

## STUDY ON THE PRODUCTION AND MARKETING OF POTATOES IN THE EUROPEAN UNION

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### ABSTRACT

An important plant for human nutrition, the potato is grown in all the countries of the European Union. Although it is considered a cold seasonal crop, it can be cultivated in many regions, on different soil types, because the planting period varies depending on the variety, the area and the destination of the crop. It can also be adapted to warmer regions if a uniform amount of water is ensured during the growing season. Classification of potatoes is based on color, vegetation period, quality and usage. The most common species is the white potato, *Solanum tuberosum*.

The paper presents data on the production and marketing of potatoes for human consumption in the European Union. The reference period is from 2010 to 2018. In this study, the following indicators were analyzed: potatoes-cultivated areas, total production and average production, potatoes sale prices, the main potatoes importers and exporters worldwide. The surfaces of organic potato farms, as well as the obtained productions are also mentioned. As a result of the analysis, we can see that the areas cultivated with potatoes at European Union level, the total production and the average production have decreased in this period. The main growers in 2018 were Poland, Germany and France, and the main producers were Germany, France and Poland. Denmark had the highest value for average production in the same year. In Germany, the largest area occupied by organic potato-growing farms was registered in 2017, and the largest organic production was obtained in The Netherlands. The Netherlands, France and Germany were the world's leading potatoes exporters in 2018, and Belgium, the Netherlands and Spain were the main importers.

The processed information was retrieved from specialized sites, among which we mention: Eurostat and ITC.

**Keywords:** potatoes growers, potatoes producers, potatoes sale prices, potatoes trade.

### INTRODUCTION

Worldwide, the total potato production was estimated at 388,191,000 tons in 2017 (FAOSTAT, 2019).

Beginning with the early 1990s, there has been a dramatic increase in the potato production and demand in Asia, Africa and Latin America, in comparison with the period until 1990s when most potatoes were grown and consumed in Europe, North America and countries of the former Soviet Union.

The biggest potato producer is now China and almost a third of all potatoes is harvested in here and in India (PotatoPro.com, 2019).

Potatoes rank fourth in the world's top food crops (after rice, wheat and maize), as a volume of production (Soare, 2018).

The maize production obtained is greater than that of potatoes, but most of it is intended for the consumption of animals and from a considerable amount, biofuels are produced. Consequently, after wheat and white rice, potato is the third food crop for human consumption (Delleman, 2019).

Potato is called an almost complete food, because it has a high content of carbohydrates, vitamins, microelements and essential amino acids. It is considered a diet of high digestibility (Soare, 2015). These qualities have led to an increase in the potato consumption in industrialized countries.

The importance of potatoes was established by the following characteristics: it represents a basic element in the daily diet of people, the consumption being estimated at

about 90 kg/inhabitant; potatoes are also used in animal feed ratios; they have the advantage that they can be kept for a long time in the cold season, they are not perishable; occupies among the first places in terms of caloric energy consumption; have high energy potential (Constantin et al., 2009).

Potatoes are used in the food sector, in the industry, in the production of fodder. It represents a source of export and profit. The export includes early potatoes, potatoes kept in optimal conditions for an additional time, food products resulting from the industrial processing of potatoes (Pânzaru et al., 2009).

Romania is one of the few European countries where potato production increased from 2.8 million tons in 1961, to 3.2 million tons in 2010 and to approximately 3.4 million tons in 2018 (Alecui et al., 2015).

The purpose of the study was to analyze the situation of the potatoes trade in the European Union in the recent years.

## MATERIAL AND METHODS

The data used in this article was found on Eurostat, ITC and other internationally specialized sites. Various materials, such as sites, papers and books were consulted. The methods used in the study were the

documentation, the comparison, the percentage method. The main tendencies in the production and commercialization of potatoes in Romania were highlighted with the help of important indicators, such as: potatoes-cultivated areas, total production and average production, potatoes sale prices, the main potatoes importers and exporters worldwide, the surfaces of organic potato farms and the obtained productions. The main indicators analyzed in this paper were studied in their dynamics between 2010-2018. The results presented in the paper were shown in tables, interpreted and illustrated graphically.

