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PRICE DEVELOPMENT EVALUATION OF CHOSEN PLANT COMMODITIES IN AGRARIAN MARKET IN THE SLOVAK REPUBLIC

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Abstract

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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 the increase or decrease in the price of commodities on the domestic and foreign markets. In 2008 the prices of the products in a year–on–year plant production increased by 1.6%. The price of the plant products, including fruits and vegetables recorded the biggest increase since January 2008 until October 2008. The biggest increase in prices was recorded in June (increase of 52.7%). The high prices of oil plants and legume were one of the causes in a year–on–year price increase (oil plants increase by 23.3% and legume –15.7%). Price development on the domestic market of cereals and oil plants was influenced in the first three terms by growing stock–exchange value and the high demand from the side of foreign buyers connected with the increasing production of biofuels. On the other hand, in the last term of the year 2008, there can be seen the rapid decrease of the prices of cereals and oil plants because of the high production and the development of the world prices. The prices of fruits, evaluated in 2004–2008, recorded the biggest increase in January and February 2008 (in January 2008 – increase by 22.1% and February 2008 – increase by 23.2%). Prices of vegetables slightly grew in the monitored period. The biggest increase was recorded in December 2006 and in January and February 2007 (more than 15%).

prices, evaluation, plant commodities

Globalization can be represented by all the events 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 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 (Baco, 2007).

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 (Matošková and Gálik, 2009).

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 the 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 2004–2008. 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:

$$Y_t = b_0 + b_1 * t + b_2 * t^2 + b_3 * t^3,$$

$$Y_t = b_0 + b_1 * t + b_2 * t^2 + b_3 * t^3 + b_4 * t^4,$$

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 sugar beat (decrease of the share by 0.4% as compared with 2004) and vegetables (decrease of the share by 0.4% as compared with 2004). There was mainly the influence of the reformation of sugar regimen by reducing the number of sugar beat processors. In the case of vegetables, reduction of growing areas continued, as a result of situation on the market from the previous years, caused mainly by production non–profitability as opposed to the foreign competition.

On the other hand, land area of the chosen crops gradually increased. The given trend of the increase was recorded mainly in oil plants, mainly oil rape (increase of the share by 5.5% as compared with 2004) and wheat (increase of the share by 1.0% 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 I) .

The development of sowing areas was visible even in the harvesting areas which were developed similarly (Table 2). As it is seen in the fig. 1, the biggest increase was marked during the monitoring period at the harvested land area of oil rape (increase of 78% compared with 2004). The biggest decrease was marked in sugar beat (decrease of 69% compared with 2004) and potatoes (decrease of 41%) and root crops (decrease of 47%).

Average harvests per hectare, excluding the oil rape and legume increased, namely the most significant are corn harvests (increase by 40% compared with 2004), sugar beat (increase by 36% compared with 2004) and sunflower (increase by 18% compared with 2004) (Table III).

The overall offer of the main commodities on the domestic market in 2008, compared with the year 2007, increased in main commodities (wheat, barley, corn, potatoes, and oil rape). There was a decrease in sunflower, legume, fruit and vegetable. The share of the domestic production in the consumption increased only in wheat, barley, potatoes and vegetable (Table IV and Table V).

