CHAPTER «DEVELOPMENT OF THE NATIONAL ECONOMY, FINANCE AND MANAGEMENT IN MODERN CONDITION»

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AGRICULTURAL POLICY AND TRANSFORMATION OF AGRI-FOOD SUPPLY CHAINS

Summary

Agriculture remains a key component of the national economy, influencing rural development, employment, and food security. Analyzing the challenges and prospects of agricultural production and the agro-food market is particularly relevant given the increasing global demand for food, climate change pressures, and the need for sustainable agricultural practices. The periods of development of the Slovak agricultural landscape are characterized. The key trends in agricultural policy such as technological advancements, environmental sustainability, trade liberalization, and supply chain resilience are considered. The economic performances of agricultural enterprises are analyzed. The problems and prospects of agricultural production and the agro-food market are considered. The main reasons that influence food prices were systematized. The identification and systematization of key factors influencing food prices contribute to a deeper understanding of price volatility, market stability, and consumer affordability.

Introduction

Agriculture is the backbone of many economies worldwide, playing a crucial role in food security, economic development, and employment generation. As global challenges such as climate change, population growth, and resource depletion intensify, the need for effective agricultural policies and the transformation of agri-food supply chains becomes increasingly critical.

Agricultural policies are essential for shaping the direction and sustainability of the agricultural sector. These policies encompass regulations, subsidies, trade agreements, and investment strategies that impact farmers, agribusinesses, and consumers.

Agricultural policies ensure stable food production and distribution, promote sustainable farming practices help mitigate environmental degradation and combat climate change. The transformation of global agri-food supply chains is significantly influenced by agricultural policies that shape production, trade, sustainability, and food security. Well-structured policies facilitate fair trade practices, protect farmers

from market volatility, and promote competitive pricing. This paper examines the evolving role of agricultural policies in modernizing agri-food supply chains, addressing key trends such as technological advancements, environmental sustainability, trade liberalization, and supply chain resilience. The study highlights the impact of regulatory frameworks, subsidies, and international trade agreements on global food systems, emphasizing the need for adaptive policies to enhance efficiency, equity, and sustainability in food production and distribution.

The agri-food supply chain is a complex system that connects primary producers, processors, distributors, retailers, and consumers. So, the agri-food supply chain encompasses all activities from food production to consumption, including processing, packaging, distribution, and retail. Transforming these supply chains is vital to improve efficiency, reduce waste, and enhance food safety. Agricultural policy plays a crucial role in shaping this system by influencing production practices, trade dynamics, and the overall sustainability of food systems. In the face of globalization, climate change, and technological innovation, agricultural policies must adapt to ensure food security, economic stability, and environmental protection. As the world faces unprecedented agricultural challenges, robust policies and innovative supply chain strategies will be critical in ensuring food security, economic stability, and sustainability. Agricultural policies must continuously evolve to address the dynamic challenges and opportunities in modern agri-food supply chains. By fostering technological advancements, promoting environmental sustainability, embracing trade liberalization, and enhancing supply chain resilience, policies can drive efficiency, equity, and sustainability in food production and distribution. Governments, private sectors, and stakeholders must interact to develop resilient agricultural systems.

Chapter 1. Development of the Slovak agricultural landscape

Agriculture plays a crucial role in Slovakia's economy, despite its declining share of GDP. Agricultural policy and agri-food supply chains in Slovakia have undergone significant transformation over the past decades due to historical, political, and economic factors. The transition from a centrally planned economy to a market-oriented system, coupled with EU integration, has shaped agricultural policies and supply chain dynamics.

The development of the Slovak agricultural landscape has been shaped by historical, political, and economic changes. Key phases in its evolution include traditional farming, socialist collectivization, and modern adaptation to EU standards.

Izakovicová Z., Špulerová J., Raniak A. in the paper "The Development of the Slovak Agricultural Landscape in a Changing World" evaluate land use changes in Slovakia since the 18th century, identify key periods of land-management practices and prevailing drivers, and specify the socio-economic and environmental impacts of land-use change (Table 1). The authors say that various socio-economic, technical, or political drivers have caused land use changes, which are linked to many socioeconomic and environmental problems, e.g., different possible land uses competing with each other, changes of landscape character, increasing anthropisation of the territory and disruption of spatial ecological stability, threatening the environmental quality and causing overexploitation of natural resources [2].

Table 1

The periods of development of the Slovak agricultural landscape

Period and basic drivers	**Main events and legislative acts**	**Characteristics**	**Impact, positive (+), negative (–)**	**Landscape structure**
1	25	3	4	5
Era of peasantry – improved plows, new crops, private land rights, land reforms	1767 – Teresian Land register; 1785 – Patent on the abolition of slavery by Joseph II.; 1848 – Act no. IX/1848 on the abolition of serfdom; 1919 – I. Land Reform (Act 215/1919);	Self-sufficient farming Fragmentation of parcels Extensive farming Low level of technology	Extensive sustainable land management (+) Environment-friendly management – respect for the soil, protection of the soil (+) Diversified landscape structure (+)	Traditional agricultural landscape
Collectivization – confiscation of property, collectivization and industrialization, guaranteed prices, mineral fertilizer	1945 – II. Land Reform (Directive No. 4/1945); 1948 – Act no. 69/1949 on United farmers' cooperatives;	Massive development of the Slovak industry after World War II, oriented mostly toward heavy industry Production of heavy machinery and chemical treatments for agriculture Land consolidation Collective husbandry and ownership Productivity as the only target (intensification) Establishment of cooperatives Use of heavy machinery	Increased mechanization for agriculture – work facilitation (+) Decline of extensive farming, orientation toward large-scale intensive farming – mono-functional landscape (–) Destruction of green infrastructure (–) Guaranteed purchase of products by the state (+) Abandonment of inaccessible localities due to remote location (–) Soil and water pollution due to using more chemicals (–) Physical soil degradation (–)	Industrialized urban landscape, Homogenous intensive agricultural land
Normalization – central management, strengthening the communist regime, increasing the intensity of using chemicals, maximization of ha yields	1971 – United farmers' cooperatives;	Occupation of land on extended built-up areas Creation of agricultural unions Central planning, market managed by the state Use of heavy machinery Increased use of artificial	Central planning (+) Guaranteed right to work (+) Increase in production (+) Increase of built-up area – occupation of arable land (–) Orientation toward large-scale intensive farming – mono-chemicals Construction of mass	Large-scale intensive land use with a low degree of ecological stability

