

## **PRODUCTION DEVELOPMENT EVALUATION OF PLANT COMMODITIES ON SLOVAKIAN AGRARIAN MARKET**

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**Abstract.** Market liberalization and influence of the foreign competition were evident mainly in reductions of the areas with cereals, sugar beat and potatoes. In the case of sugar, there was mainly the influence of the reformation of sugar regimen by reducing the number of sugar beat processors. The year 2009 and also the year 2010 in terms of weather were very difficult for the farmers. Intensive rainfalls in Spring and very hot and dry weather in Summer affected all the plant production in negative way. The reasons for the price increase or decrease of commodities in the EU are as follows: cereals reserves, structural changes in the offer and demand, increase in demand on the Asian market, increase in biofuel production, protectionism business policy, currency development, low food production productivity in Africa and in other developing countries and climatic effects mainly in Europe (in the countries where cereals are mainly grown).

**Key words:** plant commodities, agricultural markets, prices, Slovak Republic

### **INTRODUCTION**

Globalization represents all the events which become of a worldwide character. Globalization has different economic, social and political expressions and a different meaning of integration, internationalization, homogenization and worldwide concentration. It is significant in creating of new economic, political and social activities which disrupt traditional geographical borders. In fact, globalization represents intensification of economic activities in the real time.

Globalization as a multidimensional process is not only a driving power, but at the same time it is a resultant force of many development trends [Svatoš 2008].

In Agrokomplex of the Slovak Republic, the worldwide phenomenon of globalization started to be asserted and influential after integration into the EU. The positives and negatives of the globalization of the EU-10 countries have gradually appeared after entering

the EU, opening their economies and after accession of Common Agricultural Policy of the EU.

After the integration into the European Union, Slovakia and the other new member states began to enjoy the benefits associated with the liberalization of trade exchange and the introduction of the subsidization schemes provided by the Common Agricultural Policy.

The objective of the paper is to evaluate the price development of the chosen commodities in plant production in Slovakia and to focus on the factors influencing increase or decrease in the price of commodities on the domestic and foreign markets.

## MATERIAL AND METHODS

Realization of the already mentioned objective, required the research within the period of the years 2004–2010. While getting the primary data, we considered the data from the secondary information databases of the Slovak Ministry of Agriculture (MPSR), The Research Institute of Agricultural and Food Economics (VÚEPP), Internet websites and our own findings from the monitored file of agri-companies in the Slovak Republic.

We used basic organizational and economic relations and numeric calculations, while analyzing and forming the theoretical and practical solutions.

Price development of agricultural commodities is monitored via trend functions and seasonal indexes. There were used the polynomial functions of the third and fourth degree:

$$Y_t = b_0 + b_1 \times t + b_2 \times t^2 + b_3 \times t^3 \quad (1)$$

$$Y_t = b_0 + b_1 \times t + b_2 \times t^2 + b_3 \times t^3 + b_4 \times t^4 \quad (2)$$

in which:  $b_0, b_1, b_2, b_3, b_4$  are unknown parameters;  
 $t$  is a time variable (months, years).

## RESULTS

Market liberalization and influence of the foreign competition were evident mainly in reductions of the areas with cereals, sugar beet and potatoes. In the case of sugar, there was mainly the influence of the reformation of sugar regimen by reducing the number of sugar beet processors.

On the other hand, land area of the chosen crops gradually increased. The given trend of the increase was recorded mainly in oil plants growing, mainly oil rape (increase of the share by 5.33% as compared with 2004) and grain maize (increase of the share by 1.38% as compared with 2004), and i.e. crops with good market values. The continuing demand for oil plant on the domestic and foreign market was also connected with its processing for methyl ester (Table 1).

In 2009 was the situation affected by the high supply of cereals in the previous year, the low demand for cereals, decline in livestock number and low purchase prices. While in 2008 the sown area of sugar beet was reduced, in 2009 and 2010 growers responded to the situation with adverse developments in the prices of other agricultural commodities on the EU market by increasing the sown areas of sugar beet (46.3%) – Figure 1.

