The comparison of natural and value indicators of cereals in the Slovak Republic in accession period to European Union

Komparácia vybraných naturálnych a hodnotových ukazovateľov produkcie pšenice Slovenskej republiky s niektorými krajinami EU

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Abstract: Cereals have a significant position in land farming in Slovakia. Important commodities are wheat, barley and maize. In the years 1999–2000, a research showed that Slovakia's natural production was lagging behind the developed countries of the EU. Extraordinary low yields were recorded in the economic year 2000/2001 due to drought during the vegetation period. In this paper, there are analyzed the production prices, costs, cereals efficiency and profitability costs. We have also calculated the break-even point in yields, in costs and in production prices of cereals. In addition, we have done some suggestions and recommendations on how to analyze the results.

Key words: cereals, production prices, costs, break-even point in yields, costs and prices

Abstrakt: Obilniny na Slovensku majú významné postavenie pri hospodárení na ornej pôde. Rozhodujúce komodity sú pšenica, jačmeň a kukurica na zrno. Sledované obdobie rokov 1999 až 2000 poukázalo na zaostávanie naturálnej produkcie za vyspelými agrárnymi krajinami EÚ. Mimoriadne nízke úrody sa zaznamenali v hospodárskom roku 2000/2001 najmä v dôsledku sucha počas vegetácie. V príspevku sa ďalej analyzujú ceny výrobcov, náklady, efektívnosť a rentabilita nákladov obilnín. Vypočítali sa body zvratu pri úrodách, nákladoch a cenách výrobcov obilia. Formulovali sa námety a odporúčania na paralýzu výsledkov.

Kľúčové slová: obilniny, ceny výrobcov, náklady, bod zvratu úrody, nákladov a ceny

INTRODUCTION

In the accession period, Slovakia negotiated certain agricultural conditions to operate under the Common Agricultural Policy, particularly within the agrarian market. It is well known that the conditions of European farmers are more convenient in comparison with Slovak farmers in land farming entrepreneurship. The transformation process of Slovak agriculture has recorded significant changes. Only some of them will be mentioned in this paper such as: employment in agrarian sector has decreased considerably, organization and legal forms of land farming have changed a lot, entrepreneurs make the production structures more simple, intensification of agricultural production has decreased significantly, input market has increased disproportionately in comparison with output market relating to prices. There are also other forms of entrepreneurship, which can have a negative influence on land farming. The authors Gozora (2001), Kulková (2002), Podolák, Serenčéš (2003) and Šimo (2003) devoted their main attention to these problems in the research work. The similar problems of the transformation of agriculture are sun in Hungary as well as in Poland. These problems are solved by Nagy, Vántus (2001) and Makarski (2001).

In the last years, the Slovak Republic has recorded a *negative balance (result)* in the foreign agrarian trade. Bielik (2001) and Horská, Ubrežiová (2001) explained that the reason for this is that we import such commodities from abroad, which could be substituted by domestic ones not only due to convenient climate – soil conditions, but also due to cultivation and livestock traditions of the country. The state should guarantee the safety of people's nutrition. Unfortunately, a considerable part of basic products is imported especially from the Czech Republic.

The objective of this paper is the study and research of selected indicators of cereal production in 1999 and 2002 in the Slovak Republic.

MATERIAL AND METHODS

Research has been focused on very important commodities of the selected cereals market such as wheat, rye, barley, oats and maize. Figures relating to yields, cost prices, production costs and revenues were observed. Also, analyses of the selected economic indicators as well as research of other economic indicators have been carried out.

To be able to provide our research, we used secondary information database sources and publications of the Statistical Office of SR, Ministry of Agriculture of SR, EUROSTAT and other information sources.

RESULTS AND DISCUSSION

In the Slovak Republic, cereals belong to very important commodities in the crop production structure. They cover 45–58% of arable land. Currently, in the period of transition to market economy, cereals rate to be the appropriate market commodities. They are characteristic by low demand on direct labour. Production of food cereals and their sale within the agrarian market is a very lucrative deal.

