The Experience of European Countries in Managing the Expenditures of Enterprises in the Agricultural Sector

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Abstract: Ensuring the efficient development and functioning of agricultural enterprises depends on the rationally formed optimal level of costs for the implementation of economic activities, particularly for the production of agricultural products. This article aims to describe methodological principles of cost management of agricultural enterprises based on the European Union countries using determination of interconnection between total costs of agricultural enterprises and indicators of the value of agricultural products manufactured by them. **Methods:** theoretical analysis, abstraction, induction, deduction, tabular and graphical presentation, description, comparison, comparison, and generalization. **Results:** It was found that the disclosure of methodological principles of cost management of agricultural enterprises should be carried out by identifying the relationship between the total costs of agrarian enterprises and indicators of the cost of agricultural products produced by them using correlation analysis. As a result of correlation analysis, we established direct and reversed very high, high, medium, moderate, and weak correlations between the indicator of total costs of agricultural enterprises and the indicator of the cost of grain growing, index of production cost of industrial crops and the index of the cost of forage crops production according to the surveyed countries of the European Union. It was found that with very high and high intensity of interconnection between the analyzed variables. The increase in the indicator of total costs directly affects the growth of the cost of growing crops by agricultural enterprises in Austria, Belgium, Bulgaria, Croatia, Cyprus, Estonia, Latvia, the Netherlands, and Romania. The growth in the indicator of total costs directly affects the growth of the production cost of industrial crops by agricultural enterprises of Denmark, Estonia, Greece, Latvia, and Portugal and the increase

in the indicator of total costs directly affects the increase in the cost of growing forage crops by agricultural enterprises of Belgium, Croatia, Cyprus, Estonia, Ireland, the Netherlands, Romania, Slovenia, Spain, and Sweden. The prospect of the following research is to disclose the methodological principles of cost management of agricultural enterprises on the application of the United States of America.

Key-Words: agricultural business, production of agricultural products, gross value added, correlation analysis.

Received: November 16, 2021. Revised: August 16, 2022. Accepted: September 19, 2022. Published: October 12, 2022.

1 Introduction

The effective development and functioning of agricultural enterprises depend on many factors, a special place among which is the optimal level of costs for economic activity, formed by the cost management system. The basis of such a system is several business processes, including business processes of strategic cost management of agricultural enterprises, business processes of planning, forecasting, and control of costs of agricultural enterprises, and more. Operating the necessary information about the available and possible costs allows you to rationally plan the economic activities of agricultural enterprises, primarily related to the production of agricultural products.

The practice gives grounds to note that during the formation and implementation of an effective cost management system for agricultural enterprises it is necessary to take into account both methodological recommendations and rely on the experience of enterprises that already operate effectively in the field of agribusiness. Emphasizing the importance of forming and implementing a cost management system in the economic activities of agricultural enterprises, the research will focus on methodological and practical principles of cost management of agricultural enterprises.

2 Literature Review

Markina et al. [1] and Zinina et al. [2] note that an important principle of sustainable development of agricultural enterprises is to ensure the effective cost management of such enterprises. Sharifi et al. [3] in the context of the study of the peculiarities of the formation of costs of agricultural enterprises note that an important role in reducing them, in particular in reducing transaction costs, play agricultural cooperatives that form agricultural enterprises. Kocaköse et al. [4] also emphasize that an important role in the context of reducing costs, particular production costs, agricultural enterprises play the relevant factors of influence, namely: 1) the level of mechanization; 2) availability of irrigation facilities; 3) the level of supply of resources; 4) features of sales; 5) product prices; 6) prices for raw materials; 7) labor resources. Agizan et al. [5] emphasize the importance of mechanization as one of the key factors in the development of agricultural production. Panagos et al. [6] argue that agricultural enterprises often face the problem of loss of productivity of agricultural production due to soil erosion, which affects the growth of direct costs of these enterprises.

Kubala [7] examines the features of the relationship between the activities of agricultural enterprises and the costs borne by agricultural enterprises in the context of such activities. Bayramoglu et al. [8] consider the features of achieving economic stability of agricultural enterprises, one of the important components of which is to ensure effective cost management of such enterprises. Dudin et al. [9] note that renewable energy sources play an important role in reducing costs as a direction of cost management of agricultural enterprises. According to scientists, renewable energy sources are one of the main tools to increase the competitiveness of agricultural enterprises.

