

ANALYSIS OF SLOVAK AGRICULTURAL POSITION FROM THE PERSPECTIVE OF SELECTED INDICATORS AND SLOVAK REGIONS

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Abstract: This article deals with evaluation of agricultural performance on the market through selected indicators. According to the period 2000 – 2011 or 2012, we analyse, how the development trends in agriculture changed. Firstly we analyse the amount of GDP in agriculture, the number of employees, the average salary and competitiveness in foreign markets. Then we analyse the amount of agricultural production according to each region of Slovakia to show, what the effectiveness of each region is.

Key words: agriculture, Slovak republic, GDP, employment, wages, michaely Index, RCA 1 Index, Regions in Slovakia

Introduction

Agriculture is irreplaceable in every economy. The national economy is usually divided into three sectors. Agriculture belongs to the primary sector according to this division. This sector is characterized by providing essential resources from nature and providing products that have not undergone any processing stage. [2]

Agricultural production is according to Spišiak [6] a conscious and systematic use of natural forces and resources that evaluates the biological properties of some plants and animals to ensure food and other raw materials needed to meet basic subsistence needs of man.

Many authors in Slovakia analyse the Slovak agriculture sector according to selected indicators. Kotulič and Pavelková [4] analyse the financial situation of agriculture's companies. Kotulič, Adamišín and Vozárová [3] analyse the impact of foreign direct investments to agriculture according to regions of Slovakia. Ubrežiová et al. [8] dedicated at the internationalization in Slovak milk processing industry. None of mentioned authors, analyse the agriculture sector according to indicators, which we use.

When quantifying the competitiveness of this industry, there exist several approaches. The most frequently mentioned one in the literature is the RCA (revealed comparative advantage) coefficient.

Coefficient RCA 1 - compares the share of exports and imports of selected commodity groups to the total exports and imports of the country.

$$RCA\ 1 = \ln \left[\left(\frac{x_{ij}}{m_{ij}} \right) \div \left(\frac{X_j}{M_j} \right) \right] \quad (1)$$

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where:

x_{ij} - value of export of i – group of goods from analysed sector of national economy j ,

m_{ij} - value of import to i – group of goods from analysed sector of national economy j

X_j - value of total export of national economy j

M_j - value of total import to national economy j

Coefficient RCA 1 means:

$RCA > 0$ indicates that there are revealed comparative advantages for exports of given commodity groups,

$RCA < 0$ induces revealed comparative disadvantage in this commodity group.

The higher RCA is, the higher competitive advantage in this commodity exists.

Conversely, the lower the value of RCA is, the higher competitive disadvantage is.

If the $RCA = 0$, the sector has no competitive advantage or disadvantage. [1]

Michaely index - analyzes the proportion of examined commodity group on the national imports

$$M_{ij} = \frac{X_{ij}}{\sum_i X_{ij}} - \frac{M_{ij}}{\sum_i M_{ij}} \quad (2)$$

where :

X_{ij} - i – commodity group export of j - country

M_{ij} - i – commodity group import of j – country

$\sum_i X_{ij}$ - total national export

$\sum_i M_{ij}$ - total national import

Michaely index means:

$0 < M_{ij} < 1$ points to a degree of specialization of the country in the certain commodity group,

$-1 < M_{ij} < 0$ points to the lack of specialization of countries in the certain commodity group. [1]

„The Nomenclature of Units for Territorial Statistics is a geocode standard referencing the subdivisions of countries for statistical purposes. The standard is developed and regulated by the European Union, and thus only covers the member states of EU in detail.“ [5] At NUTS III level we distinguish 8 regions in the Slovak Republic.

Aim and methodology

The aim of this paper is to assess the current level of agriculture of SR on the basis of selected indicators in the context of the historical development of the last 12, respectively 13 years and also in the context of regional analysis.