The objects of research were commodities such as wheat, barley, maize, rye and oats. These are *crucial* commodities in the economic group 10 Cereals.

Yields, cost prices, costs, revenues, economic results, profitability and efficiency in cereal production are presented in Table 1.

From it, it follows that yields of wheat are relatively steady achieving the level of 3.38 to 4.45 t/ha. In the long-term period, a decrease of yields was recorded.

Cost price of wheat for the observed period is 3 519 to 4 274 SKK/t. It is very difficult to analyze this economic category because there exist two different kinds of wheat, one for human consumption and the other for animal consumption, and as a consequence, the cost price is relatively low.

The production costs of wheat tend to increase. The general tendency of increasing the production inputs and only a slight increase of primary production output prices are the main reasons for this phenomenon.

Revenues are derived from production and producer prices according to the particular years of research.

The economic result of wheat is unfavourable during the years 1999–2002 except for the year 2001 where a profit of 1 735 SKK/ha was achieved.

The results of efficiency and costs profitability were negative in the observed period except for the year 2001.

Barley and wheat can be used in two market segments regarding the human and the fodder markets. Natural and value indicators in barley compared to those in wheat for the observed year showed lower yields. The recorded arithmetical average per hectare yields in barley was 3.21 t per ha. It is very interesting to realize that from 1999 to 2002, a higher average price of barley products was achieved than in wheat products reaching the level of 4 211 SKK/ha.

Production costs of barley have an increasing tendency that oscillated from 12 036 to 15 587 SKK/ha.

The profit in barley production was recorded in the years 2001 and 2002.

Table 1.Yields. cost prices, costs, revenues, profit and production efficiency of selected commodities in the SR

Commodity	Year	Yield (t/ha)	Price (SKK/t)	Costs (SKK/ha)	Revenues (SKK/ha)	Profit/loss (SKK/ha)	Cost efficiency	Cost profitability
Food wheat	1999	4.25	3 519	15 602	14 956	–646	0.96	–0.04
	2000	3.38	3 921	15 509	13 354	–2 155	0.86	–0.14
	2001	4.45	4 274	17 284	19 019	1 735	1.10	0.10
	2002	4.03	3 989	17 480	16 076	–1 404	0.92	–0.08
Food barley	1999	3.29	3 452	12 036	11 357	–679	0.94	–0.06
	2000	2.24	3 886	13 052	8 705	–4 347	0.67	–0.33
	2001	3.58	4 662	14 582	16 690	2 108	1.14	0.14
	2002	3.76	4 844	15 587	18 213	2 626	1.17	0.17
Maize	1999	6.61	3 289	19 846	21 740	1 894	1.10	0.10
	2000	3.83	3 895	19 773	14 918	–4 965	0.75	–0.25
	2001	5.72	4 325	22 356	24 739	2 383	1.11	0.11
	2002	6.29	3 918	23 204	24 644	1 440	1.06	0.06
Rye	1999	2.47	3 696	11 589	9 129	–2 460	0.79	–0.21
	2000	2.15	3 958	12 887	8 510	–4 377	0.66	–0.34
	2001	3.23	3 966	13 213	12 810	–403	0.97	–0.03
	2002	2.80	4 031	13 651	11 287	–2 364	0.83	–0.17
Oats	1999	2.70	3 264	10 743	8 813	–1 930	0.82	–0.18
	2000	1.38	5 566	10 927	4 921	–6 006	0.45	–0.55
	2001	2.30	4 437	10 742	10 205	–538	0.95	–0.05
	2002	2.66	3 795	11 758	10 095	–1 663	0.86	–0.14

Source: Research Institute of Agriculture and Food Economics and the authors´ calculations

Maize is a very important commodity in the agrarian market. It has a wide economic use as both feed and food crops. Out of all the observed commodities, maize has the highest per hectare yields in the conditions of the Slovak Republic showing the arithmetical average of 5.61 t per ha during the observed period.