End of Table 1

1	2	3	4	5
		urban settlements – flat houses Decreased importance of agriculture in general	functional landscape (–) Degradation of natural resources (–)	
Transformation – market economy, application of international conventions, progressive environmental legislation	1989 – Velvet revolution	Transition from centrally-governed society to civil society, from central planning to free market. Economic crisis, increase of unemployment Collapse of heavy industry and common agriculture	Break-up of cooperatives (–) Decline of livestock production (–) Increase of unemployment (–) Return of land to the original owner (+) Large-scale occupation of agricultural land for construction (–) Change in crop structure (–) Significant drop of agricultural support (+) Expansion of abandoned agricultural areas (–)	Homogenous market-oriented agricultural landscape
EU accession – CAP, agro-environmental schemes, precision farming, applications area-based subsidies	2004 –Accession of SR to European Union	Availability of pre-accession and EU funds, boost of economy Implementation of CAP since 2004 (incl. agro-environment scheme) Strengthening of international cooperation – adoption of international conventions Application of environmental legislation	Low competitiveness of Slovak Farmers (–) Poor market for selling agricultural products, hard to compete with imported Products (–) Revitalization of agroecosystems (+) Slow application of greening and more attention to green infrastructure (+) Chemical regulation (+) Growth of organic farming areas (+)	Increase in extensively-used farmland (application of organic farming and greening measures)

Source: [2]

In our opinion, understanding the change of agricultural land over time is necessary for the development of effective policies and for ensuring effective protection of the values of the traditional agricultural landscape.

Chapter 2. Trends in agricultural policy of the Slovak Republic

Agricultural policy in the Slovak Republic has undergone significant transformations in recent decades, influenced by both domestic priorities and

international commitments, particularly its membership in the European Union. As a country with a strong agricultural tradition, Slovakia's policies aim to enhance competitiveness, sustainability, and rural development while addressing global challenges such as climate change and food security. The main changes in agricultural policy are shown in the Table 2.

Table 2

The periods of development of the Slovak agricultural landscape

Period	Characteristic
1. Pre-20th Century	1. Traditional Farming Agriculture in Slovakia historically revolved around small, family-run farms. 2. A mix of subsistence farming and feudal land ownership dominated, with grain, potatoes, and livestock being primary products. 3. Villages were organized around communal land use, with terraced fields in hilly regions.
2. Early 20th Century	1. Industrialization and Fragmentation Land reforms after the dissolution of Austria-Hungary (1918) redistributed land but left many small-scale, inefficient farms. 2. Mechanization was slow, with traditional farming methods still dominant.
3. Socialist Collectivization (1948–1989)	1. Under communist rule, private farms were merged into large state-controlled agricultural cooperatives. 2. Intensive mechanization and industrial-scale farming led to increased production but also environmental degradation. 3. The landscape was altered as small plots were consolidated, leading to large monoculture fields.
4. Post-Communist Transition (1990s)	1. After the fall of communism in 1989, agricultural cooperatives were privatized. 2. Many small farmers reclaimed their land, but a lack of modern equipment and investment led to inefficiency. 3. Rural depopulation increased as people moved to cities for better job opportunities.
5. Post-Socialist Transition (1990–2004)	1. The transition to a market economy led to land restitution and privatization of farms. 2. Fragmentation, lack of capital, and structural inefficiencies hindered growth. 3. Government policies focused on supporting privatization and restructuring efforts.

Source: developed by the author based on [2]

Agricultural policies play a pivotal role in modernizing agri-food supply chains by addressing key trends such as technological advancements, environmental sustainability, trade liberalization, and supply chain resilience.

These policies shape the global food system by influencing production methods, distribution networks, and market accessibility, ensuring efficiency, equity, and sustainability in food production and distribution.

Key trends and policy impacts are presented in Table 3.

It is also used the regulatory frameworks which are establish guidelines for food safety, quality, and environmental compliance; subsidies, which provide financial support to farmers for adopting modern technology and sustainable practices.

Table 3

Key trends and agricultural policy impacts

Key trend	Agricultural policy impact
Technological advancements	1. Agricultural policies promote innovation by supporting research and development in precision farming, automation, and biotechnology. 2. Investments in digital infrastructure enable the adoption of smart farming tools, enhancing productivity and reducing waste. 3. AI-driven logistics improve traceability, food safety, and supply chain transparency.
Environmental sustainability	1. Policies encourage sustainable farming practices such as regenerative agriculture, organic farming, and water conservation. 2. Regulatory frameworks impose restrictions on harmful pesticides and promote eco-friendly inputs. 3. Carbon pricing and incentives for low-emission farming techniques help mitigate climate change impacts.
Trade liberalization	1. International trade agreements play a critical role in facilitating the movement of agricultural goods across borders. 2. Tariff reductions and fair trade policies enhance market accessibility for small-scale farmers and agribusinesses. 3. Harmonization of food safety and quality standards strengthens global supply chain integration.
Supply chain resilience	1. Agricultural policies support the development of robust logistics and infrastructure to withstand disruptions such as pandemics, geopolitical conflicts, and climate-related events. 2. Risk management strategies, including insurance schemes and emergency food reserves, enhance stability in food supply. 3. Strengthening local food systems through subsidies and incentives reduces dependency on global markets and ensures food security.