Kucera et al. [10] argue that the cost management system of the enterprise is one of the main components of the management system. Govdya et al. [11] emphasize the importance of the accounting and analytical system for cost management of agricultural enterprises, which should be formed based on the decomposition approach to such a process. Stašová [12] argues that in the context of managing the costs of agricultural enterprises, it is necessary to perform a statistical analysis of the suitability of such enterprises, using the method of calculation. Borodina et al. [13] consider models of cost management of agricultural enterprises. In particular, scientists focus on adapted management models, the effective introduction of which into economic activity by agricultural enterprises will allow increasing the volume of agricultural production and improving the quality of agricultural production. Lizot et al. [14] investigate

the features of cost management in the agrarian family business. Researchers emphasize the effectiveness of using an instrumental model of cost management for agricultural enterprises of this type, which will allow more effective management decisions with a focus on the core business of such enterprises. Byshov [15] argues that in the context of cost management of agricultural enterprises should be laid systematic analysis, the effective use of which will increase the overall efficiency of production by agricultural enterprises. Zakić et al. [16] emphasize that

Shaimardanovich et al. [17] argue that a special role in the effective cost management of agricultural enterprises is played by the optimization of production of these enterprises. Savic et al. [18] note that the optimization of costs of agricultural enterprises should be carried out based on the life cycle of agricultural products produced by agricultural enterprises. Beznosov et al. [19] emphasize that in the course of cost optimization of agricultural enterprises it is impossible to reduce all production costs, at the same time it is possible to reduce only those costs that directly affect the main indicators of production efficiency. Mohamed et al. [20] note that the optimization of costs of agricultural enterprises will contribute to the greatest savings in the direction of costs for depreciation, maintenance, and repair of equipment, as well as fuel costs. Paidipati et al. [21] argue that in the context of cost optimization, which provides for cost reduction and profit maximization of agricultural enterprises, it is necessary to ensure the effective management of resources of agricultural enterprises. Kaldiyarov et al. [22] argue that the optimization of production costs of agricultural enterprises is a factor in the development of cooperative forms of business in the agricultural sector.

Emphasizing the information obtained in the context of the literature review on the researched issues, it was found that the issues of methodological and practical approaches to cost management of agricultural enterprises are insufficiently disclosed.

The article aims to reveal the methodological principles of cost management of agricultural enterprises in the example of the European Union by determining the relationship between the total costs of agricultural enterprises and indicators of the value of their agricultural products.

To achieve the aim of the article it is necessary to solve the following tasks:

determine the total costs of agricultural enterprises in the European Union;

to present indicators of the cost of the made agricultural production by the agricultural enterprises of the countries of the European Union;

to conduct a correlation analysis to determine the relationship between the total costs of agricultural enterprises in the European Union and indicators of the value of their agricultural products.

3. Materials and Methods of Research

To achieve the aim and to solve the problems identified in the article, were used: 1) methods of theoretical analysis, abstraction, induction, and deduction - to present the theoretical foundations of cost management of agricultural enterprises; 2) methods of tabular and graphical presentation, description, observation, comparison, and generalization - to reveal the methodological principles of cost management of agricultural enterprises on the example of the European Union by determining the relationship between total costs of agricultural enterprises and indicators of the value of agricultural products.

The information base of the study consists of the following indicators:

1) Gross value added of the agricultural industry - basic and producer prices, Million euro [23];

2) Output of the agricultural industry - basic and producer prices, Million euro [24];

3) Economic accounts for agriculture - values at current prices [25].

4 Results of the Research

To reveal the methodological principles of cost management of agricultural enterprises, we will conduct a correlation analysis between the total costs of agricultural enterprises and indicators of the value of their agricultural products, in particular:

1) an indicator of the cost of growing cereals at current prices;

2) an indicator of the cost of growing industrial crops at current prices;

3) an indicator of the cost of growing fodder plants at current prices.

The total costs of agricultural enterprises are calculated as the difference between the output of the agricultural industry and the Gross value added of the agricultural industry, presented in Table 1.

