

## POTATO PRODUCTION CHARACTERISTICS - COMPERATIVE ANALYSIS IN EUROPEAN UNION COUNTRIES AND SERBIA

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### Abstract

This paper analysed potato productions in some important producer countries of European Union (EU). The analysis included six countries: Germany, Spain, France, Netherland, Poland and Romania. The following production characteristics are analysed and statistically processed: area of production, yields and harvested production. Nominated countries encompass about 82% of total production of potato in EU.

This research included official statistical data from „EUROSTAT“ for the period of 13 years, 2000-12. Descriptive statistical analysis included accountings of: average and extremes values of characteristics, coefficient of variations, and change rate. The results of analysis have been compared with the same data in Serbia.

The results of analysis show the next:

- It is present tendency of decreasing the areas of potato in all observed countries. The largest areas of potato have Poland (665.000 ha), Germany (273.000 ha), and Romania (265.000 ha). The average potato area in Serbia in observed period was 85.000 ha.
- Opposite of areas, yields of potato have tendency of increasing (except Romania). Three countries have (almost, the same) the highest yields: Netherland (44.1 t/ha), France (42.2 t/ha) and Germany (41.6 t/ha). Average yield of potato in Serbia is 10.5 t/ha.
- The all of obsereved EU countries have tendencies of decreasing production. The largest producer of potato in EU is Poland, with about 12,6 million tons. Next are Germany (11,4 million tons). Average production of potato in Srebia is 886.000 tons per year.

**Key words:** *potato, production analysis, EU countries, Serbia*

### Introduction

The main six countries in potato production in European Union are: Germany, Spain, France, Netherland, Poland and Romania.

Novkovic et al. (2008, 2013) analysed vegetables production in Serbia and Vojvodina region in the period 1981-2007. Vegetables production in Vojvodina region is about 5% in the production structure of plough land, what is fare from Serbia, where is that share 8, 5%. Area under vegetables is very stable. Tendency of low increasing is present in Serbia, and low decreasing is present in Vojvodina region.

Mutavdzic et al. (2010), using regression models observe influence of yield and total production of some important sorts of vegetables in actual year, on sowing area in the next

year. In general, in vegetables production, yield and total production don't have influence on sowing are in next year, as it is case of crops and industrial plants. Mutavdzic et al. (2011) analyzed natural results in vegetables production in Serbia in period 2001-10 year. Results of analysis are compared with adequate for the period from previous decade, 1992-2000. For last ten years, vegetables production in Serbia increase in all observed sorts of vegetables.

Novkovic et al. (2012, 2012a) analysed vegetable production in the Republic of Srpska (RS), and comparatively analysed vegetable production in Serbia and RS.

Novkovic et al. (2013a) defined statistical model for predicting potato production parameters in Germany, Serbia and Vojvodina region.

The main objective of this paper is to analyze production characteristic of potato in main six potato producer countries in EU and to compare obtained data with Serbia. Harvested area, yield, and total year production of potato were analyzed.

### Materials and methods

This research included quantitative methods. The descriptive statistical analysis included harvested areas, yields and total year productions of potato in six important potato producer countries in European Union and Serbia. Analyzed period is 2000-12. Data have been processed by standard statistic measures: average value ( $\bar{X}$ ) of characteristics in observed period, extreme values (minimum-maximum), coefficient of variation (CV), and change rate (r). Different data sources have been used for research such as official published data of „EUROSTAT“ and of the Serbian Statistical Office. After separate analysis for EU countries and Serbia, the comparative analysis between EU and Serbia was done.

### Results and disscusion

#### Analysis of Potato Areas

The results of statistical analysis about harvested areas of potato in the important producer countries in EU for the period 2000-12, are given in Table 1. Extremely the largest harvested area under potato has Poland (2.4 times more than Germany which took the second place). Also, Poland shows extremely high variation of areas. Romania, on the third place has similar harvested areas as Germany. The same situation is with the Netherlands and France, on 4<sup>th</sup>, and 5<sup>th</sup> place. All observed countries shows negative change rate of areas, France symbolic, and Poland extremely high.

Area under potato in Serbia was similar as it is in Spain, coefficient of variation is as on the level of Germany and Romania. Harvested area under potato in Serbia also show negative change rate in observed period.