In this paper, we used the data published by the Statistical Office of the Slovak Republic. These data were used for the calculation of selected indicators. Other sources of data were selected articles and publications devoted to agriculture.

We examined the period 2000 - 2011 respectively 2012, if the data were available.

In this paper, we analyzed SR agriculture through selected indicators, namely:

- the share of agriculture in GDP,
- number of workers,
- the average nominal monthly wage,
- competitiveness of the agricultural commodity groups in foreign markets as measured by RCA index 1 and Michaely index
- agricultural production divided into plant and animal,
- agricultural production divided into plant and livestock according to Slovak regions.

In assessing the status of agriculture of the SR, we used the methods of analysis and calculation of indices.

Discussion

The Slovak Republic recorded growth of GDP in the given period except of 2009, when GDP fell compared with the previous year. Consequently, since 2010 the GDP has grown again. In the field of agriculture, forestry and fisheries classification of economic activities of SK NACE Rev. 2 development fluctuated. A slight decrease compared to the previous years was in 2003, 2005 and 2010. The sharp decline from the previous year was achieved in 2009, when there was also a decrease of total GDP in the country.

Higher information value of state of GDP in agriculture has an indicator of rate of agriculture GDP to total GDP of the country. It declined from 2002 until 2005 and then the decline was observed even in the period 2008 to 2010. Although in the last three years the share of agriculture in GDP had growing trend, it still did not reach the level of 2002. At present, agriculture GDP is about 3% of total GDP of the country.

Table 1. Development of GDP in the Slovak Republic in mil. €

	Total economy	Agriculture, forestry and fisheries	Agriculture in%
2000	31 177	1 240	3.98
2001	33 881	1 530	4.52
2002	36 806	1 670	4.54
2003	40 611	1 627	4.01

2004	45 161	1 647	3.65
2005	49 314	1 591	3.23
2006	55 001	1 767	3.21
2007	61 449	2 233	3.63
2008	66 842	2 504	3.75
2009	62 794	1 933	3.08
2010	65 869	1 685	2.56
2011	69 108	2 146	3.11
2012	71 463	2 375	3.32

Source: Statistical Office of SR

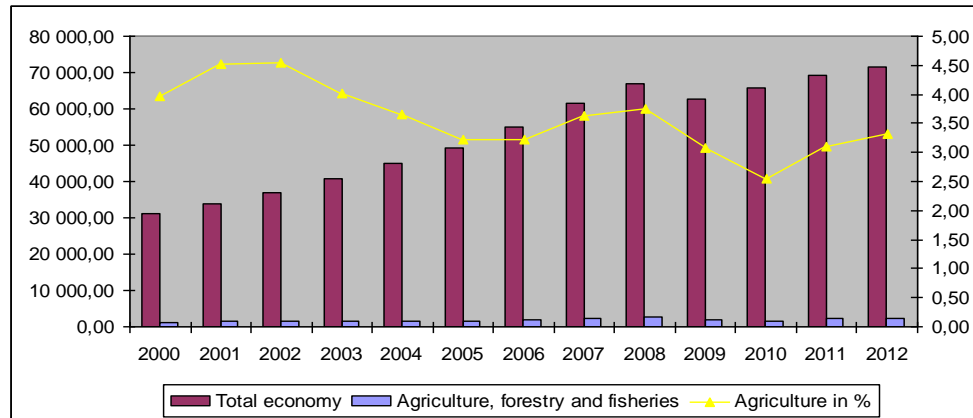


Figure 1. Development of GDP in the Slovak Republic in mil. €

Source: own elaboration

The following table shows the total number of work force in the national economy, the number of workers in agriculture and the percentage of workers in agriculture compared to the total number of workers in the Slovak Republic. The share of workers in agriculture to labour force in the Slovak Republic in the period 2000 - 2012 significantly decreased. In 2000 work force of agriculture was more than 7% of all workers, but in 2012 it was only 3.26 % of all workers.