## RESULTS AND DISCUSSION

Even during the World War II, European farmers who had arable land turned to producing cheaper food. Considered the “second bread” in many European countries, the potato has benefited from the results of cooperation between research, education and production. All this has led to an increase in potato yield and a decrease in cost prices (Delleman, 2019).

The following presents the current situation of surfaces and potato production in the EU and the trade of potatoes worldwide.

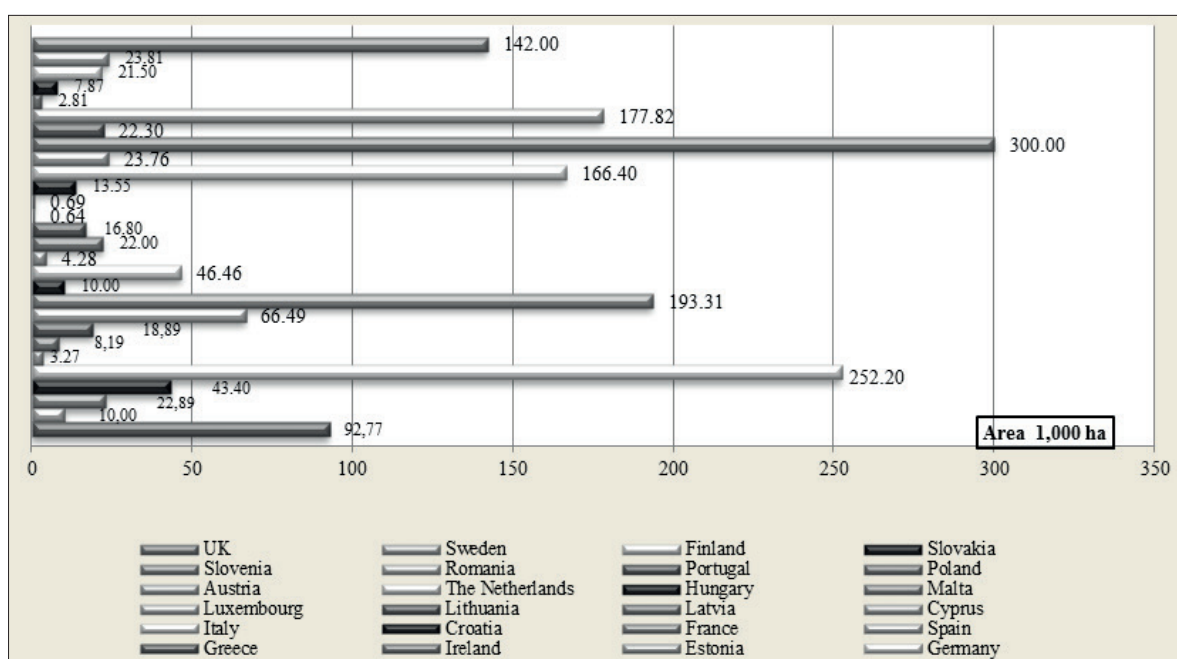


Figure 1. Potato cultivated areas in 2018, in the EU (1,000 ha)  
(Source: Eurostat, 2019)

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Figure 1 shows the areas cultivated with potatoes in the EU, in 2018. According to Eurostat, 2019, the highest area was registered in Poland - 300.00 thousand ha, followed by Germany - 252.20 thousand ha, France - 193.31 thousand ha, Romania - 177.82 thousand ha and UK with 142.00 thousand ha. On the last place is Malta, with 0.64 thousand ha. We must take into account, in this case, that this country is the smallest in the EU, having only 315.4 thousand km<sup>2</sup> (EU in figures, 2019).

