.e. the former number one supplier (apart from the UK). Excluding the United Kingdom, half of the imports, i.e. 13-14 thousand tonnes, came from Ukraine in the last two years, which was almost four times the quantity delivered in 2015. In contrast, the amount of eggs from the US has only nearly doubled during the same period. In the case of Argentina, i.e. the other major supplier, this volume shows a more significant decrease (Table 6) (EC, 2020d).

In consequence, Ukraine is the biggest threat to the EU egg sector in terms of imports. Import pressure will also be increased by the trade agreement entered into with Ukraine. However, similarly to poultry meat imports, Ukraine uses "tricks" with regard to the imports of table eggs and egg products: by adding water and citric acid, the delivered product is not classified as egg products (i.e., egg juice) to be charged with duty, but duty-free semi-finished food (diluted egg products as food products). It is a positive change that the European Commission has started to address the issue at the request of the industry. It is in the EU's sectoral interest that eggs, or egg products can only come from Ukraine – or from other third countries – if they comply with EU animal welfare and other related standards. Unfortunately, this is not currently the case (Csorbai et al., 2019).

Table 6. EU-27 imports of table eggs and egg products (2016-2020)

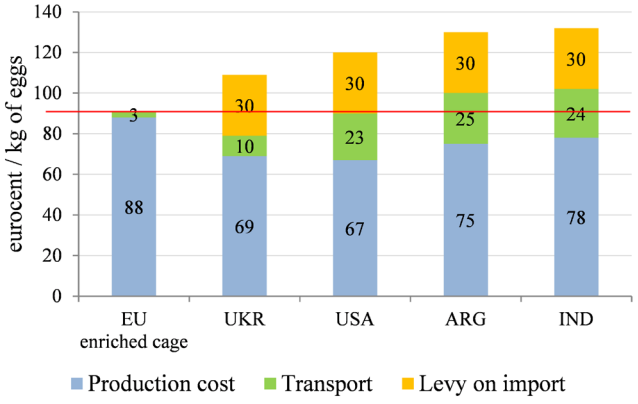
Denomination	2016		2017		2018		2019		2020 Q1		Compared to 2019 Q1
	tonnes	%	tonnes	%	tonnes	%	tonnes	%	tonnes	%	
United Kingdom	19 087	53.0	26 275	54.1	25 818	48.8	33 899	60.3	8 549	48.7	-22.7%
Ukraine	8 043	22.3	3 041	6.3	13 792	26.1	12 390	22.0	4 586	26.1	+36.6%
USA	2.856	7.9	10 918	22.5	5 656	10.7	4 462	7.9	2 271	12.9	+++
Argentina	1 864	5.2	2 921	6.0	1 938	3.7	1 365	2.4	736	4.2	+75.7%
Japan	26	0.1	193	0.4	668	1.3	52	0.1	383	2.2	+++
Albania	824	2.3	1 326	2.7	963	1.8	1 137	2.0	353	2.0	+67.0%
Others	3 333	9.3	3 858	7.9	4 034	7.6	2 921	5.2	662	3.8	-
EU total	36 033	100.0	48 530	100.0	52 870	100.0	56 226	100.0	17 540	100.0	-
% change	-	-	+35%	-	+9%	-	+6%	-	+3.3%	-	-
EU total without UK	16 946	-	22 255	-	27 052	-	22 327	-	-	-	-
% change	-	-	+31%	-	+22%	-	-17%	-	-	-	-

Note: not include hatching eggs

Source: EC (2020d)

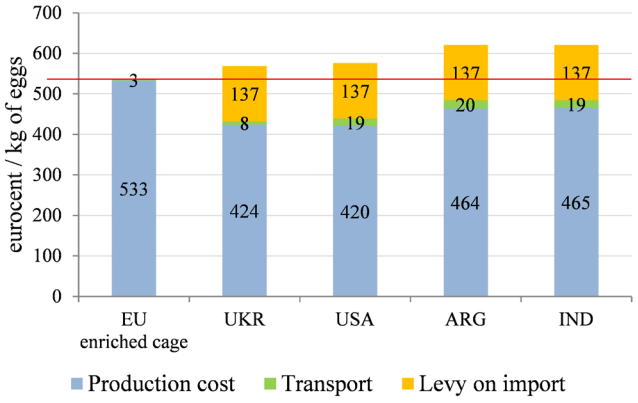
Competitiveness of the Egg Sector in the EU