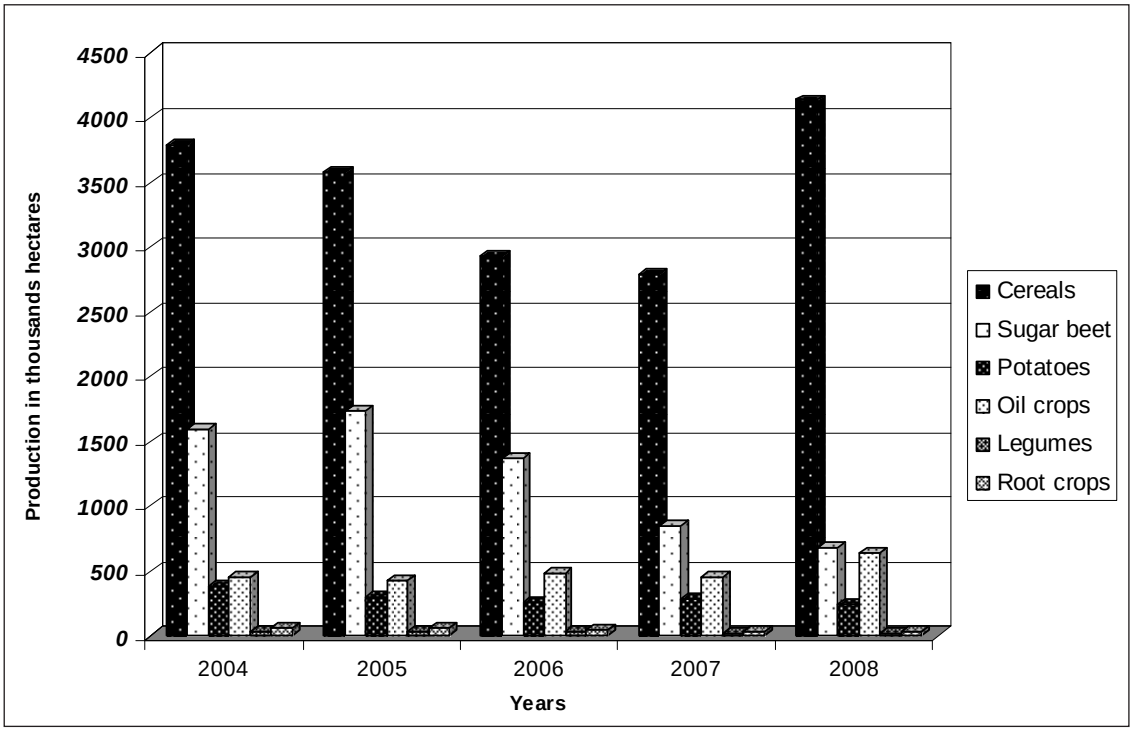
In 2008 the prices of the products in a year–on–year plant production increased by 1.6%. The price of the plant products, including fruits and vegetables recorded the biggest increase since January 2008 until October 2008. The biggest increase in prices was recorded in June (increase of 52.7%) (Fig. 2 and Fig. 3).

The high prices of oil plants were one of the causes in year–on year price increase (increase by 23.3%) and legume (15.7%). Price development on the domestic market of cereals and oil plants was influenced in the first three terms by growing stock–exchange value and the high demand from the side of

I: *Structure of sowing areas in main crops in %*

Crops	Years					Difference 08–04
	2004	2005	2006	2007	2008	
Cereals	61.00	59.80	56.30	59.50	60.60	–0.40
Wheat	27.50	28.10	26.70	27.50	28.50	1.00
Barley	16.60	15.40	14.10	15.90	16.10	–0.50
Corn	10.90	11.40	11.70	11.90	11.70	0.80
Sugar beet technician	2.60	2.50	2.10	1.40	0.80	–1.80
Potatoes	1.80	1.40	1.40	1.40	1.10	–0.70
Oil rapes	6.90	8.00	9.40	11.70	12.40	5.50
Sunflowers	6.80	6.90	8.30	4.90	5.70	–1.10
Legumes	1.10	1.30	1.40	1.00	0.70	–0.40
Root crops	0.20	0.10	0.10	0.10	0.10	–0.10
Vegetables	0.90	0.70	0.70	0.70	0.20	–0.70

Source: Statistical Office of the Slovak Republic 2009 and own research



1: *Development of production in chosen crops*
Source: Statistical Office of the Slovak Republic 2009 and own research

II: *Development of harvesting areas in chosen crops in thousand hectares*

Crops	Years					Index 08/04
	2004	2005	2006	2007	2008	
Cereals	815.50	794.60	732.90	784.40	799.37	0.98
Wheat	367.80	373.00	349.10	360.70	373.66	1.02
Barley	222.00	204.20	184.50	209.90	213.05	0.96
Corn	147.80	154.10	151.00	157.30	154.24	1.04
Sugar beet technician	35.50	33.20	27.70	18.90	11.12	0.31
Potatoe	24.20	19.10	18.40	17.80	14.27	0.59
Oil rape	91.50	106.20	122.50	153.80	162.87	1.78
Sunflower	90.00	91.10	108.80	64.70	74.93	0.83
Legume	14.80	16.40	16.90	13.50	9.63	0.65
Root crop	1.80	1.70	1.70	1.60	0.96	0.53
Fruits*	16 772.10	17 192.10	16 352.70	15 491.50	15 429.00	0.92
Vegetable	32.00	30.20	29.80	28.90	7.43	0.23