Table 1 shows the evolution of the potato cultivated areas, by comparing the data

collected in 2010 and 2018. As noted, these areas were decreasing. Except for France, which registered an increase of 23.07%, Denmark 13.02%, Cyprus 0.47%, Luxembourg 3.23%, the Netherlands 6.01%, Austria 8.15% and the UK, with 2.90%, in the other states there is a decreasing tendency. Thus, the main potato-growing state in the EU, Poland, registered a decrease of 22.74%.

According to PotatoPro, 2019, with the production obtained in 2017 (11,720,000 tons), Germany ranked 6<sup>th</sup> in the world top of potato producers.

*Table 1.* Potato surfaces in the main potatoes cultivating states of the EU

Specification	2010 (1,000 ha)	2018 (1,000 ha)	2018/2010 (%)
Poland	388.30	300.00	77.26
Germany	254.37	252.20	99.15
France	157.08	193.31	123.07
Romania	247.19	177.82	71.94
U.K.	138.00	142.00	102.90
Bulgaria	13.80	10.00	72.46
Czech Republic	27.08	22.89	84.53
Denmark	38.40	43.40	113.02
Estonia	6.10	3.27	53.61
Ireland	12.20	8.19	67.13
Greece	21.01	18.89	89.91
Spain	77.42	66.49	85.88
Cyprus	4.26	4.28	100.47
Croatia	10.95	10.00	91.32
Italy	62.40	46.46	74.46
Lithuania	36.20	16.80	46.41
Luxembourg	0.62	0.64	103.23
Hungary	20.79	13.55	65.18
The Netherlands	156.97	166.40	106.01
Austria	21.97	23.76	108.15
Portugal	25.53	22.30	87.35
Slovenia	4.13	2.81	68.04
Slovakia	10.99	7.87	71.61
Finland	25.20	21.50	85.32
Sweden	27.20	23.81	87.54
Malta	0.71	0.64	90.14

Source: Eurostat, 2019, own calculation

The first places were occupied, in order, by: China - 99,205,600 tons, India - 48,605,000 tons and Russian Federation - 29,590,000 tons.

Figure 2 provides data on the potatoes production, in 2018, in the EU Production varies, the largest quantity obtained was

in Germany - 8,920.8 thousand tons, and the smallest in Malta - 8.39 thousand tons. Other major potato producers were France - 7,862.52 thousand tons, Poland - 7,400.00 thousand tons, the Netherlands - 5,782.60 thousand tons and the UK, with 4,969.00 thousand tons.

