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Svitlana Khalatur

D.Sc. in Economics, Professor, Head of the Department of Finance, Banking and Insurance, Dnipro State Agrarian and Economic University, Dnipro, Ukraine;

ORCID: [0000-0001-8331-3341](https://orcid.org/0000-0001-8331-3341)

Oksana Hrabchuk

D.Sc. in Economics, Professor of the Department of Finance, Banking and Insurance, Dnipro State Agrarian and Economic University, Dnipro, Ukraine; e-mail: ograbchuk@j.ua

ORCID: [0000-0001-8711-864X](https://orcid.org/0000-0001-8711-864X)

(Corresponding author)

Oksana Vodolazska

Candidate of Economy Sciences, Associate Professor of the Department of Finance, Banking and Insurance, Dnipro State Agrarian and Economic University, Dnipro, Ukraine;

ORCID: [0000-0002-7858-7118](https://orcid.org/0000-0002-7858-7118)

Viktorija Babenko-Levada

Candidate of Economy Sciences, Associate Professor of the Department of Finance, Banking and Insurance, National University Zaporizhzhia Polytechnic, Zaporizhzhia, Ukraine;

ORCID: [0000-0002-4249-5369](https://orcid.org/0000-0002-4249-5369)

Oksana Pavlenko

Candidate of Economy Sciences, Associate Professor of the Department of Finance, Banking and Insurance, Dnipro State Agrarian and Economic University, Dnipro, Ukraine;

ORCID: [0000-0001-6967-8424](https://orcid.org/0000-0001-6967-8424)

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FINANCING THE DEVELOPMENT OF AGRICULTURAL PRODUCTION IN EUROPEAN COUNTRIES: COMPARATIVE ANALYSIS AND EXPERIENCE FOR UKRAINE

ABSTRACT

Current trends in the development of agricultural production necessitate the attraction of additional financial resources to finance the agricultural sector, which are specific to each national economy. The article examines the priority directions of development of the mechanism for financing agricultural production in Ukraine in the context of current trends in the implementation of the common agricultural policy in Europe. A comparative analysis of the mechanism of additional financing of agricultural production in the EU countries was carried out in the implementation of the common agricultural policy. Clustering of European countries was carried out while taking into account the existence of patterns in the agricultural market and it was confirmed that these patterns do not determine the features and volumes of additional financing of agricultural production. The existence of twelve possible types of markets of agricultural products in European countries is determined and the existence in practice of six of them is confirmed. It is determined that there are significant violations in the policy of convergence of financing of the agricultural sector declared by the OAP, which confirms the need to reform the Common Agricultural Policy of European countries in the direction of greater compliance with the national problems of the European agricultural sector.

It has been determined that there is a specific list of development problems that is not repeated for any of the European countries for the agricultural sector of Ukraine, and its own type of agricultural market has been formed, which also has no correspondence. The article focuses on the need to form in Ukraine a specific mechanism of additional financing of agricultural production, taking into account the problems of development of the national agricultural sector and in the context of the Common Agrarian Policy of the Economic Community, its priorities and direction of reform.

Keywords: production of agricultural products, Common Agricultural Policy, financing, subsidies, agro-sphere, convergence, European Union

JEL Classification: F36, Q11, Q14

INTRODUCTION

Modern trends in social development demonstrate a propensity for the growth of global risks and threats, which determined the formulation by the United Nations of global goals (Sustainable Development Goals. Department of Economic and Social Affairs, 2021), in the achievement of which humanity as a whole is interested. The need to achieve food security and promote the sustainable development of agriculture, which defines the production of agricultural products as a priority area of human activity, is one of the first among the goals of the UN. Along with ensuring a sufficient amount of agricultural production, regulating the development of the agricultural sector is directly related to the achievement of global goals 13 (urgent measures to combat climate change and its consequences) and 15 (protection and restoration of ecosystems). Sufficient financing of agricultural production is a necessary prerequisite for its complexity and efficiency.