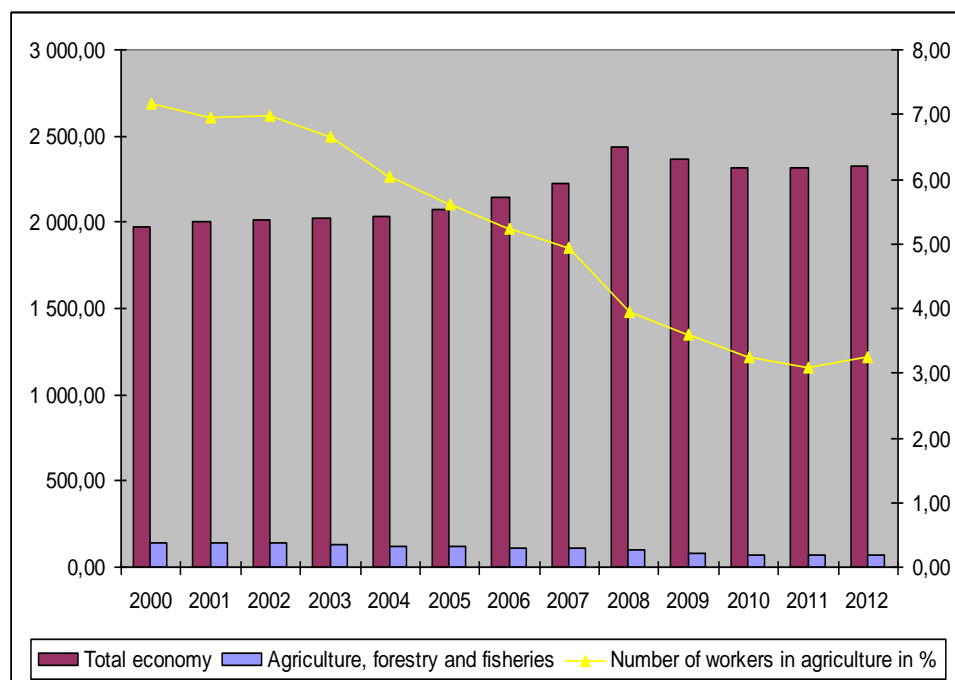


Figure 2. Work force according to selected economic activity (NACE Rev. 2) in thousand persons

Source: own elaboration

Another indicator is the average nominal wage. During the given period it grew in the Slovak economy, including the agriculture. However, during the period the average wage growth in the economy was faster than in agriculture. This difference is shown in the graph 3. In 2012, the average wage in the economy was € 805, in agriculture it was € 637, which represents 79 % of the average wage in the economy.