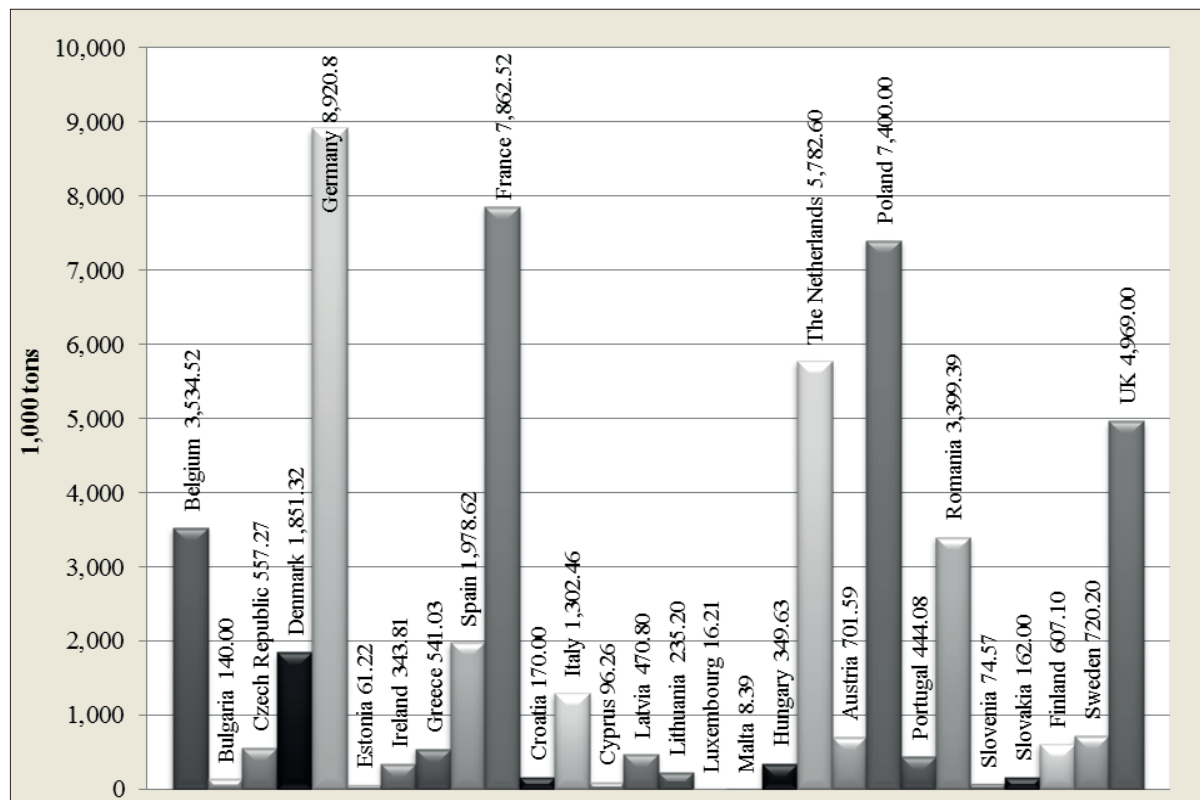


Figure 2. Production of potatoes in the E.U., in 2018 (1,000 tons)  
(Source: Eurostat, 2019)

The production of potatoes decreased in 2018 compared to 2010 (Table 2). With the exception of France, which registered an increase of 18.73%, Belgium, 2.28%, Denmark, 36.35%, Cyprus, 17.39%, Austria, 4.45%, Portugal, 15.69%, Romania, 3.52%

and Slovakia, 28.65%, in the other producing states of the EU the production obtained was lower: for Germany with 12.05%, Poland - 9.62%, the Netherlands - 15.50%, UK - 17.81% and Malta - 46.01%.

Table 2. Potato production in the main producing states of the EU

Specification	2010 (1,000 ha)	2018 (1,000 ha)	2018/2010 (%)
Belgium	3,455.80	3,534.52	102.28
Bulgaria	251.20	140.00	55.73
Czech Republic	665.18	557.27	83.78
Denmark	1,357.80	1,851.32	136.35
Germany	10,143.09	8,920.80	87.95
Estonia	110.20	61.22	55.55
Ireland	419.61	343.81	81.94
Greece	758.94	541.03	71.29
Spain	2,297.60	1,978.62	86.12
France	6,622.04	7,862.52	118.73
Croatia	178.61	170.00	95.18
Italy	1,558.03	1,302.46	83.60
Cyprus	82.00	96.26	117.39
Lithuania	471.10	235.20	49.93
Luxembourg	19.53	16.21	83.00
Hungary	488.41	349.63	71.59

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Malta	15.54	8.39	53.99
The Netherlands	6,843.53	5,782.60	84.50
Austria	671.72	701.59	104.45
Poland	8,187.70	7,400.00	90.38
Portugal	383.84	444.08	115.69
Romania	3,283.87	3,399.39	103.52
Slovenia	101.21	74.57	73.68
Slovakia	125.92	162.00	128.65
Finland	659.10	607.10	92.11
Sweden	816.30	720.20	53.99
UK	6,046.00	4,969.00	82.19

Source: Eurostat, 2019, own calculation

From the data available on Eurostat and presented in Table 3, it is observed that Denmark had the highest average production

per hectare (43.03 tons/ha). At the opposite pole is Estonia (11.76 tons/ha).