Table 1. Initial data for determining the total costs of agricultural enterprises

№	Countries	2016		2017		2018		2019		2020	
		X_1	Y_1	X_2	Y_2	X_3	Y_3	X_4	Y_4	X_5	Y_5
1	Austria	6945.34	2861,81	7302.45	3226,46	7364.08	3123,33	7471.39	3070,13	7712.53	3241,37
2	Belgium	7981.09	2155,27	8384.98	2384,52	8203.35	2124,18	8719.23	2479,24	8661.41	2275,13
3	Bulgaria	4003,63	1776,57	4213,05	1922,68	4324,36	1873,08	4321,47	1878,79	3964,61	1663,15
4	Croatia	2183,63	967,97	2203,85	974,98	2333,15	1083,08	2423,46	1135,30	2552,71	1254,60
5	Cyprus	678,66	318,83	723,42	321,17	714,24	308.38	756.04	328,72	760.69	340,25
6	Czech Republic	4918,63	1690,29	5085.03	1675,10	5304.33	1700,29	5497.72	1759,01	5494.83	1845,28
7	Denmark	10042.52	2102,97	11200.32	3113,35	10546.84	2562,48	11067.37	2921,09	11089.75	2961,08
8	Estonia	749,73	151.10	885,85	277.51	859,23	205,91	997,64	281.81	974,30	242.03
9	Finland	4318,73	1151,08	4273,37	1164,95	4466,74	1120,06	4745,42	1400,80	4463,09	1430,88
10	France	70485.70	26284.14	73152.38	29823.33	78295,39	33735.01	77023.61	31920,18	75428.14	30182,49
11	Germany	52515.44	16415.62	57553.64	21821.69	53537.29	16846.55	58527.78	22088.17	56804.21	20257.33
12	Greece	10942,28	5416.73	11722.73	6082.36	11475.73	5803.83	11880.09	6140.96	11813.99	6144.42
13	Hungary	8308.99	3437,63	8394,19	3564,95	8443.64	3465,26	8721.55	3584,04	8464.58	3647,14
14	Ireland	7444.21	2359,07	8476.41	3158,49	8686.00	2647,85	8521.68	2873,99	8763.26	3086,87
15	Italy	54402.90	31350,36	56084.92	32436.70	58515.19	33867.36	57828.71	32928.15	56320,40	31448,59
16	Latvia	1315,90	333.31	1407,32	426,81	1345,38	346,49	1628,68	549,59	1681,73	591,98
17	Lithuania	2834,78	997,50	3141,64	1241,16	2907,68	990,06	3209,39	1232,12	3461,28	1503,72
18	Luxembourg	406.33	100.51	429,08	120.70	435,16	125.55	442,43	125.59	438,84	124.60
19	Malta	126.53	63.61	121.78	59.36	121.17	56.37	126.40	60.90	127.29	62.04
20	Netherlands	27246,19	10653.13	28936.81	11743.67	28162.24	10725.06	29138.34	11269.31	28235.54	10574.15
21	Poland	22412.32	8589.42	25655,20	10625.44	25608.02	9404.99	26357.72	10189.19	27177.73	11045.32
22	Portugal	7094.87	2671,84	7639.07	2983,84	7833.53	3008,23	8084.46	3192,76	7829.15	2912,23
23	Romania	15443.75	6537.95	17180,46	7714.07	18553.78	8328.45	18963.83	8786.30	16847.02	7921.71
24	Slovakia	2391,10	625,86	2390,19	651,68	2317,75	541,09	2261,12	521.05	2329,45	577.12
25	Slovenia	1206,89	469,58	1153,01	430,26	1369,95	619,62	1325,17	561,03	1353,32	603,27
26	Spain	48411.62	27328.05	50640.76	28846.30	52144.46	28742.91	51668.68	28065.69	52919.36	29287.97
27	Sweden	5971.69	1641,99	6456.98	1933,56	5901.37	1441,28	5998.63	1553,27	6103.00	1742,22

Legend:
X_1, X_2,…, X_5 - Output of the agricultural industry - basic and producer prices, Million euro
Y_1, Y_2,…, Y_5 - Gross value added of the agricultural industry - basic and producer prices, Million euro
Source: [23; 24]

After performing the calculation, we obtain the corresponding values of the total costs of agricultural enterprises (V1, V2,… V5) for each of the countries of the European Union and present them in the Table 2.