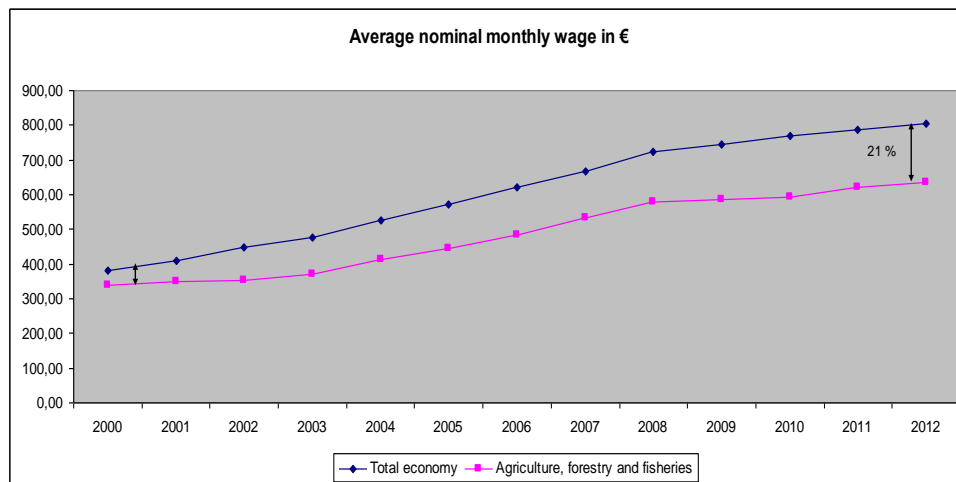


Figure 3. Average nominal monthly wage in €
Source: own elaboration

Using the RCA index 1, we analyzed each commodity group in agriculture in the period of 2003 - 2010. We see the positive values in the class of livestock in the period according to the review. Commodity group containing milk, eggs, honey and edible products of animal origin reached in the years 2003 to 2008 positive values, which means a competitive advantage for this kind of commodity group in foreign markets. But between 2009 and 2011, the competitive advantage of this group changed into competitive disadvantage. Other commodity groups had negative values throughout the analyzed period, which represents a competitive disadvantage for Slovak goods in foreign markets.

Based on the Michaely index values Slovakia specializes in the export of livestock, which achieved values > 0 throughout the analyzed period. The least competitive class of commodities in foreign markets is a group of meat and edible offal, which in 2011 reached the lowest negative value of all.

Table 2. Value of RCA 1 index in SR

	Livestock	Meat and edible meat offal	Fish and crustaceans, molluscs and other aquatic invertebrates	Milk; birds' eggs ;natural honey; edible products of animal	Products of animal origin, not elsewhere specified or included	Live trees and other plants; bulbs, roots and the like; cut flowers	Edible vegetables and certain roots and tubers	Edible fruit and nuts; peel of citrus fruits or melons
2000	0.5321	-2.0011	-2.2740	0.5833	-1.0115	-1.6079	-0.3703	-2.0969
2001	0.2516	-1.1264	-2.3246	0.8331	-0.6792	-1.8188	-0.1304	-1.6731
2002	0.4380	-1.3815	-2.2753	0.7825	-0.7797	-1.8603	-0.3762	-1.7075
2003	0.6055	-1.2744	-2.0348	0.8683	-0.6716	-1.6468	-0.5580	-1.4757
2004	0.6285	-0.6522	-1.5535	0.7007	-0.6098	-1.3483	-1.0608	-1.1230
2005	0.7130	-0.6702	-1.6263	0.4646	-0.3433	-1.7063	-0.7041	-0.6984

2006	0.8784	-0.7850	-1.7153	0.4109	-0.1955	-1.7440	-1.0022	-0.6938
2007	1.0326	-0.8714	-1.6240	0.3027	-0.5810	-2.1610	-1.0704	-1.0625
2008	0.4894	-1.1061	-1.7233	0.3250	-0.4442	-1.9101	-1.1470	-1.1091
2009	0.7679	-1.5180	-2.1087	-0.0890	-0.6326	-1.9826	-1.2400	-1.2690
2010	0.7236	-0.9229	-1.8397	-0.1976	-0.4824	-2.0316	-1.3399	-1.4243
2011	0.7671	-1.1232	-1.1859	-0.0819	-0.7196	-1.6516	-1.8352	-1.3151