* Measure unit – Number of trees and shrubs
Source: Statistical Office of the Slovak Republic 2009 and own research

foreign buyers connected with the increasing production of biofuels. On the other hand, in the last term of the year 2008, there can be seen the rapid decrease of the prices of cereals and oil plants because of the high production and the development of the world prices.

The prices of fruits, evaluated in 2004–2008, recorded the biggest increase in January and February 2008 (in January 2008 – increase by 22.1% and February 2008 – increase by 23.2%). Prices of vegetables slightly grew in the monitored period. The biggest increase was recorded in December 2006 and in January and February 2007 (more than 15%).

Trendline analysis

Trendlines equations are shown in the following figures, together with the value of reliability by the R^2 indicator (index). We can see from the table that in 71.43% the changes of the dependent variable in the price development of cereals explained in the monitored period by the third–degree polynomial function (quadratic equation). The value of reliability shows the high value in oil plants as well, where in 53.44% the changes of the dependent va-

III: *Development of harvest per hectare in chosen crops in tons per hectare*

Crops	Years					Index 08/04
	2004	2005	2006	2007	2008	
Cereals	4.65	4.51	4.00	3.56	5.18	1.11
Wheat	4.80	4.31	3.85	3.82	4.87	1.01
Barley	4.13	3.62	3.48	3.14	4.18	1.01
Corn	5.83	6.97	5.55	3.97	8.17	1.40
Sugar beet technician	45.03	52.16	49.46	44.89	61.07	1.36
Potatoes	15.76	15.77	14.31	16.19	17.19	1.09
Oil rape	2.87	2.21	2.12	2.09	2.61	0.91
Sunflower	2.18	2.14	2.10	2.05	2.57	1.18
Legume	2.54	2.13	1.94	1.73	1.84	0.72
Root crop	31.23	39.04	28.97	20.92	32.65	1.05

Source: Statistical Office of the Slovak Republic 2009 and own research

IV: *Offer and demand of chosen basic agricultural products in the Slovak Republic in years 2005–2007 in thousand tons*

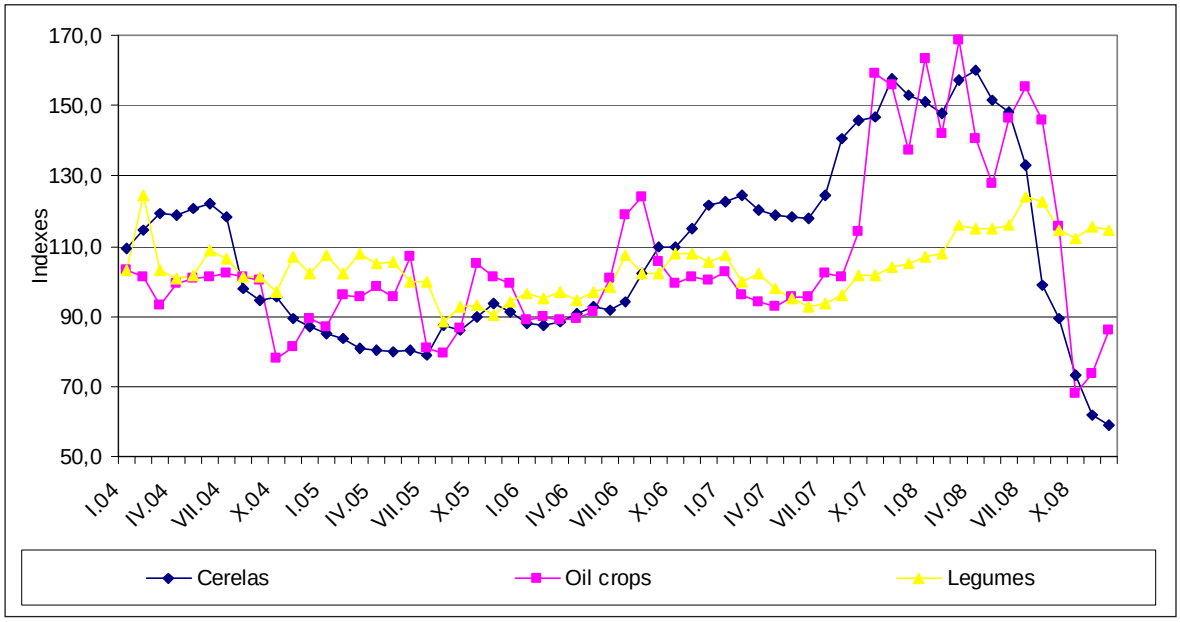
Crops	Economic year 2005–2006			Economic year 2006–2007		
	Domestic production	Domestic consumption	Share of D.p. to D.c.	Domestic production	Domestic consumption	Share of D.p. to D.c.
Wheat	1.608	1.370	117%	1.343	1.270	106%
Barley	739	730	101%	642	558	115%
Corn	1.074	657	164%	838	651	129%
Potatoes	301	362	83%	263	332	79%
Oil rape	235	172	137%	260	145	179%
Sunflower	195	59	331%	229	100	229%
Legumes	35	30	117%	33	31	106%
Fruits	63	105	60%	62	106	59%
Vegetable	354	356	99%	352	428	82%