Table 3. Potatoes yields in EU (tons/ha)

Specification	2014	2015	2016	2017	2018	2018/2014 (%)
Belgium	54.00	46.58	38.16	47.57	38.10	70.56
Bulgaria	13.01	14.97	15.18	17.78	*	*
Czech Republic	29.07	22.26	29.88	29.42	*	*
Denmark	43.12	42.10	42.48	43.68	43.03	99.79
Germany	47.42	43.81	44.42	46.79	35.38	74.61
Estonia	19.66	21.12	16.97	18.32	11.76	59.82
Ireland	40.50	42.27	38.93	*	*	*
Greece	25.12	27.00	27.13	28.51	28.49	113.42
Spain	31.89	31.87	31.14	31.60	29.76	93.32
France	*	*	38.88	44.05	*	*
Croatia	15.60	17.00	19.70	*	*	*
Italy	2.62	27.55	*	*	*	*
Cyprus	23.92	20.26	24.36	25.07	22.49	94.02
Latvia	18.00	20.12	18.76	*	*	*
Lithuania	18.00	17.00	15.94	12.27	14.00	77.78
Luxembourg	31.24	22.75	30.45	34.23	25.84	82.71
Hungary	27.05	24.13	26.17	21.49	*	*
Malta	*	*	*	*	*	*
The Netherlands	45.00	42.69	42.88	46.00	*	*
Austria	35.10	26.34	36.16	28.42	29.53	84.13
Poland	23.60	21.04	28.51	27.88	22.30	94.49
Portugal	19.84	19.77	19.36	21.70	20.21	101.86
Romania	17.37	13.77	14.44	18.19	19.12	110.07
Slovenia	28.86	27.44	26.84	24.35	26.65	92.34
Slovakia	20.46	17.93	21.46	20.10	*	*
Finland	27.30	24.31	27.12	28.86	28.27	103.55
Sweden	34.57	34.73	35.58	34.70	30.25	87.50
UK	42.17	49.00	38.70	42.90	*	*

\*not available

(Source: Eurostat, 2019, own calculation)

Greece and Romania recorded the highest increase in average production per hectare, with 13.42%, respectively 10.07%. Finland and Portugal registered less significant increases, while the rest of the states

experienced significant decreases (for example, Estonia - 41.18%).

The situation of the potato cultivated areas, completely converted into organic farming is presented in Figure 3.