In the future, can be expectance of further reducing harvesting area under poteto in main EU countries, potato producers.

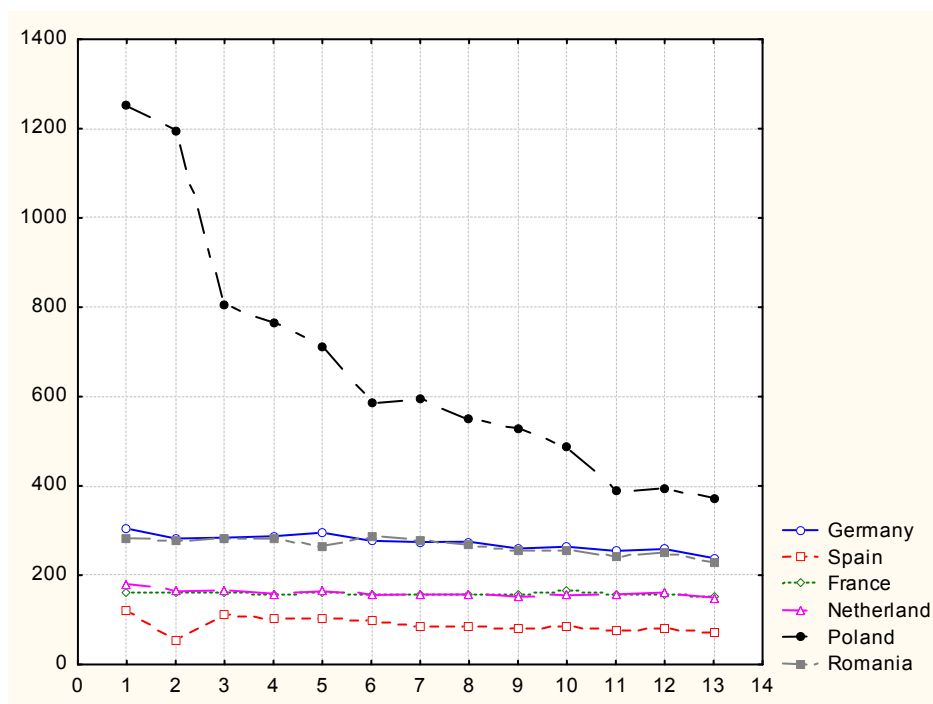
Real data of harvested areas of potato in main EU countries – producers in the observed period (2000-12) are presented on Graph 1 where can be seen extremely drop of harvested area of potato in Poland (from more than 1 million hectares, to less than 400.000), and relatively stable areas in other countries.

Table 1 Basic indicators of potato harvesting area (000ha) in studied EU countries and Serbia (2000-12)

Countries	Average $\bar{X}$ (000 ha)	Interval of variation		Coefficient of variation CV (%)	Change rate r (%)
		Minimum	Maximum		
Germany	273.41	238.30	304.40	6.62	-2.02
Spain	88.95	54.20	118.80	19.42	-4.09
France	158.95	154.10	163.60	1.80	-0.45
Netherland	159.51	150.00	180.20	4.81	-1.52

Poland	664.20	373.00	1,250.60	42.67	-9.59
Romania	265.49	228.90	284.90	6.82	-1.74
Serbia	84.35	75.45	93.90	7.58	-1.81