Source: developed by the author

Chapter 3. Agricultural performances: key determinants of income, expenditure, and production

Having stopped in more detail on the agriculture of Slovakia, it is worth saying that occupies forest lands in 2021 occupy 41,4% of the total area of the Slovak Republic, and arable land 27% (Table 4). Cereals occupy the largest share 54,33% of total utilized arable land in 2021 and 53,555 in 2023. Vegetables occupy only 0,67% in 2023.

Table 4

Characteristics of the Slovak Republic land

Indicator	Year				
	2019	2020	2021	2022	2023
1	2	3	4	5	6
Total area of the SR (ha)	4 903 407	4 903 405	4 903 391	4 903 394	4 903 395
Water area (ha)	95 311	95 250	95 405	95 349	95 357
Land area (ha)	4 808 096	4 808 155	4 807 986	4 808 045	4 808 038
Forest lands (ha)	2 027 099	2 027 852	2 028 509	2 029 035	2 030 423
Other land area (ha)	865 264	870 265	1 018 754	929 816	952 362
Utilized agriculture land (ha)	1 915 733	1 910 038	1 856 128	1 849 194	1 825 253

End of Table 4

1	2	3	4	5	6
Arable land (ha)	1 348 919	1 346 047	1 326 479	1 322 966	1 307 119
Permanent crops (ha)	17 706	17 742	16 988	16 660	16 258
Other area including domestic garden-plots (ha)	30 693	27 082	619	618	618
Permanent meadows and pastures (ha)	518 415	519 166	512 042	508 950	501 258
Utilized of arable land in total (%), among them:	100,00	100,00	100,00	100,00	100,00
Cereals (%)	57,34	56,56	54,33	55,09	53,35
Legume (%)	0,72	0,89	1,04	1,17	1,47
Root crops (%)	2,24	1,56	2,12	1,90	2,09
Industrial crops (%)	19,66	20,46	22,60	22,92	21,25
Vegetables (%)	0,53	0,54	0,62	0,64	0,67
Green fodder from arable land (%)	15,95	15,88	15,40	14,43	14,15
Other field crops (%)	0,17	0,31	0,56	0,40	1,38
Flowers and ornamental plants (%)	0,01	0,01	0,01	0,01	0,01
Seeds-plantations (%)	0,01	0,03	0,00	0,00	0,00
Fallow land (%)	3,37	3,15	3,32	3,43	5,63

Source: developed by the author based on [4; 7; 8]

The economic performance of agricultural enterprises is shaped by a range of interrelated factors influencing income generation, cost structures, and overall production efficiency. Several key trends have been observed in the sector:

– the rate of cost growth surpassed the moderate increase in agricultural revenues, leading to an overall positive financial outcome for primary agricultural production;

– despite an overall increase in the sector's production capacity, gross agricultural output at current prices declined by 4,8%, primarily due to a significant decrease in the market prices of key crop commodities. In contrast, the value of gross livestock output exhibited an upward trend, increasing by 12%;

– a notable year-on-year decline in cereal prices (-32%) and oilseed prices (-35%) at the primary production level led to reduced revenue in crop production, despite improvements in per-hectare yields. Conversely, the prices of livestock products experienced an average increase of 15,1% year-on-year, with the most pronounced growth observed in table chicken eggs (+38,6%);

– revenue from the sale of self-produced agricultural goods exhibited stagnant growth (+0,3%), attributable to a slight decline in plant product revenues (-5,5%), counterbalanced by a more substantial rise in livestock product revenues (+9,8%);

– the proportion of plant production in the overall structure of gross agricultural output at current prices decreased to 61%, while the share of animal production increased to 39%;

– the stabilization of agricultural input prices was observed, with the index of input prices for agricultural production remaining stable on a year-on-year basis. However, individual input categories displayed divergent price trends. Following a sharp rise in the previous year, prices for fertilizers and soil conditioners decreased by 16,1%, motor fuel prices declined by 11,3%, and the cost of animal feed fell by 5,4%;

– agricultural subsidies increased by 9,6% year-on-year, primarily due to a 20,4% rise in the utilization of EU financial support. A substantial portion of total agricultural subsidies (63%) was sourced from EU funds in 2023, while state-funded support from the Slovak national budget experienced a 4,9% reduction compared to the previous year;

– most crop production sectors recorded an increase in output, primarily due to improved per-hectare yields. However, certain crops, including grain legumes, temperate fruits, and cider grapes, demonstrated production declines;

– livestock production witnessed a slight expansion, as indicated by an increase in the population of pigs (+6,2%) and poultry (+3,5%). In contrast, cattle and sheep populations recorded marginal declines;

– the number of agricultural workers contracted by 11,7%, with the most pronounced reductions observed in crop production and mixed farming sectors. However, a positive demographic shift was noted, as evidenced by a decline in the average age of agricultural workers to 46,3 years;

– adverse weather conditions in the spring and summer months had significant implications for agricultural productivity. Early in the year, unusually warm temperatures accompanied by excessive precipitation facilitated favorable overwintering conditions for winter crops. Subsequently, a period of soil moisture deficit emerged in March, particularly in southwestern and western Slovakia. Cold and wet conditions during spring resulted in poor flowering and pollination of fruit trees, while also fostering the spread of plant diseases and pests. During summer, alternating periods of drought and rainfall culminated in severe drought conditions in the latter half of July. However, normal moisture levels were restored in the autumn months;

– lending activity in the agricultural sector increased by 4,7%, despite a significant rise in interest rates from 2,4% to 5,3% year-on-year, with a particular preference for long-term loans;

– the average rental cost of agricultural land rose by 5,3% on an annual basis;

– the tax burden on agricultural land increased considerably, recording a year-on-year rise of 29,2%.

Basic agricultural economic indicators of the Slovak Republic are presented in Table 5.