Source: own calculation based on data from Statistical Office SR

Table 3. Values of Michaely index in the SR

	Livestock	Meat and edible meat offal	Fish and crustaceans, molluscs and other aquatic invertebrates	Milk; birds' eggs; natural honey; edible products of animal	Products of animal origin, not elsewhere specified or included	Live trees and other plants; bulbs, roots and the like; cut flowers	Edible vegetables and certain roots and tubers	Edible fruit and nuts; peel of citrus fruits or melons
2000	0.0006	-0.0022	-0.0012	0.0018	-0.0003	-0.0009	-0.0006	-0.0044
2001	0.0003	-0.0019	-0.0012	0.0027	-0.0002	-0.0010	-0.0002	-0.0040
2002	0.0006	-0.0023	-0.0012	0.0025	-0.0002	-0.0011	-0.0007	-0.0041
2003	0.0006	-0.0019	-0.0008	0.0027	-0.0001	-0.0009	-0.0009	-0.0034
2004	0.0010	-0.0018	-0.0006	0.0027	-0.0002	-0.0007	-0.0015	-0.0035
2005	0.0013	-0.0031	-0.0007	0.0028	-0.0002	-0.0007	-0.0013	-0.0028
2006	0.0015	-0.0025	-0.0009	0.0020	-0.0001	-0.0006	-0.0019	-0.0024
2007	0.0015	-0.0025	-0.0005	0.0016	-0.0002	-0.0007	-0.0021	-0.0031
2008	0.0008	-0.0036	-0.0005	0.0017	-0.0001	-0.0007	-0.0021	-0.0031
2009	0.0015	-0.0060	-0.0006	-0.0005	-0.0002	-0.0010	-0.0029	-0.0036
2010	0.0013	-0.0043	-0.0006	-0.0011	-0.0001	-0.0009	-0.0029	-0.0033
2011	0.0016	-0.0048	-0.0005	-0.0004	-0.0002	-0.0008	-0.0029	-0.0028

Source: own calculation based on data from Statistical Office SR

Table 4. The volume of agricultural production in the mil. EUR

	Crop production	Livestock	Total agriculture production
2000	670.9	1077.8	1748.8
2001	956.38	1 053.41	2009.79
2002	935.21	1 146.09	2081.3
2003	867.26	1 100.01	1967.27
2004	1 267.74	1 014.84	2282.58
2005	964.38	980.81	1945.19
2006	980.02	965.08	1945.1
2007	1066.55	997.21	2063.76
2008	1150.3	1077.24	2227.54
2009	850.59	813.36	1663.95
2010	867.88	805.17	1673.05
2011	1 202.66	876.9	2079.56

Source: Statistical Office of SR

Development of the volume of agricultural output in the SR is given in Table 4 and in the graph 4. We can see that the volume of agricultural production reached the peaks in 2004 and 2008. Reducing of the volume of total production occurred

between 2005 and 2009. In the years 2000 - 2003 and 2005 Slovakia oriented largely on livestock. In years 2004 and from 2006 to 2011 accounted the majority of the agricultural production was plant production.

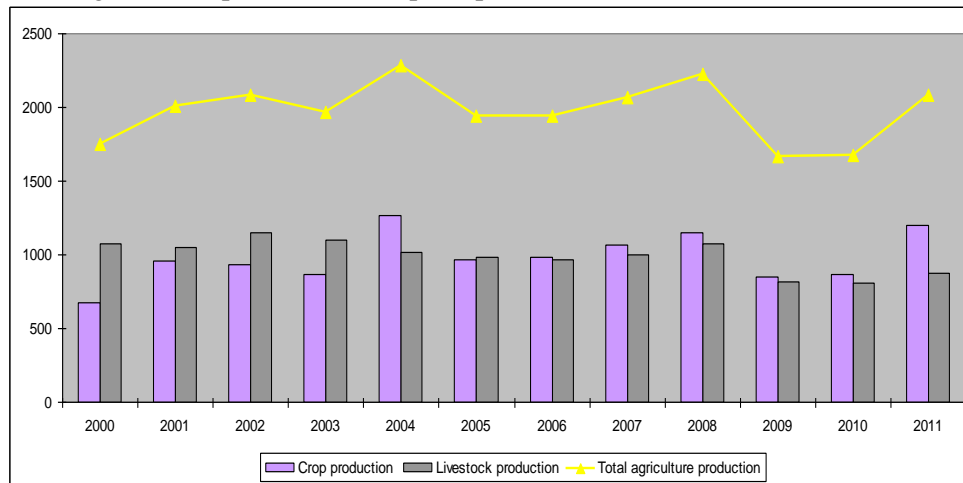


Figure 4. The volume of agricultural production in the mil. EUR

Source: own elaboration

The following table shows the volume of agricultural production divided into plant and livestock production in the regions of Slovakia. In the period 200 - 2011 there was the development of agricultural production in all regions without major changes, except in 2009, when there was economic crisis in all economy. Fluctuations in individual years were largely due to climatic conditions in a given year, but such weather events do not cause large changes in the volume of production.