Graph 1 Changes in harvested areas of potato in 000 ha, in period 2000-12



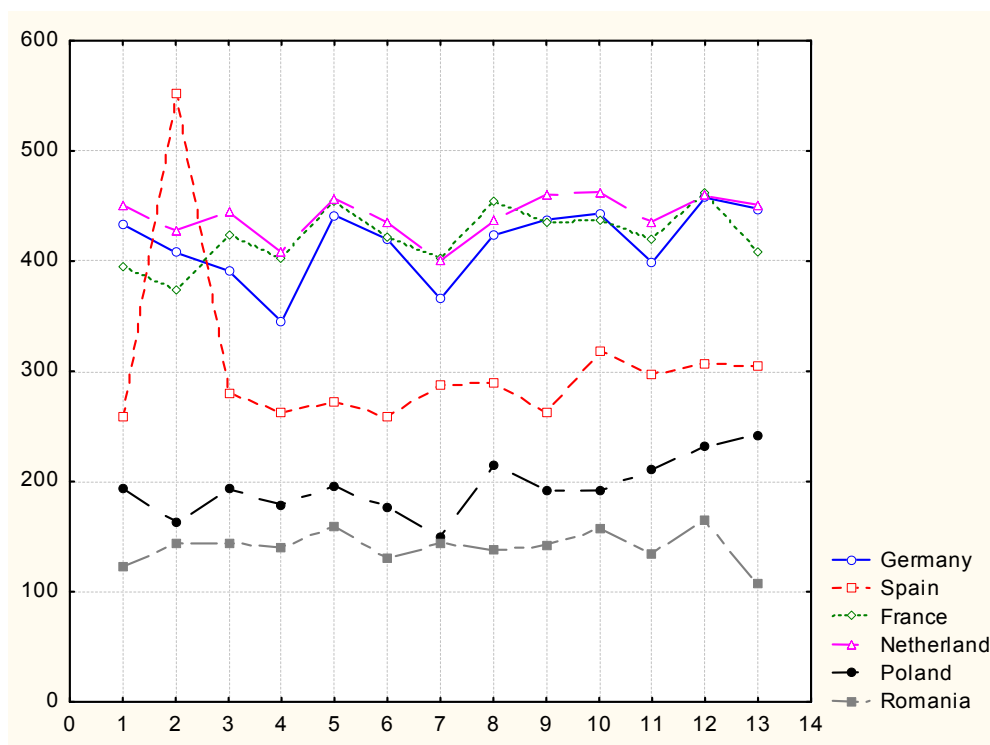
### Analysis of Potato Yields

Statistical data about yields of potato in observed EU countries are presented Table 2. The highest average yield of potato in the period 2000-12 had the Netherlands, with about 44t/ha. Very near is France and Germany, with yield lower for 4.2 and 5.6%. Spain, on the 4<sup>th</sup> place had average yield lower than the Netherlands for 31%, Poland 56%, and Romania 68% lower yield. The highest variation of yield, showed Spain, and the lowest Netherlands. All observed countries (except Romania which shows low decreasing tendency) shows low tendency of increasing of potato yield. The potato yield in Serbia was extremely low. It was 4.4 times lower than the highest in EU (The Netherlands), and 28.5% lower than in Romania which is on the last place. Potato yield in Serbia had high coefficient of variation (only Spain had higher), and tendency of increasing, in observed period. Real data of potato yields in main EU countries – producers in the observed period (2000-12) are given on Graph 2.

Table 2 Basic indicators of yield of potato (00kg/ha) in the period 2000-12

Countries	Average $\bar{X}$ (00kg/ ha)	Interval of variation		Coefficient of variation CV (%)	Change rate r (%)
		Minimum	Maximum		
Germany	416.37	345.10	457.60	8.05	0.27
Spain	303.98	258.90	552.10	25.37	1.35
France	422.59	374.40	462.00	6.10	0.27
Netherland	441.05	400.50	462.70	4.48	0.002
Poland	194.93	150.40	242.40	13.18	1.88
Romanija	140.92	107.60	165.50	10.87	-1.09
Serbia	100.17	661.20	115.73	16.88	1,23