The price of maize had the margin from 3 289 to 4 325 SKK/t.

The production costs of maize are the highest from the group 10 Cereals and they are on the level from 19 846 to 22 356 SKK/ha. From costs, production and cost prices, there are derived other economic indicators, which only in the year 2000 were favourable in maize production

Rye and oats are not significant agrarian commodities in the market. Usually they achieve relatively low per hectare yields, but the cost prices are interesting for producers especially for food market segments. For the period observed, the yields show the lowest level, but the average cost prices of rye were 3 912 SKK/ha and those of oats were 3 765 SKK/ha. Efficiency and also cost profitability recorded negative values.

Production efficiency of selected cereals

Production efficiency of the selected cereals was analyzed as the relation between revenues and additional indicators of production costs. The analyzed results of production efficiency of the selected cereals with and without subsidies are presented in Table 2.

Table 2 demonstrates that the level of additional subsidies in wheat was different during 1999–2002. The highest level of subsidies was recorded in 2000 when farmers obtained 4 013 SKK/ha and the lowest level was recorded in 2002 when farmers obtained 1 380 SKK/ha. These are the average indicators relating to individual production regions of the Slovak Republic. We may conclude that wheat production without additional subsidies was only efficient in 2001 and in the same crop, only the year 2002 showed a negative result in spite of obtaining additional subsidies.

Barley production subsidies range was between 1 155 to 3 821 SKK/ha. In spite of what was mentioned above, the year 2000 was not profitable, it made a loss.

Maize is a very important commodity. The subsidy system was very different during the observed period. In the year 2000, the maximum subsidy level of 5 194 SKK per ha was recorded, but in 2002 this was only 988 SKK per ha. The rest of maize production economics will be derived from these subsidy tools.

Rye and oats as the less important market commodities obtained relatively higher subsidies than maize. But during the followed period, they achieved a lower cost efficiency as well as cost profitability.

Table 2. Production efficiency of the selected cereals with and without subsidies

Commodity	Year	Subsidies (SKK/ha)	Profit/Loss (SKK/ha)		Cost efficiency	Cost profitability
			without subsidies	with subsidies		
Wheat	1999	1 961	–646	1 315	1.08	0.08
	2000	4 013	–2 155	1 858	1.12	0.12
	2001	1 535	1 735	3 270	1.19	0.19
	2002	1 380	–1 404	–24	1.00	0.00
Barley	1999	1 622	–679	983	1.08	0.08
	2000	3 821	–4 347	–526	0.96	–0.04
	2001	1 409	2 108	3 517	1.24	0.24
	2002	1 155	2 626	3 781	1.24	0.24
Maize	1999	1 730	1 894	3 624	1.18	0.18
	2000	5 194	–4 965	229	1.01	0.01
	2001	1 419	2 383	3 802	1.17	0.17
	2002	988	1 440	2 428	1.10	0.10
Rye	1999	2 771	–2 460	311	1.03	0.03
	2000	4 086	–4 377	–291	0.98	–0.02
	2001	2 151	–403	1 748	1.13	0.13
	2002	1 944	–2 364	–420	0.97	–0.03
Oats	1999	1 728	–1 930	–202	0.98	–0.02
	2000	2 679	–6 006	–3 327	0.70	–0.30
	2001	1 530	–538	992	1.09	0.09
	2002	1 665	–1 663	2	1.00	0.00

Source: Research Institute of Agriculture and Food Economies and the authors´ calculations

Break-even point in natural production and particular production costs in cereals in the Slovak Republic

Natural production

Theoretical level or the break-even point of the selected natural and economic indicators of cereals production point to the limits of the break-even point in terms of fertility analysis, costs and cereals cost prices. The results of this analysis are presented in Table 3.