Source: Green Report 2006 and 2007

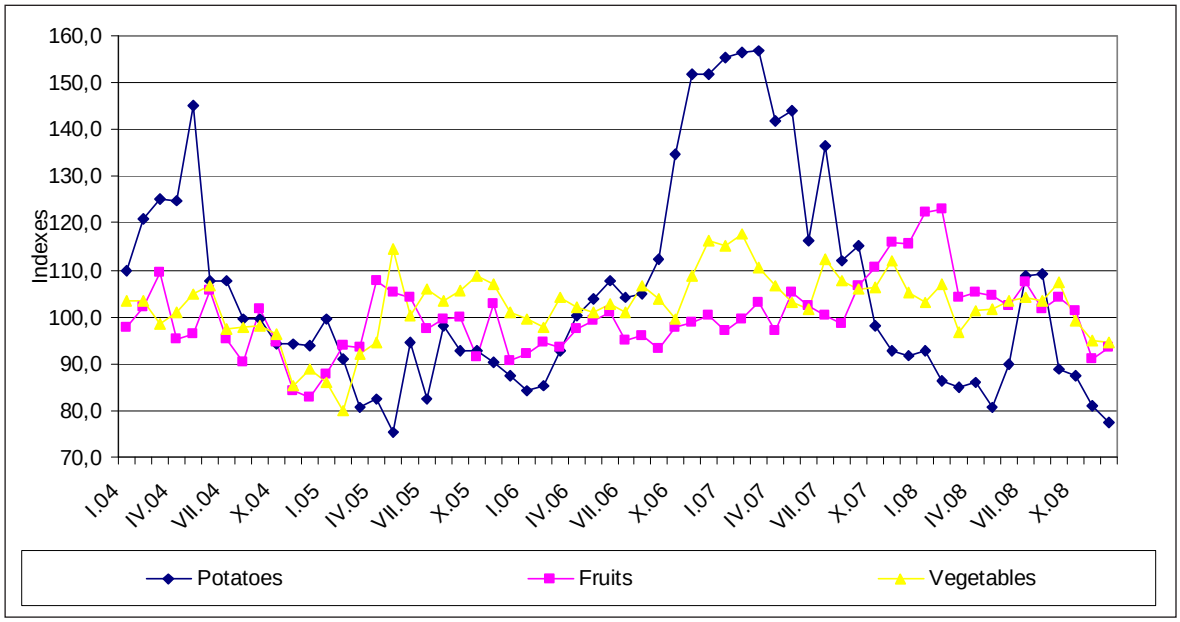
V: *Offer and demand of chosen basic agricultural products in the Slovak Republic in years 2007–2008 in thousand tons*