Table 1. Structure of sowing areas in main crops in years 2004–2010, in %

Specification	2004	2005	2006	2007	2008	2009	2010	Difference 2010–2004
	%							
Cereals, total	59.92	58.39	53.85	57.64	58.74	56.49	50.21	-9.71
Wheat	27.02	27.41	25.65	26.50	27.46	27.86	25.14	-1.88
Barley	16.31	15.01	13.56	15.43	15.66	14.39	9.77	-6.54
Rye	2.39	1.78	0.92	1.52	1.91	1.44	1.17	-1.22
Grain maize	10.86	11.32	11.10	11.56	11.33	10.60	12.24	1.38
Oil plants, total	14.46	15.69	18.40	17.00	18.32	19.67	19.62	5.17
Oil rape	6.72	7.80	9.00	11.30	11.97	12.23	12.05	5.33
Sunflower	6.62	6.70	8.00	4.76	5.51	6.09	6.09	-0.53
Potatoes, total	1.78	1.40	1.35	1.31	1.05	0.85	0.81	-0.97
Sugar beet	2.61	2.44	2.04	1.39	0.82	1.17	1.32	-1.29
Legumes	1.09	1.20	1.24	0.99	0.71	0.68	0.85	-0.24
Grape	0.88	0.96	0.87	0.85	0.71	0.69	0.60	-0.28

Source: Statistical Office of the Slovak Republic [2011] and own research

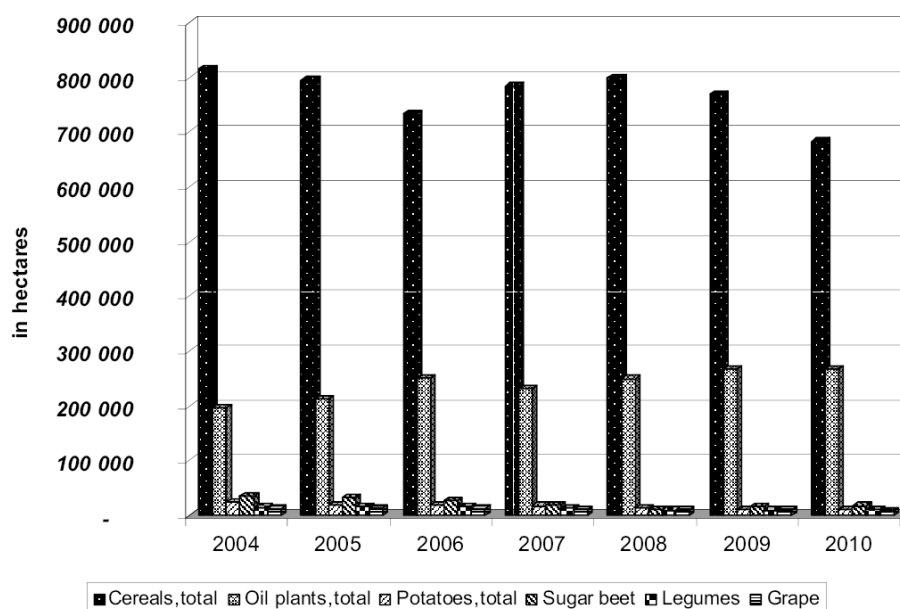


Fig. 1. Development of production areas in chosen crops in years 2004–2010, in hectares  
Source: Statistical Office of the Slovak Republic [2011] and own research.

The increase in sown area for oilseeds significantly influences their multipurpose use, their market character, advance purchasing system, continuing global economic prosperity, manufacture of alternative energy sources, the technical breakthrough in animal feed, cosmetics, pharmaceuticals and in connection with this the continuing demand in the European and world market.

The year 2009 and also the year 2010 in terms of weather were very difficult for the farmers. Intensive rainfalls in Spring and very hot and dry weather in Summer affected all the plant production in negative way (Fig. 2).