Table 5

Basic agricultural economic indicators of the Slovak Republic, in mil. €, current prices, share in %

Indicators	Average 2018-2022	2022	2023	Index	
				2023/2022	2023/Average 2018-2022
1	2	3	4	5	6
Revenues	3488,4	4216,0	4361,8	103,5	125,0
Costs	3325.5	3846,2	4133,6	107,5	124,3
Profit/Loss before tax	162,9	369,8	228,2	61,7	140,0
Value added	414,2	508,6	522,0	102,6	126,0
Sales from own products	1914,8	2352,8	2360,2	100,3	123,3

End of Table 5

1	2	3	4	5	6
– of which: plant products	1149,0	1460,0	1379,8	94,5	120,1
animal products	765,8	892,7	980,4	109,8	128,0
Cost-effectiveness	4,9	9,6	5,5	–	–
Income costs	95,3	91,2	94,8	–	–
Total subsidies	859,8	736,9	807,8	109,6	94,0
of which direct payments	416,9	277,3	323,7	116,7	77,6
Share of total subsidies in revenues	24,6	17,5	18,5	–	–
Share of direct payments in revenues	12,0	6,6	7,4	–	–
Share of profitable enterprises	75,6	85,7	71,1	–	–

Source: developed by the author based on [7]

The analysis of the economic results of agricultural enterprises made it possible to identify trends in the agricultural sector development in the Slovak Republic (Figure 1).

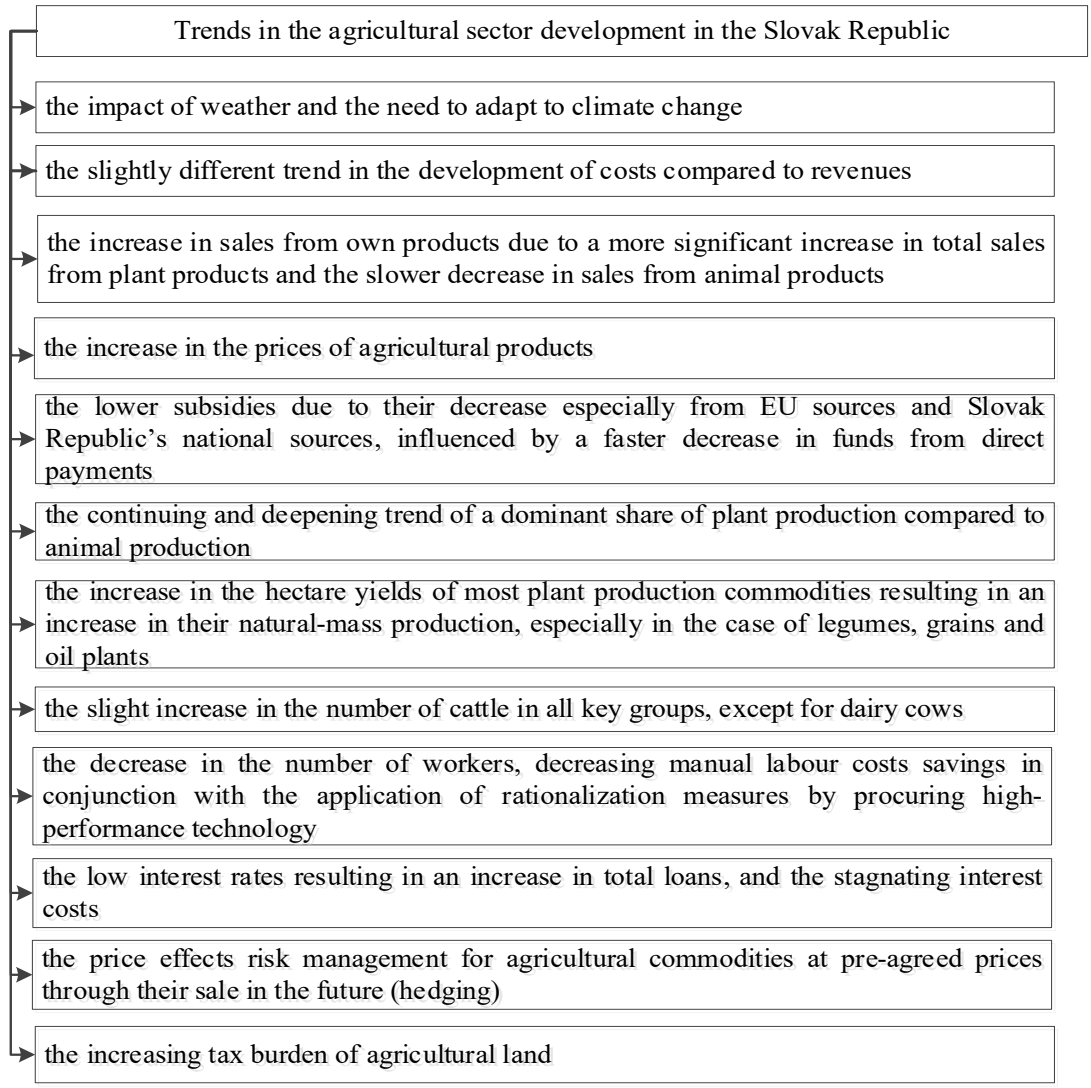

Figure1. Trends in the agricultural sector development in the Slovak Republic

Source: developed by the author based on [7; 9]

Chapter 4. Agricultural production and the agri-food market

Agricultural production and the agri-food market in the Slovak Republic have witnessed both opportunities and challenges in recent years. While technological advancements and EU support have contributed to sectoral growth, price volatility, labor shortages, and climate-related risks remain critical concerns. Production of agricultural crops in thousand tons is presented in Table 6.