Table 2. Total costs of agricultural enterprises, Million €

№	Countries	2016	2017	2018	2019	2020
1	Austria	4083,53	4075,99	4240,75	4401,26	4471,16
2	Belgium	5825.82	6000.46	6079.17	6239.99	6386.28
3	Bulgaria	2227,06	2290,37	2451,28	2442,68	2301,46
4	Croatia	1215,66	1228,87	1250,07	1288,16	1298,11
5	Cyprus	359,83	402,25	405,86	427,32	420,44
6	Czech Republic	3228,34	3409,93	3604,04	3738,71	3649,55
7	Denmark	7939.55	8086.97	7984.36	8146.28	8128.67
8	Estonia	598,63	608,34	653,32	715,83	732,27
9	Finland	3167,65	3108,42	3346,68	3344,62	3032,21
10	France	44201,56	43329.05	44560.38	45103,43	45245,65
11	Germany	36099.82	35731.95	36690,74	36439.61	36546.88
12	Greece	5525.55	5640.37	5671.9	5739.13	5669.57
13	Hungary	4871,36	4829,24	4978.38	5137.51	4817,44
14	Ireland	5085.14	5317.92	6038.15	5647.69	5676.39
15	Italy	23052,54	23648.22	24647.83	24900,56	24871.81
16	Latvia	982,59	980,51	998,89	1079,09	1089,75
17	Lithuania	1837,28	1900,48	1917,62	1977,27	1957,56
18	Luxembourg	305.82	308.38	309.61	316.84	314,24
19	Malta	62.92	62.42	64.8	65.5	65.25
20	Netherlands	16593.06	17193.14	17437.18	17869.03	17661,39
21	Poland	13822.9	15029.76	16203.03	16168.53	16132,41
22	Portugal	4423,03	4655,23	4825.3	4891.7	4916.92
23	Romania	8905.8	9466.39	10225.33	10177.53	8925.31
24	Slovakia	1765,24	1738,51	1776,66	1740,07	1752,33
25	Slovenia	737,31	722,75	750,33	764,14	750.05
26	Spain	21083.57	21794.46	23401.55	23602.99	23631.39
27	Sweden	4329.7	4523,42	4460.09	4445,36	4360,78

Source: calculated by the authors according to [23; 24].

Indicators of the cost of growing cereals at current prices, the cost of growing industrial crops at current prices, and the cost of growing fodder plants at current prices, which will be variable in the correlation analysis, are presented in Table 3 (Annex 1).

As a result of our calculation, we obtained the value of the correlation coefficient. We assessed the degree of relationship between variables on the Chaddock scale (Appendix 2, Table 4).

Analyzing the data of correlation analysis, a very high and sometimes direct correlation between the indicator of total costs and the indicator of the cost of growing crops was established, which indicates that an increase in the indicator of total costs directly affects the increase in the indicator of the cost of growing crops in Belgium, Bulgaria, Latvia, and Rumania. The high correlation, which indicates that the increase in the indicator of total costs directly affects the increase in the indicator of the cost of growing crops in Austria, Croatia, Cyprus, Estonia, and the Netherlands, the correlation between the analyzed variables was 89.90%, 72.70%, 87.26%, 87.51%, and 82.60%. The presence of a high inverse relationship between the analyzed variables, according to which an increase in the indicator of total costs influences the decrease in the indicator of the cost of growing crops, is found in Greece. In Portugal, the intensity of the relationship between the analyzed variables is average and the relationship is negative, but in Germany, Italy, and Sweden the intensity of the relationship is weak, while the relationship is average. The data received for Portugal indicate that the variation of growth in the indicator of total costs leads to a decrease in the indicator of the cost of

growing crops by 63.73%. At the same time, the variation of growth of the total costs index in Germany, Italy, and Switzerland leads to a decrease in the indicator of the cost of crop production by 5.07%, 23.84%, and 15.54% respectively.

The results of the correlation analysis between the indicator of total inputs and the indicator of the cost of growing fodder crops allowed us to note the existence of a direct and very high correlation between the analyzed variables in Belgium, Croatia, Cyprus, Italy, Romania, and Sweden. Thus, the variation of growth of the index of total costs in these countries of the European Union leads to growth of the cost of producing feed crops by 94.65%, 92.26%, 99.19%, 92.22%, 92.40%, and 98.66% accordingly. The presence of a high correlation between increasing total inputs directly affects the growth of the cost of producing fodder crops in Estonia, Ireland, the Netherlands, Slovenia, and Spain. The high correlation between the analyzed variables is observed only in Luxembourg, as the variation of growth in total inputs leads to a decrease in the indicator of the value of feed crops by 73.13%. The presence of a reversed and weak relationship between the indicator of total inputs and the indicator of the cost of growing fodder plants in Bulgaria, Denmark, Germany, and Portugal. Thus, in these countries of the European Union, the variation of growth of the total costs index leads to a decrease in the cost of producing forage crops by 24,10%, 23,95%, 27,14%, and 21,84% accordingly.