The table 5 shows the percentage of plant and livestock production in total agricultural production in given year in different regions. The values above 50% are highlighted for each year in selected type of agricultural production. This is the dominant type of agricultural production in a given year in different regions of Slovakia.

Prevalence of livestock to crop production was in Bratislava, Trnava and Nitra regions and since 2004 also in the Košice region, where in 2005 the difference between crop and livestock production was minimal. Prevalence of livestock production was in Trenčín, Žilina, Banská Bystrica and Prešov regions.

Table 5. Agricultural production (thousand EUR) by territory

Bratislava region					
	Total	Crop production	Livestock	Crop prod. in %	Livestock in %
2000	105 723	51 119	54 604	48	52
2001	114 287	60 181	54 106	53	47
2002	95 598	51 085	44 513	53	47
2003	113 025	72 296	40 729	64	36
2004	99 051	66 487	32 563	67	33

2005	93 374	51 816	41 559	55	45
2006	97 026	59 019	38 007	61	39
2007	98 154	59 782	38 372	61	39
2008	116 909	65 292	51 617	56	44
2009	101 356	55 903	45 453	55	45
2010	109 015	61 647	47 368	57	43
2011	138 185	86 017	52 168	62	38
Trnava region					
2000	320 886	137 290	183 596	43	57
2001	385 813	190 699	195 114	49	51
2002	387 838	189 637	198 201	49	51
2003	413 629	213 404	200 226	52	48
2004	431 986	229 802	202 184	53	47
2005	404 103	212 375	191 728	53	47
2006	390 327	201 288	189 039	52	48
2007	400 319	203 346	196 973	51	49
2008	419 803	233 055	186 749	56	44
2009	321 405	170 014	151 391	53	47
2010	375 330	207 369	167 961	55	45
2011	464 800	279 708	185 092	60	40
Trenčín region					
2000	175 098	47 003	128 095	27	73
2001	220 972	74 753	146 219	34	66
2002	218 881	74 454	144 427	34	66
2003	233 785	106 320	127 465	45	55
2004	212 873	79 234	133 639	37	63
2005	188 210	66 155	122 054	35	65
2006	193 720	64 927	128 792	34	66
2007	215 462	78 271	137 190	36	64
2008	204 607	79 665	124 942	39	61
2009	165 339	67 123	98 216	41	59
2010	148 874	66 097	82 777	44	56
2011	182 689	84 667	98 022	46	54
Nitra region					
2000	422 260	198 101	224 159	47	53
2001	548 928	300 339	248 589	55	45
2002	570 338	306 679	263 659	54	46
2003	490 141	242 581	247 560	49	51
2004	573 292	341 632	231 660	60	40
2005	564 031	324 172	239 859	57	43
2006	566 023	330 379	235 644	58	42
2007	623 847	354 345	269 501	57	43
2008	626 635	391 655	234 980	63	37
2009	455 944	275 071	180 873	60	40
2010	481 816	319 165	162 651	66	34
2011	630 763	452 119	178 644	72	28
Žilina region					
2000	137 522	34 422	103 100	25	75
2001	157 406	44 314	113 092	28	72
2002	156 211	50 621	105 590	32	68
2003	143 464	43 218	100 246	30	70
2004	137 489	45 774	91 715	33	67
2005	121 191	32 099	89 092	26	74
2006	129 423	39 202	90 221	30	70
2007	132 842	44 181	88 661	33	67
2008	123 913	34 588	89 325	28	72