Crops	Economic year 2007–2008		
	Domestic production	Domestic consumption	Share of D.p. to D.c.
Wheat	1.380	1.134	122%
Barley	660	530	125%
Corn	624	820	76%
Potatoes	288	326	88%
Oil rape	321	187	172%
Sunflower	133	65	205%
Legumes	23	25	92%
Fruits	45	105	43%
Vegetable	308	350	88%

Source: Green Report 2008



2: *Development of indexes in chosen commodities in years 2004–2008*
Source: Statistical Office of the Slovak Republic 2009 and own research



3: *Development of indexes in chosen commodities in years 2004–2008*
Source: Statistical Office of the Slovak Republic 2009 and own research

VI: *Trend function prices of chosen commodities in 2004–2008*

Commodities	Trendlines	Value of reliability R^2
Cereals	y = –0.0048 x3 + 0.4468x2 – 10.654x + 153.28	0.7143
Oil plants	y = –0.0001x4 + 0.0161x3 – 0.5166x2 + 5.2179x + 85.43	0.5344
Potatoes	y = –0.0034x3 + 0,2903x2 – 6.6087x + 136.77	0.4209
Legumes	y = 3E – 05x3 + 0.0164x2 – 0.9272x + 110.39	0.5242
Fruits	y = –3E – 05x4 + 0.0035x2 + 0.5645x + 98.045	0.4145
Vegetable	y = 2E–05x4 – 0.0035x3 + 0.1699x2 – 2.6488x + 108.2	0.3913

Source: Statistical Office of the Slovak Republic 2009 and own research

riable explained by the fourth–degree polynomial function.

Cereals

Domestic consumption of the cereals represents the level of 70%. The Slovak Republic is self–sufficient in production and there is a presumption of sustainable self–sufficiency in the following years unless there is unpredictable influence of the weather caused by the global warming.

It is assumed that there will be a sufficient amount of basic types of cereals for domestic food industry and industry for feeding livestock. Export of cereals abroad will be possible, because of the higher production than consumption. There might be a problem of progressing the surplus production in the EU markets due to a strong price competition. Except of the EU countries, the strong competition occurs even in the countries of the third world. Majority of the Slovak cereal production is placed in the neighboring countries (Poland, the Czech Republic, Austria, and Hungary). The states in Asia are also a challenge due to the rising tendency in number of inhabitants and increasing the real income, there is a growing demand for cereals and cereal products and thus, it represents export opportunities for Slovak wheat and corn exporters.

It is clear, from the given trends, that it is necessary for Slovak agri–businessmen, regarding the strong competition on the EU markets, to invest in variable costs (chemical protection, fertilizers and seeds), with the aim to increase cereal harvests per hectare and subsequently the increase in production profitability. The importance of growing cereals will be increasing in the following years, regarding the expected demand from the side of domestic and foreign biofuel producers. The main pro–export commodities will be wheat and malt barley. The decrease in corn export is assumed, due to the increase of domestic processing because of bio–ethanol production.

Oil plants

There is an increasing demand for this group of crops on the Slovak and world marked. Oil rape represents 68% and sunflower represents 31% in the overall oil plant production. Oil plant production exceeds domestic consumption. Arising from the given facts it is clear that the Slovak Republic is self–sufficient in these commodities. The economy of the oil plant production is influenced by the low intensity of production. The Slovak Republic reaches the low harvest per hectare compared with the other EU countries (by 10–30%). The production is profitable only with the support. On the other hand, there is a growing demand for the commodities on the foreign markets. It is assumed that the domestic demand will grow regarding the accepted EU legislation. The EU legislation determines to produce biofuels and ecological ingredients into conventional fuels where the main components are oil plants. In the following period the increase approximately by 30–40% of oil rape production is assumed for food and industrial use.

Fruits and vegetables

The competitiveness of the Slovak Republic in growing chosen fruits and vegetables is not sufficient (apples, peach, cabbage and tomatoes). There is a decrease in the growing areas as well as in the number of fruit trees, despite the fact that the production is not sufficient enough. The increase in production is assumed after the transformation recession. These tendencies can be stimulated by already approved reformation of fruits and vegetables, where the given commodities are implemented in the system of a uniform pay per area. The government supported the accession of farmers to marketing boards and associations with the aim to resist the pressure of business retails and increase competitiveness of domestic producers with the help of the Rural Development Program. The supporting activities of the Rural Development Program are activities for promoting the consumption of fruits and vegetables. The income elasticity in fruits and vegetables is higher than in other commodities, which means that due to the increase of incomes there should be a demand for these commodities.