As Table 3 shows, the break-even point relating to fertility is different in terms of the individual commodities observed. As far as wheat is concerned, the lowest per hectare yield during the observed period was achieved in 2000, being 3.38 t/ha. Within the basic calculations, we can demonstrate that the minimal yield without subsidies could theoretically achieve the level of 3.92 t/ha, which was still within the limit of profitability. If subsidies of the given year were taken into account, per hectare yield could decrease on the level of 2.90 t/ha, where wheat production would still remain within the profitability limit.

The year 2000 was also not a favorable one. The per hectare yields only achieved 2.24 t/ha. The producers to be within a limit of profitability they should achieve their per hectare yield of 3.35 t/ha without subsidies and 2.37 t per ha with subsidies.

The year 2000 was unfavorable for all of the followed commodities especially for oats, when the yield of 1.38 t per ha was achieved.

Production costs of the selected cereals

It results from Table 3, that in general the costs have an increasing trend, which is especially caused by the in-

Table 3. Break–even point in natural production, prime costs, cost price of selected cereals in SR during 1999–2002

Commodity	Break–even point in yield			Break–even point in costs			Break–even point in producer prices		
	yield (t/ha)	minimal yield (t/ha)		costs (SKK/ha)	maximal costs (SKK/ha)		producer price (SKK/t)	minimal price (SKK/t)	
		without subsidies	with subsidies		without subsidies	with subsidies		without subsidies	with subsidies
Wheat									
1999	4.25	4.43*	3.87*	15 602	14 956	16 917	3 519	3 671	3 210
2000	3.38	3.92	2.90	15 509	13 354	17 367	3 951	4 589	3 401
2001	4.45	4.04	3.68	17 284	19 019	20 554	4 274	3 884	3 539
2002	4.03	4.38	4.03	17 480	16 076	17 456	3 989	4 337	3 995
Barley									
1999	3.29	3.48	3.00	12 036	11 357	13 019	3 452	3 658	3 153
2000	2.24	3.35	2.37	13 052	8 705	12 526	3 886	5 826	4 121
2001	3.58	3.12	2.82	14 582	16 690	18 099	4 662	4 073	3 681
2002	3.76	3.21	2.97	15 587	18 213	19 368	4 844	4 146	3 838
Maize									
1999	6.61	6.03	5.50	19 864	21 740	23 470	3 289	3 002	2 740
2000	3.84	5.11	3.78	19 883	14 918	20 112	3 895	5 191	3 835
2001	5.72	5.16	5.66	22 356	24 739	26 158	4 325	3 908	3 243
2002	6.29	5.92	5.67	23 204	24 644	25 632	3 918	3 689	3 561
Rye									
1999	2.47	3.13	2.38	11 589	9 129	11 900	3 696	4 692	4 566
2000	2.15	3.25	2.22	12 887	8 510	12 596	3 958	5 994	4 093
2001	3.23	3.33	2.78	13 213	12 810	14 961	3 966	4 091	3 425
2002	2.80	3.38	2.90	13 651	11 287	13 231	4 031	4 875	4 181
Oats									
1999	2.70	3.29	2.76	10 743	8 813	10 541	3 264	3 979	3 339
2000	1.38	3.06	2.31	10 927	4 921	7 600	3 566	7 918	5 977
2001	2.30	2.42	2.07	10 742	10 205	11 735	4 437	4 671	4 006
2002	2.66	3.09	2.66	11 758	10 095	11 760	3 795	4 420	4 419

Source: Research Institute of Agriculture and Food Economies and the author's calculations

creased input prices. During 1999–2002, index changes of 12.5% in wheat; 29.5% in barley; 16.8% in maize; 17.8% in rye, and 9.4% in oats were recorded.

The year 2001 was the wheat best production year overcoming the expected cost increase level of 19 019 SKK/ha. Under these conditions, the barley production would be still profitable without subsidies. On the other hand, with subsidies the costs would increase to the level of 20 554 SKK/ha. Relatively favorable results were recorded in maize production.