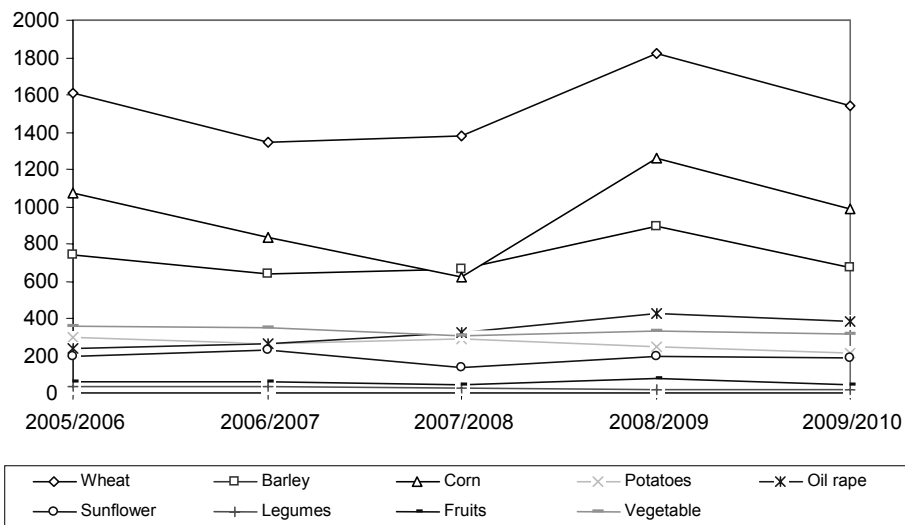


Fig. 2. Production of selected crops in the Slovak Republic, in thousand tons in years 2005–2010

Average harvests per hectare were decreasing almost in all commodities except sugar beet. The biggest decrease was observed in commodities as wheat, rye, legumes and grape (Table 2).

Table 2. Development of harvest in chosen crops in years 2004–2010, in tons per hectare

Specification	2004	2005	2006	2007	2008	2009	2010	Index 2010/2004
	t · ha <sup>-1</sup>							
Cereals, total	4,65	4,51	4	3,56	5,18	4,33	3,74	0.80
Wheat	4,8	4,31	3,85	3,82	4,87	4,06	3,46	0.72
Barley	4,13	3,62	3,48	3,14	4,18	3,45	2,72	0.66
Rye	3,83	2,84	2,41	2,63	3,1	2,87	2,23	0.58
Grain maize	5,83	6,97	5,55	3,97	8,17	6,85	5,53	0.95
Oil plants, total	2,43	2,12	2,06	2,02	2,54	2,23	1,88	0.77
Oil Rape	2,87	2,21	2,12	2,09	2,61	2,32	1,97	0.69
Sunflower	2,18	2,14	2,1	2,05	2,57	2,26	1,81	0.83
Potatoes, total	15,76	15,77	14,31	16,19	17,19	18,6	11,45	0.73
Sugar beet	45,03	52,16	49,46	44,89	61,07	56,11	54,52	1.21
Legumes	5,08	4,27	3,94	3,48	3,68	3,31	2,97	0.58
Grape	4,71	4,12	4,42	4,27	5,35	4,51	2,59	0.55

Source: Statistical Office of the Slovak Republic [2011] and own research.

The overall offer of the main commodities and their consumption on the domestic market in 2010 is shown in Table 3. It could be found that the demand for cereals and bakery products is income-inelastic, bread and bakery products belong to the group of the basic goods [Kubicová and Kádeková 2011].

Table 3. Offer and demand of chosen basic agricultural products in the Slovak Republic in years 2005–2007 in thousand tons

Crops	Economical year 2009–2010		
	domestic production (dp)	domestic consumption (dc)	Share of dp to dc
	ths. t		%
Wheat	1,538	878	175%
Barley	676	557	121%
Corn	988	835	118%
Potatoes	216	287	75%
Oil rape	387	196	197%
Sunflower	187	60	312%
Legumes	15	21	72%
Fruits	46	107	43%
Vegetable	312	485	64%

Source: [Green Report 2011].