Table 6

Production of agricultural crops, thousand tons

Indicator	Years				
	2019	2020	2021	2022	2023
Cereals in total	4 104,1	4 580,9	4 308,0	3 382,8	4 304,6
of which:					
Thick drill	2 659,2	2 938,2	2 710,3	2 699,1	3 149,1
of which:					
Wheat	1 939,1	2 133,3	2 002,2	2 048,2	2 490,6
Rye	48,7	48,6	36,1	31,8	35,2
Barley	599,6	679,4	592,7	556,5	603,0
Oats	31,9	33,0	36,6	24,2	20,3
Grain maize	1 444,8	1 642,7	1 597,7	683,7	1 105,7
Legume in total	20,6	25,4	29,2	40,1	34,6
of which:					
Edible	6,7	9,7	15,4	17,9	11,8
of which:					
Peas	6,4	9,5	15,1	17,4	11,4
Lentils	0,1	0,2	0,1	0,2	0,2
Beans	0,1	0,0	0,1	0,2	D
Feeding	13,8	15,7	13,9	22,2	22,8
Potatoes in total	182,4	166,2	151,1	130,6	135,8
of which early potatoes	20,2	24,3	16,1	28,6	25,7
Sugar-beet	1 251,7	1 273,0	1 364,4	1 096,7	1 407,7
Oil-plants in total	671,3	716,1	786,3	716,9	848,7
of which:					
Rape	417,6	440,9	420,1	439,4	538,1
Sunflower	128,3	135,7	195,2	170,7	171,7
Soya	116,9	129,2	161,4	96,5	129,8
Tobacco	0,0	0,0	D	D	D
Fresh vegetables	125,8	123,3	147,8	133,6	143,0
Fruit	41,8	34,1	35,7	38,0	32,7
Grape	43,0	46,9	44,1	44,8	40,7
Feeding root-crops	5,6	2,2	0,9	2,9	3,8
Fodder on arable land					
Annual	493,1	504,5	400,6	357,2	449,4
of which:					
Green maize	450,7	463,6	367,1	316,2	397,4
Lasting more years	573,4	552,4	525,8	405,8	551,8
of which:					
Lucerne	322,2	313,9	279,0	223,9	302,1
Red clover	35,7	38,3	48,3	41,5	61,2
Permanent grassland and meadow	1 200,0	1 181,8	1 296,6	1 035,8	1 362,9

Source: developed by the author based on [9]

Hectare yields are presented in Table 7.

Table 7

Hectare yields, tons per hectare

Indicator	Years				
	2019	2020	2021	2022	2023
Cereals in total	5,34	6,13	6,00	4,75	6,20
of which:					
Thick drill	4,65	5,29	5,30	4,88	5,82
of which:					
Wheat	4,77	5,51	5,61	4,97	6,12
Rye	3,50	3,90	3,54	3,55	3,38
Barley	4,74	5,19	5,06	5,10	5,28
Oats	2,64	2,69	2,24	2,38	2,10
Grain maize	7,33	8,58	7,86	4,31	7,99
Legume in total	2,21	2,38	2,20	2,69	1,91
of which:					
Edible	2,39	2,60	2,50	2,93	1,98
of which:					
Peas	2,53	2,74	2,56	2,99	2,12
Lentils	1,14	0,95	1,03	1,03	0,40
Beans	0,74	0,51	0,84	0,84	D
Feeding	2,13	2,26	1,94	2,52	1,88
Potatoes in total	22,27	23,75	24,88	22,78	25,02
of which early potatoes	21,00	20,38	19,15	25,97	24,92
Sugar-beet	57,63	60,39	62,57	56,29	63,62
Oil-plants in total	2,61	2,70	2,71	2,45	3,11
of which:					
Rape	2,84	3,01	3,09	3,14	3,62
Sunflower	2,64	2,53	2,66	2,33	2,78
Soya	2,46	2,53	2,52	1,45	2,59
Tobacco	0,49	0,36	D	D	D
Grape	5,44	6,07	5,68	5,76	4,51
Feeding root-crops	21,44	20,03	22,99	29,90	45,95
Fodder on arable land					
Annual	5,71	6,36	5,20	4,27	5,84
of which:					
Green maize	6,00	6,86	5,57	4,47	6,29
Lasting more years	4,48	4,39	4,24	3,49	5,08
of which:					
Lucerne	6,17	5,97	5,37	4,63	6,49
Red clover	4,44	4,25	4,10	3,46	5,67
Permanent grassland and meadow	2,34	2,31	2,31	2,06	2,75

Source: developed by the author based on [9]

Food inflation from September 2021 to August 2022 is presented in Table 8.

Table 8

Food inflation in September 2021 – August 2022 (percent change, year on year)

Country	Period											
	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022
Law income												
Ethiopia	41,9	40,7	39,0	41,7	40,1	41,8	43,5	42,9	43,9	38,1	35,5	
Mozambique	11,8	12,3	10,5	9,8	10,9	8,9	8,0	10,5	13,9	16,3	17,2	17,3
Lower Middle Income												
Egypt	10,7	11,5	8,0	8,4	12,4	17,7	19,8	26,0	24,8	22,4	22,4	23,1
Iran	62,5	61,4	46,9	41,7	42,7	40,7	41,2	44,3	50,9	85,5	90,2	81,2
Nigeria	19,5	18,3	17,1	17,2	17,0	17,0	17,2	18,4	19,5	20,6	22,0	
Sri Lanka	9,9	11,7	17,1	21,6	24,3	24,4	29,5	45,1	58,0	75,8	90,9	99,4
Ukraine	13,7	13,6	13,3	12,8	14,1	14,4	19,6	23,1	24,1	28,3	28,9	30,7
Zimbabwe	54,5	61,4	65,4	64,9	63,3	69,3	75,1	104	155	255	309	353
Upper Middle Income												
Belarus	11,1	12,1	11,8	11,5	12,0	11,3	15,5	19,0	19,3	19,6	19,6	18,9
Russian Federation	9,2	10,9	10,8	10,7	11,1	11,5	18,0	20,5	20,1	18,0	16,8	15,8
High Income												
Czech Republic	1,9	1,0	2,1	4,2	5,4	6,9	7,8	11,1	15,5	18,7	19,3	19,6
Hungary	4,4	5,2	6,0	8,1	10,1	11,3	13,0	15,6	18,6	22,1	28,8	33,1
Poland	4,3	4,9	6,4	8,6	9,4	7,6	9,8	13,4	14,2	14,9	15,3	16,1
Slovak Republic	4,2	4,0	4,5	5,9	8,8	9,5	11,7	13,9	16,0	17,9	19,1	20,2

Note: Price increase less than 2 percent – green colour; price increase between 2 and 5 percent – yellow; price increase between 5 and 30 percent – red; price increase 30 percent or higher – violet colour.