Graph 2 Changes in yields of potato in 00kg/ha, in period 2000-12



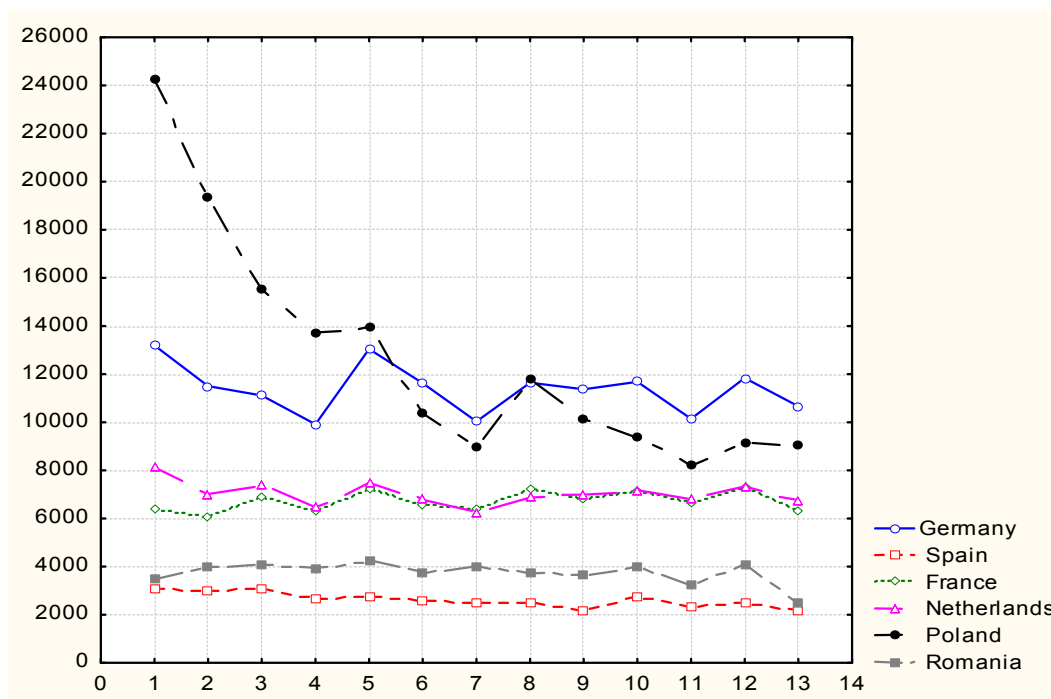
## Analysis of total potato productions

The results of statistical analysis related to potato productions per year in EU, important producer countries in EU and data for Serbia during the period 2000-12 are given in Table 3. In average, EU produces about 55 million tons of potato per year, and show low tendency of increasing (less than 1% per year). As for of potato production in EU during the studied period, the first place took Poland, mainly thanks to its harvested area. On the second place, is Germany, mainly thanks to its high yield, but, in the second part of the observed period Germany took primate (Graph 3). Both countries show high rate of decreasing potato production, but Poland much higher than Germany.

Table 3 Basic indicators of potato year production (000t) in studied EU countries and Serbia (2000-12)

Countries	Average $\bar{X}$ (000t)	Interval of variation		Coefficient of variation CV (%)	Change rate r (%)
		Minimum	Maximum		
EU	55,198.79	40,996.40	66,021.00	14,64	0,94
Germany	11,366.59	9,915.70	13,193.00	9.01	-1.76
Spain	2,615.15	2,146.90	3,078.10	11.90	-2.79
France	6,716.15	6,049.60	7,280.90	6.17	-0.18
Netherland	7,035.72	6,239.60	8,126.80	6.83	-1.52
Poland	12,602.87	8,187.70	24,232.40	37.82	-7.89
Romanija	3,744.44	2,463.90	4,230.20	12.65	-2.81
Serbia	842.29	577.97	1,015.02	16.79	-0.60

Graph 3 Changes in year production of potato in 000t, in period 2000-12



The Netherlands and France took the 3<sup>rd</sup> and the 4<sup>th</sup> place of potato producers in EU with similar level of year production (44.4% and 46.8% lower than Poland). On the 5<sup>th</sup> and 6<sup>th</sup> place are Romania and Spain (3.4 and 4.8 times lower production than Poland). All main countries in EU had negative change rates of year production of potato even EU shows tendency of increase. That means that potato production increases in other EU countries. Serbia is not competitive with its year production. Also, Serbia shows a negative change rate, too.

### Conclusions

The characteristic of potato production in EU and Serbia, in the period 2000-12 is generally as follows:

- Poland had the largest harvested area under potato (2.4 times more than Germany on the second place). All six observed countries show a negative change rate of harvested area under potato. Serbia had a similar area under potato as Spain on the 6<sup>th</sup> place, and shows a tendency of decreasing.
- The Netherlands had the highest yield of potato (44t/ha). Serbia had 4.4 less (10t/ha). All observed countries show tendencies of increasing yield of potato.
- Poland (12.6 mill.ton), and Germany (11.4 mill.ton) participate with 43.6% of total year production of potato in EU.

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