In 2009 it is possible to see big decrease of plant commodities and on the other side in 2010 big decrease of all plant commodities (Figs 3 and 4).

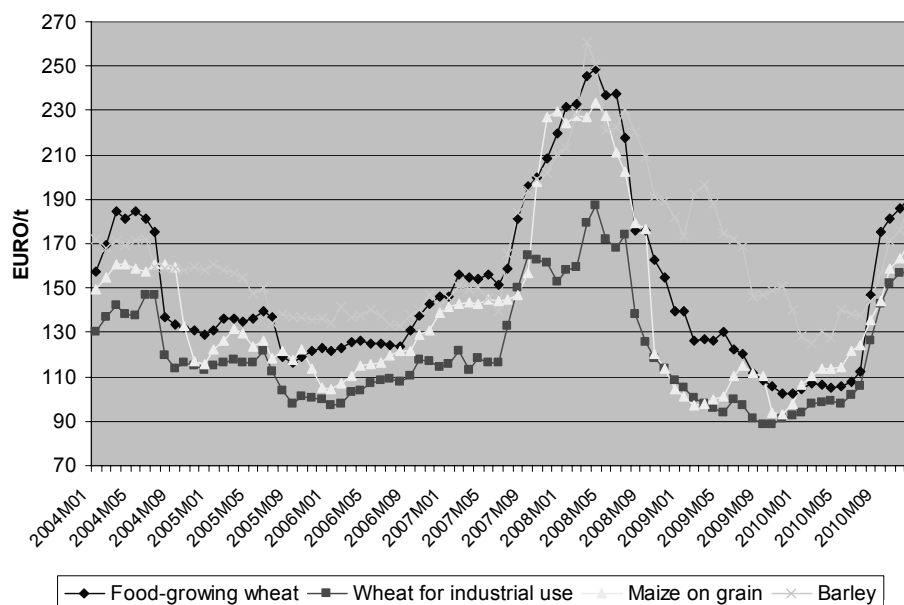


Fig. 3. Development of indexes in chosen commodities in years 2004–2010

Source: Statistical Office of the Slovak Republic [2011] and own research.

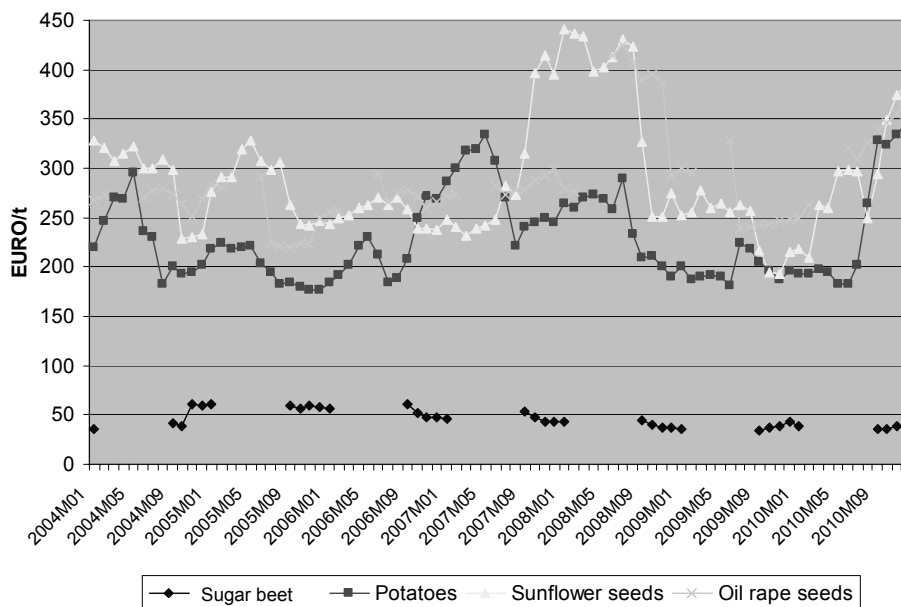


Fig. 4. Development of indexes in chosen commodities in years 2004–2010  
Source: Statistical Office of the Slovak Republic [2011] and own research.