Examining the EU's 102-104% self-sufficiency and the resulting export orientation, the competitiveness issues of the EU egg sector cannot be ignored. Current EU regulations (environmental, animal welfare, food safety) are associated with about 16% of production costs, which may increase further in the future. As a result, for both shell eggs and processed products (Figure 2-3), the unit cost in the EU exceeds the unit cost level in Ukraine, the USA, Argentina and India. In the US and Ukraine, egg unit costs were 24% and 22% lower in 2017, respectively, than the EU average (88 eurocents/kg). For Argentina and India, this value was 14% and 11% lower, respectively. In 2017, the production cost of whole egg powder was 22% lower in the US, 19% in Ukraine and 15% in both Argentina and India than in the EU (533 eurocents/kg). Although import levies protect EU producers from large imported quantities for the time being, exchange rate volatility and tariff reductions due to multilateral and bilateral agreements can be expected in the future, which will further weaken the competitive position of the EU egg sector, especially egg processors (van Horne, 2019).



Source: van Horne (2019)

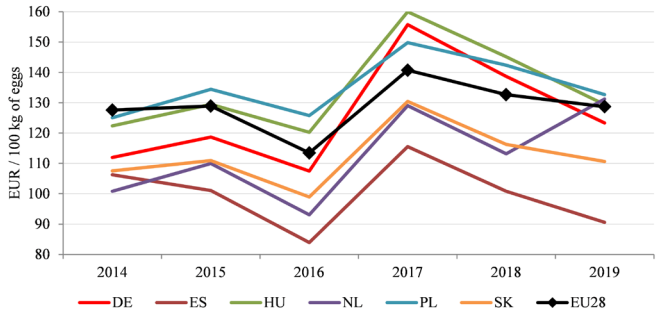
Figure 2. Costs of shell eggs in the EU and non-EU countries in 2017



Source: van Horne (2019)

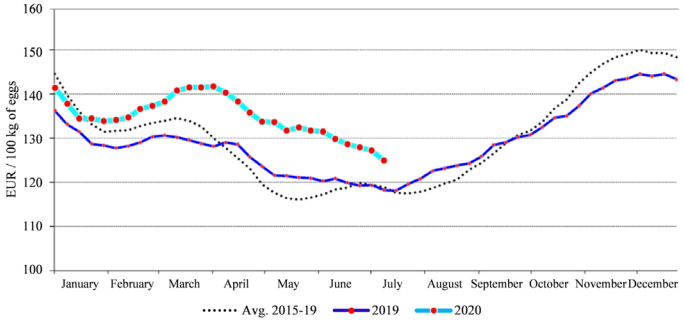
Figure 3. Costs of whole egg powder in the EU and non-EU countries in 2017

Egg sales prices are constantly shaped by the relationship between supply and demand, resulting in significantly fluctuating sales prices in the EU in recent years. Due to the short supply resulting from the mandatory replacement of cages in 2012, there was a significant price increase in 2011, but the overproduction in the following year resulted in a drastic decrease in prices. This tendency has led to a temporary slowdown in establishing new stocks in some countries, i.e. the market and egg prices have stabilised again. The 2014 bird flu in the US encouraged European producers to overproduce, resulting in the re-emergence of a supply market in 2015, the effects of which were manifested in a sharp fall in prices in early 2016. Subsequently, the deficit resulting from the 2017 bird flu outbreaks and the fipronil scandal had led to higher sales prices, before eventually decreasing to their previous levels by 2019 (Figure 4). Prices in 2019 essentially followed the average development of prices within a year between 2015-2019, which is characterised by a 10-12% lower egg price in the summer period (May to September) than during other periods of the year (Figure 5).