The financial efficiency of agricultural production, as a rule, is not significant and fluctuates depending on a wide range of conditions. This determines the need for additional

financing of agriculture, including those aimed at achieving non-economic benefits from the use of natural resources of a strategic nature. The participation of national governments and supranational structures in financing the development of agriculture and rural areas is becoming one of the defining links of the financial mechanisms of national economies. A clear example of consistency in financing the development of agricultural production and ensuring the development of rural areas is the Common Agricultural Policy (CAP) of the EU countries, which is also focused on by those European countries that are not part of the European Union.

Ukraine aspires to join the European Union, therefore, the principles and mechanisms of the CAP are a reference point for the transformation of the financial mechanism of the national economy. At the same time, taking into account the experience of financing the development of agricultural production in European countries, it is necessary to take into account the modern realities of the agrarian sphere of the Ukrainian economy, systemic risks and threats. The justification of directions for the development of the financing of agricultural production in Ukraine in the context of the implementation mechanism of the EU CAP, taking into account its advantages and disadvantages, is the subject of this article.

LITERATURE REVIEW

Coordinating the development of rural areas has been the subject of the economic policy of the European Union since the mid-1990s. N. V. Pavlikha, N. L. Khomiuk (2018), when at the Berlin Summit in 1999 the "Action Plan 2000" was adopted, outlining the main principles of the Joint of agrarian policy (CAP). The accession of Eastern European countries to the European Union intensified the implementation of CAP and supplemented it with two key components: the Structural Policy for Preparation for Accession (ISPA) and the Special Program for Agriculture and Rural Development (SAPARD). The common agrarian policy includes a system of 23 measures, the totality of which is different for each individual national economy, based on typical problems of the development of rural areas. The development of a common agrarian policy is focused on the primary consideration of global problems, such as climate change and loss of biodiversity (Sowing Sustainability: The Power of Relationships in Food Systems Transformation, 2023).

The effectiveness of the implementation of the Common Agricultural Policy of the EU is evaluated in many scientific studies of individual scientists and institutions. In particular, in the studies of the European Commission regarding factor markets in agriculture (Comparative Analysis of Factor Markets for Agriculture across the Member States, 2014), financial needs and access to financing of agricultural enterprises (Survey on financial needs and access to finance of EU agricultural enterprises, 2020), access to finance remains insufficient for farmers and agri-food SMEs, 2023), studies of the European Investment Bank regarding the impact of investments in innovation in agriculture and direction and pace of its development (Feeding future generations How finance can boost innovation in agri-food, 2019) are evaluated as the amount of financial resources available to agricultural producers, as well as the direction of their use. However, it is often emphasized that the exact quantitative results of additional financing of agricultural production are quite difficult to assess, especially from the point of view of achieving the goals of the Common Agricultural Policy.

In the studies of individual scientists, it is stated that the common agricultural policy of the EU does not achieve its goals. Moreover, its current results cannot be quantified (Scown M.W., Brady M.V., Kimberly A.N., 2020). G. Pe'er and S. Lakner (2020) note that there are three main orientations to which additional financing of rural areas is directed in accordance with the Common Agricultural Policy: solving social problems EUR productions of "green architecture" of agriculture; ensuring a sufficient volume of agricultural production and food security in European countries. In their work, they prove the insufficient effectiveness of additional financing of agriculture through CAP tools to ensure the transformation of the agricultural sector in the direction of building "green architecture". On the one hand, numerous studies confirm that funding from the EU contributes to the development of "green" agricultural production in European countries (I. Darnhofer, S. D'Amico, E. Fouilleux, 2019), (N. Casolani'a, E. Nissi 'a, A. Giampaolo'b, L. Liberatore, 2021), gradually increasing the share of organic agriculture in the total volume of production. On the other hand, organic agriculture is less productive than traditional agriculture. According to certain crops, the gap in productivity is up to 20%, and the costs of conducting organic agriculture are high and are not compensated by additional financing through CAP mechanisms, as noted by de T. Ponti, B. Rijk, M. K. van Ittersum (2012), M. Beltrán-Esteve'a, E. Reig-Martínez (2014). Similarly, M. W. Scown, M. V. Brady, and A. M. Kimberly (2020) emphasize the insufficient effectiveness of the mechanism of implementation of the common agrarian policy in overcoming the social problems of rural areas. A. Sin, C. Czesław (2014) note the insufficient participation of national governments in the co-financing of CAP measures together with the EU, necessary for the development of agriculture, which is characteristic of Eastern European countries. Z. Jurjević, S. Zekić, B. Matkovski B., D. Đokić (2022) confirm this, noting that the existing mechanism of direct payments, according to the CAP, selects large and medium-sized farms as a priority for additional financing, which increases inequality in the incomes of the rural population. L. O. Fresco and P.