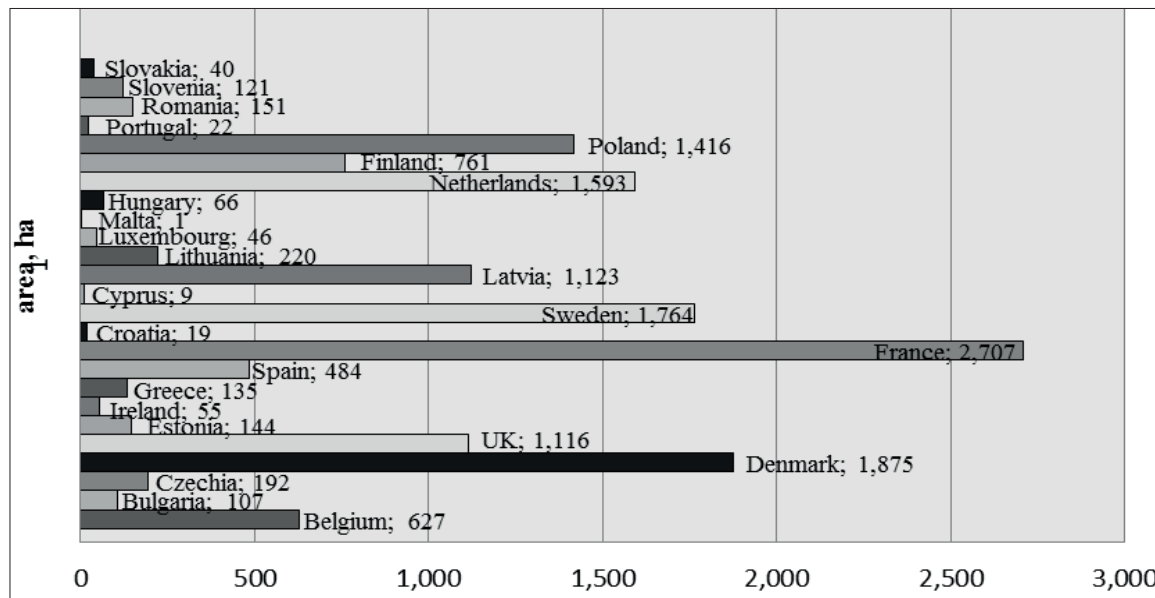


Figure 3. Surfaces cultivated with organic potatoes in 2017, in the EU (ha) (Source: Eurostat, 2019)

France ranked first in terms of areas cultivated with organic potatoes, in 2017, with 2,707 ha. Among the countries with the largest ecological surfaces are also Denmark – 1,875 ha, Sweden – 1,764 ha. Eurostat did not present data available for 2017 for Germany, Italy and Austria.

Figure 4 shows the organic potatoes production in 2017, for some EU member countries. The Netherlands was the largest producer, obtaining 71,241 tons. Other major producing countries were Sweden - 35,300 tons, Belgium - 21,945 tons and Poland - 19,335 tons.

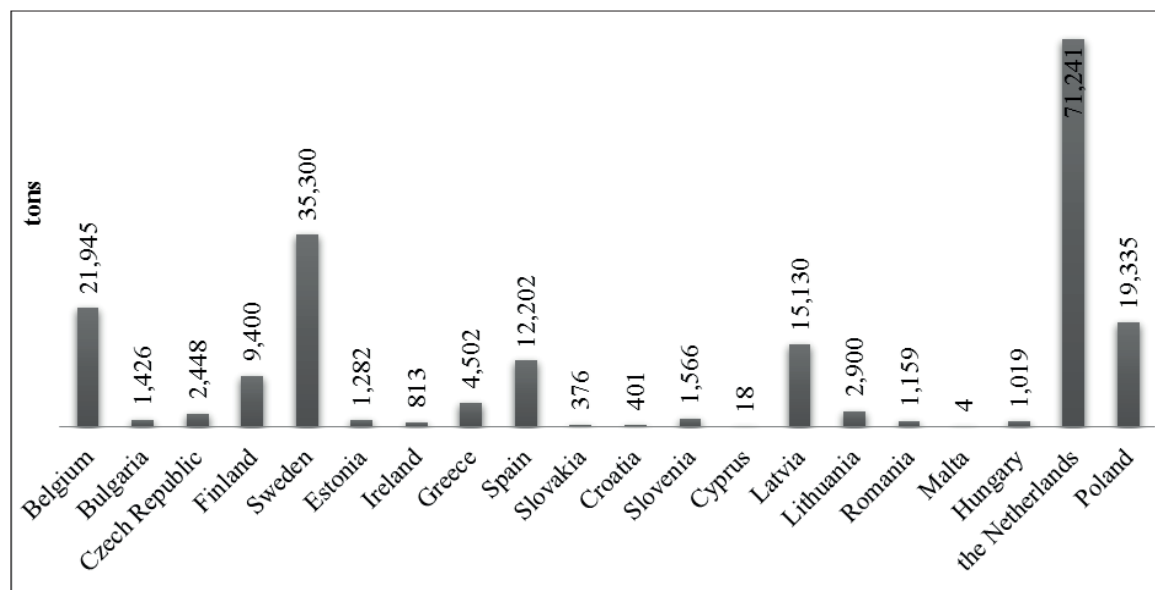


Figure 4. Production of organic potatoes in EU, in 2017 (tons) (Source: Eurostat, 2019)

Analyzing the data available on Eurostat and presented in Figure 5, we find that the highest price for potatoes was registered in Greece, of 51.45 Euro / 100 kg, and the lowest price, of 13.49 Euro / 100 kg was in

Poland. Other big potato producing countries also had a low price for this product: Germany - 16.92 Euro / 100 kg, the Netherlands - 15.53 Euro / 100 kg and the UK - 19.26 Euro / 100 kg.