2009	100 120	35 204	64 916	35	65
2010	104 557	30 732	73 825	29	71
2011	119 019	37 588	81 431	32	68
Banská Bystrica region					
2000	214 897	60 513	154 385	28	72
2001	246 598	93 574	153 024	38	62
2002	254 199	94 735	159 464	37	63
2003	220 740	67 550	153 190	31	69
2004	238 067	103 432	134 635	43	57
2005	214 964	84 877	130 087	39	61
2006	218 848	95 665	123 183	44	56
2007	224 988	102 968	122 021	46	54
2008	233 785	104 860	128 925	45	55
2009	155 669	74 339	81 330	48	52
2010	168 870	73 002	95 868	43	57
2011	220 342	102 081	118 261	46	54
Prešov region					
2000	182 733	58 089	124 643	32	68
2001	186 915	63 068	123 847	34	66
2002	192 160	77 574	114 585	40	60
2003	149 638	50 289	99 349	34	66
2004	171 812	78 138	93 673	45	55
2005	146 883	53 044	93 839	36	64
2006	151 497	56 629	94 868	37	63
2007	160 559	73 525	87 034	46	54
2008	157 771	65 658	92 113	42	58
2009	119 322	57 383	61 939	48	52
2010	114 376	46 666	67 710	41	59
2011	141 847	65 305	76 542	46	54
Košice region					
2000	189 670	84 412	105 258	45	55
2001	211 711	102 569	109 142	48	52
2002	213 802	109 374	104 428	51	49
2003	176 791	67 350	109 440	38	62
2004	227 611	116 378	111 233	51	49
2005	180 509	89 424	91 084	50	50
2006	180 077	99 017	81 060	55	45
2007	202 616	120 295	82 321	59	41
2008	212 972	132 477	80 495	62	38
2009	170 636	99 476	71 160	58	42
2010	153 005	87 668	65 337	57	43
2011	193 254	130 793	62 461	68	32

Source: own calculation based on data from Statistical Office SR

As shown in the graph 5, the largest volume of agricultural production was reached in Nitra and Trnava regions. Other regions had considerably lower agricultural production in the given period. The biggest decline in agricultural production was in 2009 in all regions of Slovakia caused by the economic crisis. Throughout the examined period, the lowest values were recorded in Žilina and Bratislava regions. These disparities are due to significantly different geographical conditions and also the size of individual regions. Žilina region is characterized by very rugged surface with a high proportion of mountainous areas and lower annual average temperatures compared to other regions of Slovakia. Bratislava region is the smallest among the regions of Slovakia and represents the capital of the Slovakia.

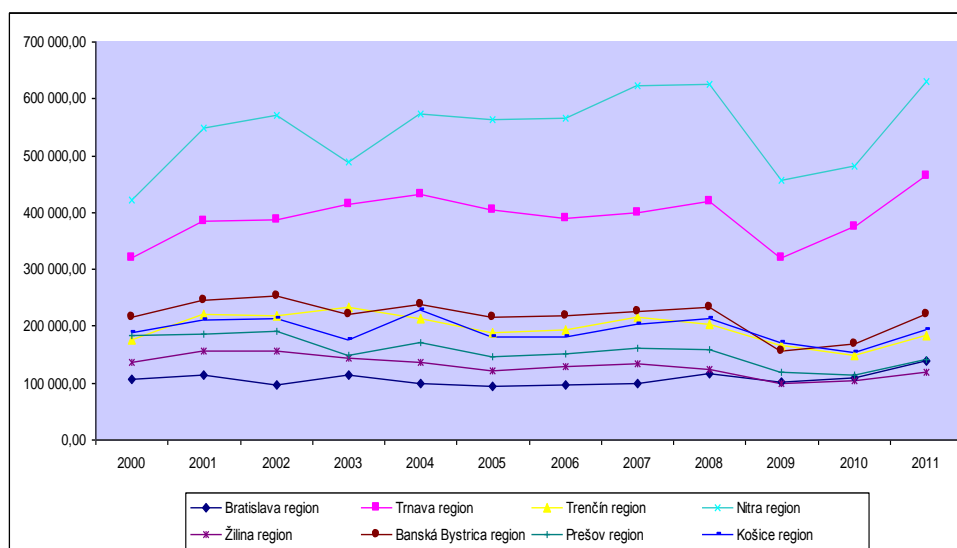


Figure 5. The volume of total agricultural production in regions
Source: own elaboration