5 Discussion

The carried out research gives grounds to state that the problem of cost management of agricultural enterprises is very relevant since it is widely represented in the studies of many scientists. In particular, it has been established that efficient cost management of agricultural enterprises is one of the key prerequisites for ensuring the sustainable development of these enterprises (Markina et al. [1]; Zinina et al. [2]. Kocaköse et al. [4] and Agizan et al. [5] stressed the importance of an appropriate level of mechanization, availability of agrarian capacities, the appropriate level of supply of resources, etc., which reduces the costs of agrarian enterprises and Agizan et al. [5]. The research of Bayramoglu et al. [8] has stated that ensuring efficient cost management of agricultural enterprises is one of the important components of achieving the economic sustainability of these enterprises. Govdya et al. [11] argue that the accounting and analytical system should be introduced into the cost management system of agrarian enterprises, but Stašová [12] notes that the cost management system of agricultural enterprises should include a business process of statistical analysis and assessment of such enterprises' ability to carry out efficient economic activities. Byshov [15] argues for the use of system analysis in the cost management system of agricultural enterprises, and Zakić et al. [16] focus on the use of classical (traditional) approaches to cost accounting. Borodina et al. [13] focus on the use of adapted models in the cost management of agricultural enterprises. The importance of implementation of the cost management system of agricultural enterprises in the agricultural family business is the subject of research by Lizot et al. [14]. Optimization of production of agricultural enterprises, due to which it is possible to effectively manage the costs of these enterprises, is the subject of research Shaimardanovich et al. [17]. The optimization of costs of agricultural enterprises, which will allow for effectively managing them, is the subject of research by Savić et al. [18], Beznosov et al. [19], Mohamed et al. [20], Paidipati et al. [21] and Kaldiyarov et al. [22].

We fully agree with the results of the research of the above-mentioned scientists and researchers, but note that the cost management of agricultural enterprises should be based on the relationship between the total costs of agricultural enterprises and the cost of agricultural products. Therefore, in the study, we conducted a correlation analysis to determine the relationship between the cost of agricultural enterprises and the cost of agricultural products of each type, respectively. Correlation analysis was performed on the example of agricultural enterprises in the European Union.

The results of the correlation analysis will allow us to establish both direct and inverse relationships between the total cost of agricultural enterprises and the cost of growing cereals, the cost of growing industrial crops, and the cost of growing fodder plants, respectively, for the studied countries of the European Union.

It was found that efficient cost management of agricultural enterprises specializing in growing crops is generally present in agricultural enterprises of such European Union countries as Austria, Belgium, Bulgaria, Croatia, Cyprus, Estonia, Latvia, the Netherlands, and Romania, as evidenced by the very high direct and indirect correlation between the total costs of agricultural enterprises and the cost of grain production. Efficient cost management of agricultural enterprises specializing in industrial crop production is generally present in agricultural enterprises of such countries of the European Union as Denmark, Estonia, Greece, Latvia, and Portugal,

as evidenced by the very high direct and indirect correlation between the total costs of agricultural enterprises and the cost of industrial crops. The efficient cost management of agricultural enterprises specializing in forage crops is generally present in agricultural enterprises of such countries of the European Union as Belgium, Croatia, Cyprus, Estonia, Ireland, Italy, Netherlands, Rumania, Slovenia, Spain, and Sweden, as evidenced by the presence of direct very high and high correlation between the indicator of total costs of agricultural enterprises and the indicator of the cost of producing forage crops.

It was found that the agrarian enterprises of Germany, Greece, and Portugal, which specialize in the cultivation of crops, the agrarian enterprises of Cyprus, Czech Republic, France, Germany, Ukraine, and Luxembourg specializing in growing industrial crops and agricultural enterprises of Luxembourg, which specialize in the cultivation of fodder crops, in general, should be based on the experience of agrarian enterprises of other countries of the European Union, which in a particular area of agricultural production show very high and a high degree of generality of the relationship between costs and production costs of the appropriate type of agrarian products.

6 Conclusions

It is stated that methodological principles of agrarian enterprise costs management based on European Union countries should be explained through the determination of interrelation between total costs of agrarian enterprises and indicators of costs of agrarian products produced by them, using correlation analysis.