### Trendline analysis

Trendlines equations are shown in the Table 6, together with the value of reliability by the  $R^2$  indicator (index). We can see from the Table that in 57.46% the changes of the dependent variable in the price development of potatoes explained in the monitored period by the fourth-degree polynomial function (quadratic equation).

Table 6. Trend function prices of chosen commodities in 2004–2010

Commodities	Trendlines	Value of reliability $R^2$
Food-growing wheat	$Y = 1E-04x^4 - 0.0177x^3 + 1.0226x^2 - 20.532x + 243.83$	0.4942
Wheat for industrial use	$Y = 7E-05x^4 - 0.0115x^3 + 0.655x^2 - 13.10x + 183.92$	0.4389
Maize on grain	$Y = 9E-05x^4 - 0.0156x^3 + 0.8982x^2 - 17.924x + 221.83$	0.3975
Barley	$Y = 4E-05x^4 - 0.0081x^3 + 0.5329x^2 - 11.843x + 216.33$	0.4339
Potatoes	$Y = 0.0001x^4 - 0.0236x^3 + 1.2646x^2 - 23.279x + 322.15$	0.5746
Sunflower seeds	$Y = 0.0001x^4 - 0.02x^3 + 1.1594x^2 - 23.582x + 400.14$	0.2184

Source: Statistical Office of the Slovak Republic [2011] and own research.

## CONCLUSIONS

Price development in Slovakia was affected by the substantial growth of the global demand for food that is becoming a strategic item which affects the economic and pricing policy. The prices are also affected by the inputs of farmers and processors the prices of which are rising, including energy, fuel, fertilizers, chemicals, seeds or wages. The prices of food producers and consumer prices depend on a number of other factors, including some unpredictable factors (mostly weather) [Křížová 2009].

The reasons for the price increase or decrease of commodities in the EU are as follows: cereals reserves, structural changes in the offer and demand, increase in demand on the Asian market, increase in biofuel production, protectionism business policy, currency development, low food production productivity in Africa and in other developing countries and climatic effects mainly in Europe (in the countries where cereals are mainly grown).

These factors cause the increase in the demand in a long-term horizon and the reaction of the demand is slowed down. The growing price of oil and price of gas, connected with it, automatically causes higher price for processing and transport.

The significant price volatility of plant commodities has been observed in the world agri-food markets in these latter years. It has been caused by the triggers of the so-called market shocks that negatively influenced the stability of supply and demand of agri-food commodities [Matošková 2011].

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## EWALUACJA ROZWOJU PRODUKCJI PRODUKTÓW ROŚLINNYCH NA RYNKU ROLNYM SŁOWACJI

**Streszczenie.** Wpływ liberalizacji rynków i konkurencji z zagranicy na redukcję powierzchni upraw zbóż, buraków cukrowych i ziemniaków. W przypadku rynku cukru, szczególnie odczuwalny był wpływ reformy tego rynku, która prowadziła do redukcji liczby przetwórców buraków cukrowych. Lata 2009 i 2010 były z punktu widzenia warunków pogodowych szczególnie trudne dla rolników. Intensywne opady deszczu wiosną oraz bardzo gorące i suche lato wpłynęły negatywnie na całą produkcję roślinną. Przyczynami wzrostu cen produktów w Unii Europejskiej są: rezerwy zbóż, zmiany strukturalne podaży i popytu, wzrost popytu na rynkach azjatyckich, wzrost produkcji biopaliw, protekcjonizm gospodarczy, rozwój waluty, niska wydajność produkcji w Afryce oraz w innych krajach rozwijających się, a także wpływ zmian klimatu szczególnie w Europie (w krajach, w których przede wszystkim są produkowane zboża).

**Słowa kluczowe:** produkty pochodzenia roślinnego, rynki rolne, ceny, Słowacja

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