CONCLUSION

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) (Krížová, 2009).
The reasons for the price increase or decrease of commodities in the EU are as follows:

1. cereals reserves
2. structural changes in the offer and demand
3. increase in demand on the Asian market
4. increase in biofuel production
5. protectionism business policy

6. currency development
7. low food production productivity in Africa and in other developing countries
8. 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 most significant influence on food prices and their decrease or stability has the low elasticity of the offer on the world markets.

According to the authors, the solution for the mentioned fact is an increase in food productions in the poor countries in the world in a short–term horizon based on the governmental programs of the richest world countries. It means that it is more efficient for the richer countries to invest in seeds, seedlings, fertilizers, technologies and then free (advantageous) import to the poorer countries, rather than the direct support of grown commodities, which are quickly consumable and do not bring any effect of lowering the food crisis from the long–term point of view.

The expectable development until 2010 in the Slovak Republic can be characterized with:

- focusing on the food quality and safety. The changes in food ingredients and food labeling (quality, consumer awareness and traceability) should be done. Due to growing incomes, a group of consumers who prefer biofood production, functional, dietetic and fresh food, will be significantly enlarged
- halting the decrease of fruits and vegetables consumption. The consumption of these commodities will start growing
- continuing in the tendencies of decreasing the cereal consumption in the form of flour
- gradual disappearing of the ´local patriotic´ feelings of Slovak people and building the awareness of "a European citizen" which will lead to avoiding the preferences of the food products produced in the Slovak Republic. It will be enforced even with a gradual flow of immigrants bringing their own religious, social customs and traditions

Except of the mentioned consumption factors, the future of food consumption will depend on the wide range of the other factors, such as age, education, village or town, cultural values, etc. The differentiation in the regions will persist, but the higher homogenization of the consumption habits will occur. Their range will depend on the level of the given country (Blaas, 2004).

Presently, there is a big amount of cereals in the EU surplus stocks. The authors estimate that the cereal surplus not only in Slovakia and the EU, but also on the global markets will have an impact on the decrease in cereal prices from the harvest in 2009.

SÚHRN

Zhodnotenie vývoja cien vybraných rastlinných komodít agrárneho trhu Slovenskej republiky

Cieľom príspevku je zhodnotenie vývoja cien vybraných komodít rastlinnej výroby na Slovensku a poukázanie na faktory ovplyvňujúce rast, resp. pokles cien komodít na domácich a zahraničných trhoch. V roku 2008 vzrástli ceny produktov rastlinnej výroby medziročne o 1,6 %. Ceny rastlinných produktov vrátane ovocia a zeleniny zaznamenali najväčší nárast od januára 2008 do októbra 2008. Najvyšší nárast cien bol zaznamenaný v mesiaci jún (nárast až o 52,7 %). Na medziročnom raste cien sa podieľali najmä vysoké ceny olejnín (nárast o 23,3 %) a strukovín (15,7 %). Cenový vývoj na domácom trhu s obilninami a olejninami ovplyvnili v prvých troch štvrťrokoch rastúce burzové ceny a vysoký dopyt zo strany zahraničných nákupcov súvisiaci so zvyšujúcou sa výrobou biopalív. Na druhej strane v poslednom štvrťroku 2008 z dôvodu vysokej produkcie a vývoja svetových cien došlo k rapídnemu poklesu cien obilnín a olejnín. Ceny ovocia za hodnotené obdobie rokov 2004–2008 zaznamenali najväčší nárast v mesiacoch január a február 2008 (január 2008 – nárast o 22,1% a február 2008 – nárast o 23,2 %), Ceny zeleniny za sledované obdobie mierne vzrástli. Najvyšší nárast bol zaznamenaný v decembri 2006 a v mesiacoch január a február 2007 (viac ako 15 %).

ceny, hodnotenie, rastlinné komodity

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