According to the results of correlation analysis carried out between the indicator of total costs of agricultural enterprises and the indicator of the cost of growing crops, The indicator of industrial crop production costs and the indicator of forage crops production costs for the surveyed countries of the European Union found a very high, high, medium, moderate and low correlation between the analyzed variables.

It was found that an increase in the indicator of total costs directly affects (with a very high and high intensity of interconnection between the analyzed variables) the increase in the indicator of the cost of growing crops by agricultural enterprises in such countries of the European Union, Austria, Belgium, Bulgaria, Croatia, Cyprus, Estonia, Latvia, the Netherlands, and Romania. An increase in the indicator of total costs directly affects (with a very high and high intensity of interconnection between the analyzed variables) the increase in the indicator of the cost of production of industrial crops by agricultural enterprises in such countries of the European Union, such as Denmark, Estonia, Greece, Latvia, and Portugal. An increase in the indicator of total costs directly affects (with a very high and high intensity of interconnection between the analyzed variables) the increase in the indicator of the cost of growing forage plants by agricultural enterprises in such countries of the European Union, such as Belgium, Croatia, Cyprus, Estonia, Ireland, Italy, the Netherlands, Romania, Slovenia, Spain, and Sweden.

The practical importance of the results of the research shows that this approach to the disclosure of methodological principles of cost management of agricultural enterprises by identifying the relationship between total costs of agricultural enterprises and indicators of the cost of agricultural products produced by them, using thus correlation analysis is universal and can be used for revealing the methodological principles of cost management of enterprises of other types of economic activities.

In the future, it is planned to disclose methodological principles of cost management of agricultural enterprises based on the application of the United States of America.

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Appendix 1

Table 3. Indicators of the cost of growing cereals at current prices, growing industrial crops at current prices, and the cost of growing fodder plants at current prices, Million euro

№	Countries	2016			2017			2018			2019			2020		
		A1	B1	C1	A2	B2	C2	A3	B3	C3	A4	B4	C4	A5	B5	C5
1	Austria	749,33	357,48	569,79	754,07	281.15	483.05	776,49	246.42	479,75	801,11	273.67	499,66	884,19	299,29	542,24
2	Belgium	305.91	198.64	600.77	376,77	228,37	659,38	417,79	222.89	639,51	435.90	229.57	681,40	484,64	195.93	747,33
3	Bulgaria	1199,37	987,69	81.61	1246,43	1006,85	114.47	1443,72	935,16	90.38	1499,80	899,13	73.29	1253,52	812,09	80.17
4	Croatia	365.05	216.88	207.31	323.85	252.15	182.65	399.05	240,53	219.80	393.12	224.60	253.13	406,38	265.43	281.24
5	Cyprus	3.20	0.95	16.13	7.18	0.72	31.33	5.84	0.55	36.20	11.94	0.58	44.48	13.43	0.64	39.83
6	Czech Republic	1158,70	812,43	506.93	1085,51	733,01	476,21	1180.00	782,11	448,55	1219,29	701.63	591,55	1225,99	752,64	596,41
7	Denmark	1129,68	269.13	751,58	1358,64	357,49	799,85	1327,51	254.83	788,56	1301,14	340,96 thmost common	772,80	1182,25	300.83	689,56
8	Estonia	111.69	70.59	59.29	175.90	76.45	62.82	149.05	58.50	64.14	222.01	92.36	76.09	229.72	99.67	69.83
9	Finland	446,44	73.86	213.27	447,14	67.63	200.55	443,33	55.63	234.61	652,18	54.61	319,22	468,14	55.16	244.46
10	France	8003,17	3864,21	5480.83	9846.95	4373,51	5213.13	10763.15	4056,23	5195.24	10793.12	3506,88	5463.81	9484.14	3553,00	5565.57
11	Germany	5659.29	4739,79	5218.58	6664.60	4646,24	4662,29	5567.63	4436,27	3327,76	7167.32	3926,01	5503.44	7050.78	4045,31	5266.45
12	Greece	785,56	892,09	591,06	724,96	965,59	562,46	668.01	1013,16	621,43	704,13	1047,57	642,38	731,26	974,85	668.90
13	Hungary	2223,54	1218,86	222.22	1998,53	1257,35	208.54	2238,24	1086,18	224.63	2300,71	1053,21	219.06	2272,99	1082,49	203.69
14	Ireland	304.81	8.64	975,43	325.07	9.90	1017,91	361.72	9.87	1266,97	365.24	10.33	1013,44	306.04	10.33	1011,84
15	Italy	4034,01	786,07	1382,53	3500,59	849,80	1469,24	3680,16	820,02	1880,24	3679,35	808,52	1787,48	3904,71	825,28	1716,48
16	Latvia	359,77	127.73	81.79	376,76	153.89	73.21	353,48	110.63	67.39	504.43	177.64	82.08	587,29	200.49	86.71
17	Lithuania	811,08	363.64	235,49	881,40	410,58	249.42	813,06	310,37 thmost common	252.05	966,86	397,49	248.81	1198,05	504.80	241.36
18	Luxembourg	18.27	4.06	115.50	21.31	4.38	98.98	26.18	4.31	95.58	24.01	3.92	96.15	22.85	3.57	89.13
19	Malta	n.d.	n.d.	2.74	n.d.	n.d.	3.98	n.d.	n.d.	4.25	n.d.	n.d.	4.20	n.d.	n.d.	3.85
20	Netherlands	267.55	205,73 thmost	628,57	277.58	270.08	643,86	338,56	184.68	682,94	323,23	197.07	707,13	335,92	188,56 thmost	738,66