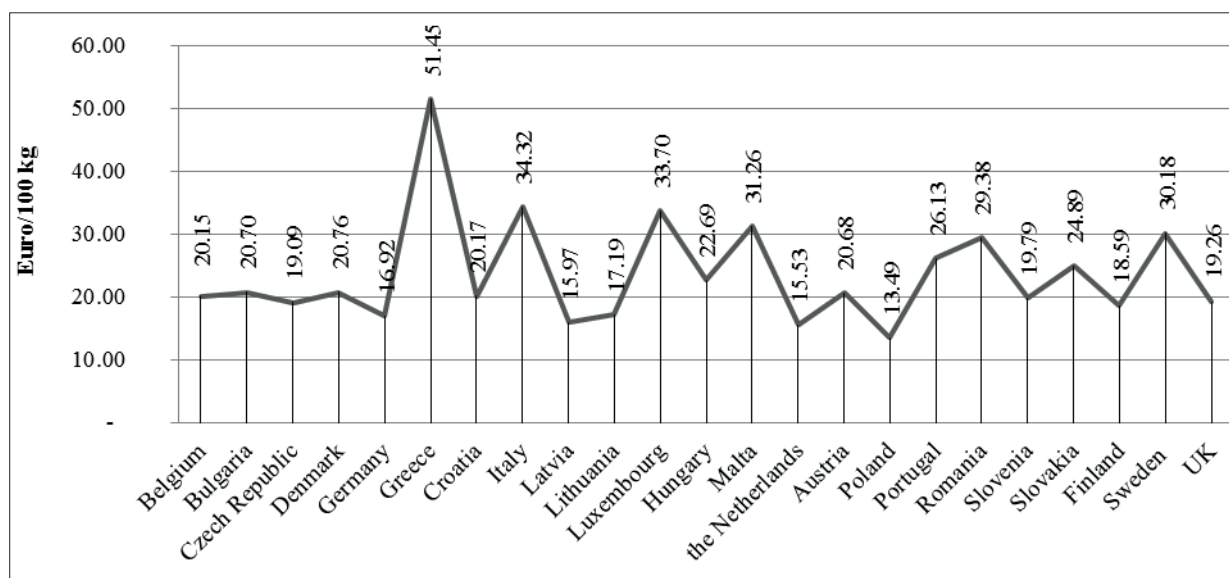


Figure 5. Annual selling prices for potatoes (Euro/100 kg), in 2018  
(Source: Eurostat, 2019)

Table 4 presents the main importers of potatoes worldwide. In 2018 the presence of 5 states from the European Union was noted among the first 7 importers. The first place was occupied by Belgium (the country that is not in the top of the potato cultivators), with

the value of potato imports of 545,538 thousand USD. It was followed by the Netherlands - 365,298 thousand USD, Spain - 246,669 thousand USD. Germany and Italy took 5<sup>th</sup>, respectively 7<sup>th</sup> place.

Table 4. Main importers of potatoes worldwide, thousand USD

Exporters	2015	2016	2017	2018	2018/2015 %
World	3,827,100	4,265,303	4,541,388	4,621,688	120.76
Belgium	287,843	463,471	505,908	545,538	189.53
The Netherlands	299,492	342,619	354,126	365,298	121.97
Spain	178,534	252,516	250,411	246,669	138.16
USA	168,182	217,656	232,289	243,601	144.84
Germany	204,941	268,448	245,637	238,179	116.22
Russian Federation	256,244	107,635	220,413	217,926	85.05
Italy	167,913	205,310	191,811	187,551	111.70

Source: ITC, 2019, own calculation

Analyzing the data in the table, it can be observed that the value of imports increased in 2018, compared to 2015, except for the Russian Federation, which registered a

decrease of 14.95%. Belgium had the highest growth, with 89.53%.