Source: developed by the author based on [10]

Food inflation from November 2022 to September 2023 (percentage change, year-on-year) is shown in Table 9.

Table 9

Food inflation in November 2022 – September 2023 (percentage change, year-on-year)

Country	Period										
	Nov 2022	Dec 2022	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023	Sept 2023
1	2	3	4	5	6	7	8	9	10	11	12
Law income											
Ethiopia	34,2	32,9	33,6	29,6	32,8	31,8	28,4	28,0	27,3	26,5	27,1
Mozam-bique	15,2	14,6	16,1	17,0	18,5	17,3	14,3	6,8	4,8	3,6	2,9
Lower Middle Income											
Egypt	30,0	37,3	47,9	61,8	63,0	54,8	60,0	65,8	68,3	71,4	73,6
Iran	68,4	66,0	72,4	73,0	79,5	80,3	77,5	42,7	36,7	38,0	37,4
Nigeria	24,1	23,8	24,3	24,4	24,5	24,6	24,8	25,3	27,0	29,3	30,6

End of Table 9

1	2	3	4	5	6	7	8	9	10	11	12
Sri Lanka	69,8	58,5	53,6	49,0	42,3	27,1	15,8	2,5	-1,4	-5,4	-5,2
Ukraine	35,2	34,4	32,8	31,5	26,5	21,7	19,7	16,1	12,8	7,7	5,2
Zimbab-we	376,0	285,0	264,0	137,0	128,0	102,0	117,0	256,0	103,0	70,8	23,1
Upper Middle Income											
Belarus	14,4	13,8	12,9	12,8	9,0	5,5	3,7	3,2	3,5	3,2	2,4
Russian Fede-ration	11,1	10,3	10,2	9,3	2,6	0,0	-0,9	0,2	2,2	3,6	4,9
High Income											
Czech Republic	27,1	26,4	25,6	24,6	24,0	17,5	14,5	11,6	9,2	7,5	5,4
Hungary	43,8	44,8	44,0	43,3	42,6	37,9	33,5	29,3	23,1	19,5	15,2
Poland	23,0	22,1	21,2	24,8	24,7	19,9	18,9	17,8	15,6	12,7	10,4
Slovak Republic	27,8	28,1	27,5	27,8	28,1	25,4	21,7	18,9	16,5	13,5	11,2

Note: Price increase less than 2 percent – green colour; price increase between 2 and 5 percent – yellow; price increase between 5 and 30 percent – red; price increase 30 percent or higher – violet colour.

Source: developed by the author based on [10]

From September 2021 to September 2022, consumer food prices increased by 11,2 percent, while energy prices increased by 19,8 percent.

The indices of the prices of plant and animal products in the Slovak Republic are presented in Table 10 and Table 11 respectively.

Table 10

Indices of the prices of plant products in the Slovak Republic

Index	Total plant products	of which:					Fruits	Vegetables
		Cereals	Edible legumes	Oil crops	Potatoes	Sugar beet		
2009/2008	69,4	66,1	103,6	64,5	85,2	111,3	86,8	98,9
2010/2009	130,3	131,8	111	145,4	136,9	86,5	129,4	117,3
2011/2010	123,2	126,2	97,2	125,9	102,4	99,4	104,4	102,8
2012/2011	109,6	110,7	99,2	112,2	76,8	101,6	101	103
2013/2012	88,5	91,5	116,3	76,7	117,8	109,8	99,4	112,5
2014/2013	85	81,9	94,7	88,9	105,7	92,5	98,1	91,9
2015/2014	100,4	97,8	89,8	110,7	88,8	87,9	98,4	98,2
2016/2015	93	90,2	93,7	98	109,5	85	107,3	96,4
2017/2016	104,4	107,5	101,7	102,4	88	90,6	107,3	99,1
2018/2017	104	107,1	101,2	100,8	121,4	92,4	106,2	101,4
2019/2018	103,2	99,6	99,1	102,9	138,1	99,1	100,5	113,6
2020/2019	100,2	96,5	97,7	105	94,4	99,1	110,8	105,7

Source: developed by the author based on [6]

Table 11

Indices of the prices of animal products in the Slovak Republic

Index	Total animal pro-ducts	of which:						
		Slaughter bovine animals excluding calves	Slaugh-ter pigs	Slaugh-ter sheep and lambs	Cow milk	Slaugh-ter poultry	Hen eggs	Sheep milk
2009/2008	80	99,6	93,7	77,9	66,9	81,2	97,7	98,6
2010/2009	101,1	100	93,6	102,1	108	99,4	93,7	103,6
2011/2010	110,8	101	101,4	107,2	120,1	115,5	93,2	104,6
2012/2011	104	102	110,6	110,2	98,4	102,9	137,1	102,1
2013/2012	99,3	100,9	106	94,4	103,7	106,3	81,8	103,9
2014/2013	99,3	100,9	95,5	103,3	105,6	92,5	93,7	110,2
2015/2014	95,4	101,4	89,5	104	89,3	94,5	103,3	101,1
2016/2015	95,5	99,9	98,8	93,2	91,1	96,7	88,9	99
2017/2016	105,5	101	107,8	91,3	111	98,2	134	96,9
2018/2017	105,1	101,2	104,1	99	109,2	99,8	127,2	99,5
2019/2018	99,7	101,4	104,8	99,7	101	99,8	92,5	100,1
2020/2019	100,7	98,9	106,7	96,3	100	96,6	110,1	101,3

Source: developed by the author based on [7]

In January 2025, the year-on-year growth in agricultural product prices exhibited a notable acceleration, reaching 7,6%. The prices of crop products increased by 5,3%. The overall rise in crop product prices was primarily driven by significant price increases in cereals (10,9%), legumes (11,5%), and fruits and nuts (14,3%). In contrast, the prices of oilseeds and fruits experienced a slight decline of 1,5%. The price of potatoes continued its downward trend, decreasing by 7,6%, while vegetable prices registered a substantial double-digit drop of 15,9%. Animal product prices rose by 10,9% compared to the previous year. Notably, the prices of slaughter cattle and calves increased by 6%, hen edible eggs surged by 14%, and cow's milk recorded an 8,1% rise.