Break-even point in cost price

During 1999–2002, the production of wheat (both for human and animal consumption) reached an average cost price of 3 933 SKK/t. As it is presented in Table 3, the minimal wheat price in 1999 was lower of 152 SKK/t and of 348 SKK/t in 2002. This is the way the price should be calcultated in order to remain within the limit of profitability.

Barley has lower per hectare yields in comparison with wheat, but the average cost price achieved was 4 211 SKK per t. The year 2000 is unfavourable also for barley. In theory, the minimal price achieved should have been 5 826 SKK/t without subsidies and of 4 121 SKK/t with subsidies. The real price was of only 3 886 SKK/t.

The average price of maize during the observed period was 3 856 SKK/t. In the year 2000, the low per hectare yield caused that the minimal price (without subsidies) should have reached the level of 5 191 SKK/t to remain within the limit of profitability.

In the period observed, the production of rye and oats recorded low costs. The year 2001 was an exception due to the existence of subsidies.

On the basis of research and study of this topic, it is possible to conclude that Slovakia's natural production of cereals, except maize, achieves a considerably lower fertility in comparison with the EU countries. The year 2000 was extremely unfavourable for Slovak farmers due to climatic conditions and as a result, there were lower per hectare yields.

Cost prices of cereals tend to fluctuate. During 1999–2002, barley reached the highest level of cost price (4 211 SKK/t) followed by wheat (3 933 SKK/t), rye (3 912 SKK/t), maize (3 856 SKK/t) and oats (3 765 SKK/t), which recorded the lowest cost price.

The level of costs of the selected cereals was derived from inputs and from the level of labour and technological process organization. In densely sown cereals, the highest costs were recorded in wheat 16 468 SKK/ha, in rye 12 835 SKK/ha and in barley 13 814 SKK/ha. The higher costs of wheat production are the reason for its larger cultivated areas in comparison with rye. Both are cultivated as winter crops. Barley and oats are cultivated as spring crops but also a small part of the area is sown with winter barley. Maize is cultivated as a spring crop, but it has particular demands on soil preparation, machinery and technological systems for seeding, treating and harvesting. These are objective reasons for higher growing costs.

The profit in wheat production was only recorded in 2001; in barley production in 2001 and 2002; in maize production in 1999, 2001 and 2002, and other followed commodities such as rye and oats made loss each year.

Cost efficiency and profitability are derived from all the above indicators.

The break-even point in the observed period showed a significant influcence of subsidies in the economic results of land farming in the commodities observed.

Scheme and references

The comparison of Slovakia's natural indicators during 1999–2002 showed a considerable lagging behind the developed agrarian countries of the EU. The increase of fertility will predict a higher degree of intensification process; especially of qualitative, technical and technological systems in cereal cultivation. Effective biological materials as well as effective agrichemical products are also of importance.

In the price policy of cereals, there are conditions of price and non-price tools, which are stated by the system of the EU market organization regarding crops on arable land. Cost prices of Slovak farmers are on the level of 80–85% in comparison with the EU countries. There is an assumption that on the basis of activities and temporary decision making, the cost prices will increase.

We can observe on the basis of information and material studies that the appropriate conditions are being created for further development of cereal production in Slovakia.

CONCLUSION

Cereal production in the Slovak Republic has a particular position in land farming because cereal cultivation structure covers from 45 to 58% of arable land. Crucial commodities are wheat, barley and maize and will be crucial also after the accession to the EU. The research done in the period 1999–2002 showed that the economic year 2000/2001 had the worst production due to unfavourable climatic conditions. But in spite of this, our farmers lag behind the developed agrarian countries in fertility. Domestic cost prices reached the level of 80–85% in comparison with the ones of the EU countries. However, it is very difficult to compare costs because of the difference of the calculation methodology. We can observe that the level of natural and value indicators of Slovak farmers are significantly lower than those in the EU.

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