			commo n												commo n	
21	Poland	3530,89	1639,82	851,43	4031,34	1765,46	879,32	3660,41	1585,27	793,57	3959,36	1659,64	735,46	4430, .61	1931,00	1092,72
22	Portugal	247.65	54.82	271.07	235.65	62.21	231.62	241.69	62.60	263.74	240.92	72.30	240.03	233.86	78.74	263.72
23	Romania	3448,48	1339,06	1245,46	4054,52	1800,64	1312,82	4877.45	1686,25	1446,85	4764,68	1568,64	1520,36	3207,44	1125,04	1310,04
24	Slovakia	618,38	328,18	126.89	450.25	327.13	211.98	575.64	313.72	168.89	583.05	281.14	138.25	613,86	313,78	160.35
25	Slovenia	82.79	39.70	199,39	75,83	29.78	156.94	85.79	37.24	201.95	84.76	36.63	202,35	95.74	39.13	197.93
26	Spain	3841,08	968,39	1733,46	2966,52	986,81	1539,23	4342,57	1053,15	1850,45	3643,10	834,07	1831,98	4696,37	889,37	1945,23
27	Sweden	695,80	189.59	966,84	755,35	219.84	1098,56	577,17	146.43	1056,52	775.69	219.30	1033,99	821,63	202,11	1001,64

Legend:
A1, A2,..., A5 - the cost of growing cereals, Million euro
B1, B2,..., B5 - the cost of growing industrial crops, Million euro
C1, C2,..., C5 - the cost of growing fodder plants, Million euro
Source: built by the authors according to Eurostat, 2021p.

Annex 2

Table 3. The results of the correlation analysis

Countries	Correlation between V and A			Correlation between V and B			Correlation between V and C		
Austria	straight and high			inverted and moderate			straight and weak		
		Column 1	*Column 2*		*Column 1*	*Column 2*		*Column 1*	*Column 2*
	Column 1	1		Column 1	1		Column 1	1	
	Column 2	0.899037	1	Column 2	-0.32626	1	Column 2	0.016555	1
Belgium	straight and very high			inverted and weak			straight and very high		
		Column 1	*Column 2*		*Column 1*	*Column 2*		*Column 1*	*Column 2*
	Column 1	1		Column 1	1		Column 1	1	
	Column 2	0.978443	1	Column 2	-0.03033	1	Column 2	0,946536	1
Bulgaria	straight and very high			inverted and weak			inverted and weak		
		Column 1	*Column 2*		*Column 1*	*Column 2*		*Column 1*	*Column 2*
	Column 1	1		Column 1	1		Column 1	1	
	Column 2	0.975431	1	Column 2	-0.27054	1	Column 2	-0.24106	1