Food prices are increasingly affected by global challenges, including economic instability, climate change, geopolitical conflicts, and supply chain disruptions. These factors create volatility in agricultural markets, leading to higher costs and food insecurity in many regions.

The main reasons that influence food prices are systematized in Table 12.

Table 12

The main reasons that influence food prices

Factors contributing to rising food prices	
Inflationary	**Non-inflationary**
1	2
1. Monetary policy. An increase in the money supply, low interest rates and quantitative easing can raise the general level of prices, including agricultural products.	**1. Natural and climatic conditions** that lead to a decrease in productivity, a reduction in the supply of agricultural products and an increase in prices for agricultural products due to their shortage.

End of Table 12

1	2
2. Government policy aimed at stimulating the economy, which is often accompanied by inflationary processes.	**2. Climate change,** as long-term changes in temperature and precipitation affect agricultural productivity in the long term.
3. Disproportionality. The imbalance of state expenditures and revenues, the deficit of the state budget, which is often covered by additional money issuance, which leads to an increase in the money supply, that is, to inflation.	**3. Geopolitical risks and conflicts.** Hostilities, land loss, trade restrictions, and political instability disrupt the supply of agricultural products and resources; closure of trade routes or export markets also affects product availability.
4. Growth of production costs. The increase in prices for energy carriers, fertilizers, transport and other production resources due to inflation directly affects the cost of agricultural products. Wage inflation also causes labor costs to rise.	**4. Urbanization and land use change,** which reduce the area of agricultural land.
5. Currency fluctuations. The devaluation of the national currency increases the cost of imported goods and materials necessary for agriculture, which, in turn, affects the final price of products.	**5. COVID-19 pandemic** has led to significant disruptions in supply chains, increasing the costs of producing and shipping agricultural products. Global challenges affect supply and demand, as well as access to financial resources.
6. The need to increase defense spending in the context of military operations, which leads to the formation of additional solvent demand and, as a result, to an increase in the money supply. Excessive military appropriations are one of the main reasons for the chronic deficit of the state budget, as well as the increase in the state debt, to cover which additional paper money is issued.	**6. Technological factors.** A low level of technological development, limited access to modern methods of growing and processing products can limit productivity.
7. Absence of a pure free market and perfect competition as part of it. The modern agricultural market is largely oligopolistic. Since oligopolists are interested in reducing the production and supply of goods, a deficit is created, which they use to maintain or increase the prices of goods.	**7. Infrastructure problems.** Inefficient infrastructure for storage, transportation and processing of agricultural products leads to significant losses and price increases; logistical problems, including transport shortages and increased transport costs, affect product prices.
8. Inflationary expectations, that is, the occurrence of self-sustaining inflation. The population and business entities are getting used to constant price increases. The population demands an increase in wages and stocks goods in advance, expecting their price to rise. Manufacturers, on the other hand, are afraid of price increases from their suppliers, who at the same time include in the price of their own goods the predicted increase in the prices of components and thereby spin the flywheel of inflation.	**8. Non-equivalence of inter-branch exchange and price disparity.** Due to the lack of equivalence of inter-branch exchange, agriculture loses its assets, the possibilities of not only expanded, but also simple reproduction of production are sharply reduced.
9. Imported inflation, i.e. inflation caused by external factors such as price increases for imported goods, excessive inflow of foreign currency, etc.	

Source: developed by the author based on [1; 3; 5; 6]

The main reasons influencing food prices in the context of global challenges include:

1. Geopolitical conflicts and trade disruptions:

– wars, trade restrictions, and international sanctions disrupt agricultural exports and imports, limiting food availability and driving up prices;

– conflicts in major food-producing regions affect supply chains, increasing transportation and insurance costs;

– political instability can lead to food hoarding, speculation, and stockpiling, further exacerbating price volatility.

2. Climate change and extreme weather events:

– global warming has intensified droughts, floods, hurricanes, and wildfires, reducing crop yields and livestock productivity;

– changes in precipitation patterns and rising temperatures negatively impact soil fertility and water resources, affecting long-term agricultural output;

– unfavorable climatic conditions increase the risk of pests and diseases, leading to reduced harvests and higher food prices.

3. Energy and fuel price fluctuations:

– agriculture is highly dependent on energy for production, irrigation, transportation, and storage;

– rising fuel prices increase the cost of farming operations and logistics;

– the high cost of fertilizers, which rely on natural gas for production, significantly impacts crop production and food prices;

– energy crises and supply chain bottlenecks contribute to delays in food distribution, adding further costs.

4. Supply chain disruptions and transportation costs:

– the COVID-19 pandemic exposed vulnerabilities in global food supply chains, causing labor shortages, logistical delays, and production slowdowns;

– port congestion, container shortages, and increased shipping costs make food transportation more expensive and less efficient;

– disruptions in food processing and storage infrastructure contribute to price spikes and shortages in certain markets.

5. Economic inflation and currency depreciation:

– rising inflation erodes purchasing power, increasing food costs for consumers;

– depreciation of local currencies against major global currencies (e.g., the US dollar) makes food imports more expensive;

– inflationary pressures raise the cost of agricultural inputs, including seeds, fertilizers, pesticides, and feed for livestock.