The top of quantitative imports for potatoes was occupied in 2018 by Belgium -

2,568,576 tons, the Netherlands - 1,791,824 tons, Spain - 813,226 tons and Germany - 596,922 tons (ITC).

The largest exporters of potatoes worldwide in 2018 were the Netherlands, France, Germany, China and Canada. The export values can be seen in Table 5. In this

top, only two countries from the European Union are present.

As shown in the Table 5, the value of exports increased in 2018 compared to 2015. The highest growth in the countries of the top 5 was recorded by Canada, with 40%, and the lowest, the Netherlands - 12.06%.

Table 5. Main exporters of potatoes worldwide, thousand USD

Exporters	2015	2016	2017	2018	2018/2015 (%)
World	3,680,972	4,021,423	4,344,885	4,331,170	117.66
The Netherlands	708,528	805,356	796,796	793,942	112.06
France	464,361	603,406	596,901	642,009	138.26
Germany	283,244	349,234	392,969	374,000	132.04
China	227,442	226,453	280,758	261,240	114.86
Canada	180,157	226,951	237,548	252,214	140.00

Source: ITC, 2019, own calculation

As for the quantitative exports of potatoes, the first four places in 2018 were occupied by the member states of the European Union: France - 2,312,010 tons, Germany - 1,860,358 tons, the Netherlands - 1,791,985 tons (ITC).

It is estimated that in the future there will be more CO<sub>2</sub> in the air, the temperatures will be higher, and the rainfall will be irregular. It is known that plants need CO<sub>2</sub> for growth, so the more CO<sub>2</sub> they will have, the faster they will grow, with an estimated 30% faster in the next forty years.

The predicted rise of the average temperature in the next forty years, by 2°C, will lead to a change in the freezing period in the temperate climate, by three weeks. This will lead to an increase in yield by 15%.

Climate change will bring other challenges for potatoes, such as: irregular rainfall to be replaced by irrigation and drainage and the risk of tropical diseases and pests.

Because it can adapt to climate changes and expand faster than other food crops, it is estimated that potato will be a crop of the future (Delleman, 2019).

## CONCLUSIONS

A complex food, potato is the third world food culture for human consumption.

Considered the second bread of mankind, potatoes are grown in all the EU states.

The conclusions drawn from the analysis of the available statistical data are the following:

- Except for France, Denmark, Cyprus, Luxembourg, the Netherlands, Austria and the UK, potato cultivated areas decreased in 2018 compared to 2010.

- In 2018, the highest potato crop area of 300.00 thousand ha was registered in Poland. Other big growers were Germany, 252.20 thousand ha and France, 193.31 thousand ha.

- The production of potatoes decreased in 2018 compared to 2010 except for France, Belgium, Denmark, Cyprus, Austria, Portugal, Romania and Slovakia.

- Germany was in 2018 the largest potato producer, obtaining 8,920.8 thousand tons, followed by France, 7,862.52 thousand tons and Poland, 7,400.00 thousand tons.

- The highest average production per hectare was obtained in Denmark, 43.03 tons/ha, in 2018. Belgium recorded 38.10 tons/ha in the same year. Greece and Romania had the largest increases for the average production per hectare.

- From the data provided by Eurostat, it appears that France with 2,707 ha, Denmark, 1,875 ha and Sweden, 1,764 ha were the main organic potato growers in 2017.



The most important producers of organic potatoes in the EU were the Netherlands (71,241 tons), Sweden (35,300 tons) and Belgium (21,945 tons).

- The highest price for potatoes was recorded in Greece, of 51.45 Euro / 100 kg, and the lowest price, of 13.49 Euro / 100 kg was in Poland.

- The main importers of potatoes worldwide in 2018 were the Netherlands, France and Germany. The value imports of these states increased in the period 2015-2018.

- The Netherlands, France and Germany were the main exporters of potatoes in 2018.

Potato is considered a crop that can adapt to the climate changes that are foreseen.

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