Summary

Based on selected indicators, we examined the development of Slovak agriculture in the years 2000 - 2011 (or 2012).

The Slovak Republic recorded growth of GDP except in 2009, when GDP fell compared with the previous year. Consequently, since 2010 the GDP has grown again. In comparison of GDP growth in agriculture with the GDP growth of the country, the significant differences can be seen. While GDP in agriculture grew almost over the whole period, its share on the country's GDP declined. This was due to slower growth in agricultural GDP compared to GDP growth of the country. Currently, the share of agriculture in GDP is about 3% of the country's GDP.

The number of people working in agriculture had a downward trend during the period. In 2000 there worked about 7% of all workers in agriculture, but in 2012 only about 3%. However, despite this fact, the volume of production of the agricultural sector grew. The average wage of workers in agriculture during the period grew, but its growth was slower than the average wage in national economy. In 2012, the average wage in the economy was € 805, in agriculture it was € 637.

The position of Slovak agriculture in the foreign markets was examined via RCA values 1 and Michaely index. The most competitive area of Slovak agriculture in foreign markets was the livestock production throughout this period. Thus, we can conclude that the export is intended primarily on livestock production, which has competitive advantage in the foreign markets.

At the beginning of the examined period (2000 - 2003, 2005) there prevailed livestock production in Slovakia. In years 2004, 2006-2011 there was the change to crop production in Slovak agriculture.

In regional analysis, we identified the regions with above-average agricultural production throughout the period, which was in Nitra and Trnava regions. In both cases, the regions specialized in crop production. Based on a comparison of the percentage of crop and livestock production we identified regions with a predominance of plant and animal production in total agricultural production. In summary, we can conclude that the 4 regions had a predominance of livestock production over plant production.

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ANALIZA STANU ROLNICTWA NA SŁOWACJI Z PERSPEKTYWY WYBRANYCH CZYNNIKÓW I REGIONÓW

Streszczenie: Artykuł ten podnosi kwestię ewaluacji wydajności rolnictwa, dzięki wybranym czynnikom. W badanym okresie czasu 2001 – 2011 i 2012, zbadaliśmy jak zmieniały się trendy rozwoju w rolnictwie. Po pierwsze, zbadaliśmy wielkość PKB w rolnictwie, liczbę pracowników, średni poziom wynagrodzeń i konkurencyjność z zagranicznymi rynkami. Następnie, zbadaliśmy wielkość produkcji rolnictwa w odniesieniu do każdego regionu Słowacji, aby pokazać efektywność każdego z nich.

Słowa kluczowe: rolnictwo, Republika Słowacji, PKB, zatrudnienie, wynagrodzenia, Michaely Index, RCA 1 Index, regiony na Słowacji

SLOVAK 農業狀況從選定的指標和斯洛伐克地區視角下分析

摘要：本文涉及的農業績效評估在市場上通過選定的指標。據時期 2000 至 11 年或 2012 年，我們分析一下，怎麼發展趨勢農業改變。首先，我們分析在農業佔 GDP 的量，員工人數，平均工資和在國外市場的競爭力。然後我們根據斯洛伐克的每個區域，以顯示中，每個區域的有效性是分析農業生產的量。

關鍵詞：農業。斯洛伐克共和國。國內生產總值。就業。工資。 Michaely 指數。 RCA1 指數。地區斯洛伐克。