6. Labor shortages and wage increases:

– the agricultural sector faces a labor crisis due to demographic shifts, migration policies, and the decline in rural workforces;

– rising wages and improved working conditions in other sectors make agricultural labor more expensive;

– mechanization and automation are potential solutions, but high initial investment costs limit their widespread adoption.

7. Food security policies and government interventions:

– export bans, trade restrictions, and price controls imposed by governments to stabilize domestic markets often lead to global food price fluctuations;

– subsidies and support programs can help reduce food costs but may also distort market dynamics;

– strategic grain reserves and emergency food programs impact price trends depending on their scale and effectiveness.

8. Market speculation and commodity trading:

– financial speculation in agricultural commodity markets can amplify food price volatility;

– large-scale investment funds influence market trends, sometimes leading to sudden price spikes or collapses;

– speculative trading on futures markets affects price expectations and supply chain behavior.

9. Pandemics and global health crises:

– the COVID-19 pandemic highlighted the vulnerability of global food supply chains, leading to initial price surges and long-term disruptions;

– health-related workforce shortages in agriculture, transportation, and retail sectors contributed to reduced food production and distribution efficiency;

– increased demand for non-perishable food products during crises affects supply and pricing.

10. Changing consumer demand and food preferences:

– rising demand for sustainable, organic, and ethically sourced food products influences price trends;

– urbanization and dietary shifts towards protein-rich diets, particularly in emerging economies, drive up prices for meat, dairy, and plant-based alternatives;

– food waste reduction efforts and circular economy policies impact production and pricing strategies.

In the face of global challenges, food prices are influenced by a combination of economic, environmental, political, and structural factors. Understanding these dynamics is crucial for policymakers, farmers, and businesses to develop strategies that promote food security, market stability, and resilience in agricultural systems. Long-term solutions require coordinated global efforts, investment in sustainable agriculture, and adaptive supply chain management to mitigate price volatility and ensure food accessibility.

Conclusions

The article examines trends in agricultural policy of the Slovak Republic. The economic performances of agricultural enterprises are analyzed. The problems and prospects of agricultural production and the agro-food market are considered. The results show that price volatility in the agricultural and food market remains a significant challenge, driven by factors such as climate change, supply chain disruptions, geopolitical tensions, and shifts in global demand. Government interventions, such as subsidies and strategic reserves, play a crucial role in stabilizing markets, but excessive interference may lead to inefficiencies. Strengthening global trade policies and enhancing transparency in price formation can further contribute

to reducing unpredictability. Agricultural policies are fundamental in shaping the transformation of global agri-food supply chains.

Policies that support the adoption of digital technologies, precision farming, and smart logistics improve efficiency, reduce waste, and enhance the traceability of food products. Governments and policymakers must encourage investments in agricultural research and development and facilitate the integration of modern technology into traditional farming and supply chain practices.

Globalization and trade liberalization have also significantly impacted agri-food supply chains, necessitating policies that enable farmers and agribusinesses to compete effectively in international markets. Policies that support access to global markets, fair trade agreements, and infrastructure development can enhance the competitiveness of agricultural producers while ensuring that food supply chains remain robust and adaptable to global economic fluctuations.

Policies that promote sustainable farming practices, reduce carbon footprints, and encourage circular economy principles within supply chains contribute to long-term food security and environmental health. Additionally, policies that support smallholder farmers, cooperatives, and rural development initiatives ensure inclusive growth and social equity within the agricultural sector.

The transformation of agri-food supply chains is an ongoing process that requires dynamic and forward-thinking agricultural policies. Governments, stakeholders, and industry players must collaborate to create policies that foster innovation, sustainability, and resilience. Policymakers must develop adaptive and inclusive strategies that promote efficiency, resilience, and sustainability in food systems. A coordinated approach involving interaction between governments, international organizations, and private sector stakeholders is necessary to address emerging challenges and ensure a sustainable future for global food supply chains. A well-structured agricultural policy framework will not only strengthen supply chains but also enhance food security, economic prosperity, and environmental conservation for future generations.

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References:

1. Amolegbe K.B., Upton J., Bageant E., Blom S. (2021). Food price volatility and household food security: Evidence from Nigeria. *Food Policy*, vol. 102, 102061. DOI: https://doi.org/10.1016/j.foodpol.2021.102061

2. Izakovicová Z., Špulerová J., Raniak A. (2022) The Development of the Slovak Agricultural Landscape in a Changing World. *Frontiers in Sustainable Food Systems*, vol. 6, pp. 1-16. Available at: https://www.frontiersin.org/articles/10.3389/fsufs.2022.862451/full

3. Çakır M., Pérez A.M., Arita S., Cooper J., Boehm R.N. (2024). Perspectives on high US retail food prices during 2020–2022. *Food Policy*, vol. 129, 102765. DOI: https://doi.org/10.1016/j.foodpol.2024.102765
4. Food and Agriculture Organization of the United Nations. Available at: https://www.fao.org/faostat/en/#country
5. Hamulczuk M., Pawlak K., Stefańczyk J., Gołębiewski J. (2023). Agri-food supply and retail food prices during the Russia–Ukraine conflict's early stage: implications for food security. *Agriculture*, vol. 13(11), 2154. DOI: https://doi.org/10.3390/agriculture13112154
6. Matthews A. (2023) Food price situation in Europe. *Studies in Agricultural Economics*, vol. 125, pp. 60-68. DOI: https://doi.org/10.7896/j.2563
7. Ministry of Agriculture and Rural Development of the Slovak Republic. Green Report. Available at: https://www.mpsr.sk/en/index.php?navID=16
8. Statistical Office of the Slovak Republic. Available at: https://slovak.statistics.sk/wps/portal/ext/Databases/
9. Statistical Yearbook of the Slovak Republic (2024). Available at: https://slovak.statistics.sk/
10. The World Bank. Food Security Update. Available at: https://thedocs.worldbank.org/en/doc/40ebbf38f5a6b68bfc11e5273e1405d4-0090012022/related/Food-Security-Update-LXIX-September-15-2022.pdf