Croatia	straight and high	direct and medium	straight and very high
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.727042 1	Column 2 0.411685 1	Column 2 0.922686 1
Cyprus	straight and high	inverted and high	straight and very high
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.872668 1	Column 2 -0.9012 1	Column 2 0.991963 1
Czech Republic	direct and medium	inverted and middle	direct and medium
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.673272 1	Column 2 -0.68312 1	Column 2 0.508105 1
Denmark	direct and moderate	straight and high	inverted and weak
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.319017 1	Column 2 0.765038 1	Column 2 -0.23952 1
Estonia	straight and high	straight and high	straight and high
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.875151 1	Column 2 0.747742 1	Column 2 0.887476 1
Finland	direct and medium	inverted and moderate	direct and medium
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0,500831 1	Column 2 -0.35101 1	Column 2 0,549881 1
France	straight and weak	inverted and very high	direct and medium
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.255157 1	Column 2 -0.92656 1	Column 2 0.659987 1
Germany	inverted and middle	inverted and middle	inverted and weak
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1

	Column 2 -0.05074 1	Column 2 -0.62394 1	Column 2 -0.27149 1
Greece	inverted and high	straight and very high	direct and medium
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 -0.7857 1	Column 2 0,972517 1	Column 2 0,545488 1
Hungary	direct and medium	inverted and middle	direct and medium
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0,521461 1	Column 2 -0.62256 1	Column 2 0,580768 1
Ireland	direct and medium	direct and medium	straight and high
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.669352 1	Column 2 0.6604 1	Column 2 0.80556 1
Italy	inverted and weak	straight and weak	straight and very high
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 -0.23842 1	Column 2 0.235409 1	Column 2 0.922278 1
Latvia	straight and very high	straight and high	direct and medium
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.956927 1	Column 2 0.835799 1	Column 2 0.64775 1
Lithuania	direct and medium	direct and moderate	direct and moderate
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.664037 1	Column 2 0.434986 1	Column 2 0.516302 1
Luxembourg	direct and medium	inverted and middle	inverted and high
	Column 1 *Column 2*	*Column 1* *Column 2*	*Column 1* *Column 2*
	Column 1 1	Column 1 1	Column 1 1
	Column 2 0.561652 1	Column 2 -0.61602 1	Column 2 -0.73135 1
Malta	n.d.	n.d.	direct and medium
			Column 1 *Column 2*

			Column 1 1 Column 2 0,540233 1
Netherlands	straight and high *Column 1* *Column 2* Column 1 1 Column 2 0,826051 1	inverted and weak *Column 1* *Column 2* Column 1 1 Column 2 -0.31596 1	straight and high *Column 1* *Column 2* Column 1 1 Column 2 0.868318 1
Poland	direct and medium *Column 1* *Column 2* Column 1 1 Column 2 0,522489 1	straight and weak *Column 1* *Column 2* Column 1 1 Column 2 0,194066 1	straight and weak *Column 1* *Column 2* Column 1 1 Column 2 0.042218 1
Portugal	inverted and middle *Column 1* *Column 2* Column 1 1 Column 2 -0.63735 1	straight and high *Column 1* *Column 2* Column 1 1 Column 2 0.877856 1	inverted and weak *Column 1* *Column 2* Column 1 1 Column 2 -0.21846 1
Romania	straight and very high *Column 1* *Column 2* Column 1 1 Column 2 0.990592 1	direct and medium *Column 1* *Column 2* Column 1 1 Column 2 0.686799 1	straight and very high *Column 1* *Column 2* Column 1 1 Column 2 0.924002 1
Slovakia	direct and medium *Column 1* *Column 2* Column 1 1 Column 2 0.506497 1	direct and moderate *Column 1* *Column 2* Column 1 1 Column 2 0.329773 1	inverted and moderate *Column 1* *Column 2* Column 1 1 Column 2 -0.31337 1
Slovenia	direct and medium *Column 1* *Column 2* Column 1 1 Column 2 0.615013 1	direct and medium *Column 1* *Column 2* Column 1 1 Column 2 0.58427 1	straight and high *Column 1* *Column 2* Column 1 1 Column 2 0,823879 1
Spain	direct and medium *Column 1* *Column 2* Column 1 1 Column 2 0.558748 1	inverted and moderate *Column 1* *Column 2* Column 1 1 Column 2 -0.37396 1	straight and high *Column 1* *Column 2* Column 1 1 Column 2 0.744241 1
Sweden	inverted and weak	straight and weak	straight and very high

	Column 1	*Column 2*
Column 1	1	
Column 2	-0.15547	1

	Column 1	*Column 2*
Column 1	1	
Column 2	0.137122	1

	Column 1	*Column 2*
Column 1	1	
Column 2	0.986628	1

Source: calculated by the authors