Source: EC (2020b)

Figure 4. The yearly average selling price of table eggs in packing station in the EU and some Member States



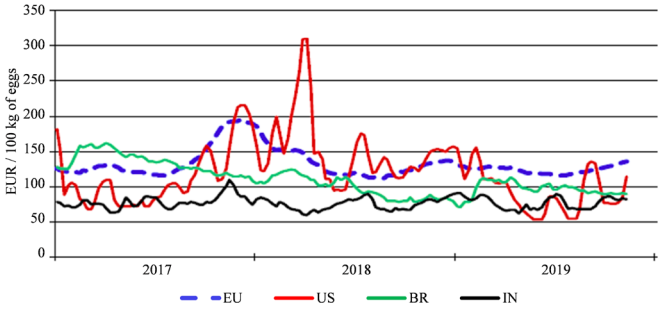
Source: EC (2020d)

Note: based on Member State notifications (Commission Implementing Regulation (EU) 2017/1185)

Figure 5. The weekly average selling price of table eggs in packing stations in the EU, excluding the United Kingdom (EUR 100 kg^{-1})

Significant differences can be found in sales prices between EU member states. Prices are highest in Sweden, Denmark and Austria, while they are lowest in Spain and the Czech Republic. In addition to the yearly average price of the EU, Figure 4 shows the development of the yearly average sales prices of some member states, including Hungary, between 2014 and 2019, which also illustrates the development of the market conditions described above. The relatively high Hungarian prices are favourable for Hungarian producers, but it poses a problem from the aspect of competitiveness.

Comparing the average prices in the EU between 2017 and 2019 with the prices of the USA, Brazil and India (Figure 6), it can be stated that the price of eggs in the EU is relatively high, which is not favourable for exports to non-EU countries. At the same time, the 102-104% self-sufficiency presented above is an export constraint for the sector, as persistently low prices would develop on the EU market if surplus production was not exported.



Source: EC (2019c)

Notes:
EU = weighted average of Member State prices – average class L&M
US = weekly USDA prices – eggs grade A, Chicago
BR = average of prices in main producing states – (noticiasagricolas.com.br)
IN = average of NECC (National Egg Coordination Committee) prices in available Production Centres – (e2necc.com)

Figure 6. Sales prices of table eggs in the EU, USA, Brazil (BR) and India (IN) between 2017-2019 (EUR 100 kg^{-1})

Conclusion

This paper reviewed and evaluated the global and EU situation and main trends in the egg sector and factors of influence. The poultry sector, and, more specifically, egg production, will play a key role in providing the world's population with sufficient food while also taking sustainability into account. Global egg production, as well as consumption, has developed dynamically over the last 10 years. Forecasts show that this increasing trend will continue during the next decade. Egg production in the European Union also increased over the last decade, albeit to a lesser extent than the global trend, and is projected to increase by a further 8-9% by 2030. A similar increase in consumption can already be observed and it is projected to continue. The self-sufficiency of the EU-28 is between 102-104%, and the resulting export orientation is a very serious challenge for the EU egg sector, especially considering that the unit cost of eggs and egg products and the sales price of eggs are relatively high in the EU due to EU regulations, in comparison with competing countries. Following Turkey, the EU-28 is currently the second largest exporter of eggs and egg products globally, and the volume exported is expected to increase by almost 30% over the next decade. Although imports have a smaller significance, their volume is also showing an increasing trend, and the increase in Ukrainian imports in recent years poses a significant threat to the sector. Table egg production in the EU is highly regionally concentrated, and this concentration is projected to continue, with the largest increase in production expected in the most significant member states in terms of egg production. The proportion of housing technologies used within the EU has changed significantly over the last decade. In 2019, more than half of the hen population was already housed in cage-free technologies, the proportion of which is expected to further increase. The latest challenge for industry players is that several international retail chains are planning to phase out caged eggs by 2025, the implementation of which could cause market disruptions similar to the 2012 technology change.

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