Mauguin (2018) note the insufficiency of funding for the introduction of innovations and conducting research in the field of agricultural production, which is only a few per cent of the II component of the Common Agrarian Policy.

At the same time, European farmers have urgent problems with financing their activities, such as the increase in the cost of production and the corresponding insufficiency of working capital, access to investment financing, access to bank loans and difficulties with their repayment, high cost of non-current assets (Survey on financial needs and access to finance of EU agricultural enterprises, 2020). The unsatisfied demand of European farmers for bank loans amounted to more than EUR 62 billion in 2022, and the majority of these requests are for long- and medium-term loans, which is typical for agricultural enterprises (Access to finance remains insufficient for farmers and agri-food SMEs, 2023). M. Grivins, M. N. Thorse, and D. Maye (2021) perceive this trend as the global dependence of the results of agricultural production on access to capital, the so-called "financialization of the agricultural sector".

Also, the European agricultural sector faces problems of growth, fragmentation, and low levels of costs for innovation, although in general, the EU is the world's largest exporter of agricultural products. The surplus of EU trade in agricultural products is more than EUR 30 billion, as noted by A. Verbeek, S. Fackelmann and B. McDonagh (2019). All this determined the tendency to diversify the financial instruments used in European countries to finance agriculture. Among the relatively new tools proposed to be used by the European Investment Bank are crowdfunding, the issuance of mini-bonds, and digital risk-sharing tools. Obviously, the tested instruments of additional financing of agricultural production in the EU countries in accordance with the Common Agricultural Policy do not fully meet the expectations placed on them.

In Ukraine, the production of agricultural products was unprofitable for a long time. Improvements in the efficiency of agriculture after independence were mostly determined by abundant natural resources rather than institutional changes in the economy. In particular, 27% of arable land in Europe is located in Ukraine (Y. Sologub, O. Bezpala, 2019), with 0.9 hectares of land per person (according to 2019 data). In Poland, for example, this figure is 0.3 ha. The natural productivity of agricultural production in Ukraine is also comparatively higher than in many European countries. The improvement of the financial efficiency of the Ukrainian agricultural sector was positively influenced by the transformation of the property institution (O. Anysenko, K. Vakar, 2018). But at the same time, the challenges and troubles of recent years have led to a constant decrease in the volume of agricultural products, both in physical terms and in terms of value.

The integration of Ukraine into Europe determines the need for coordination and policy of financing the agricultural industry, and the range of measures offered is extremely wide. Determining the priority areas of financial support for the production of agricultural products, Ukrainian scientists are guided by the experience and results of various countries of the world. Even before the COVID-19 crisis and the direct aggression of Russia (2016), there were shortcomings in the financing of the development of agriculture in Ukraine due to the lack of state support and the variability of state policy, as noted in the work of V. P. Horyn, I. V. Varemchuk (2016). Now T. Dobrunik, O. Kuznietsova (2022) fix three priorities of additional financing for the development of agricultural production according to the recommendations of the European Business Association: development of export logistics; crop storage; lending and access to agricultural finance. S. V. Stepanenko (2022) notes the need to restore the financial potential of the agricultural sector of Ukraine and the competitiveness of its products. B. Korovaieva (2023) defines as priorities: direct support of farmers for the diversification of agricultural production; financing of ecologically oriented agriculture; assistance in the creation of agricultural infrastructure and integration of the agricultural sector of Ukraine into the EU system. As you can see, the range of measures proposed for the restoration of Ukrainian agriculture and its development is quite wide, which is unacceptable in the conditions of systemic risks and shortage of financial resources.

AIMS AND OBJECTIVES

The purpose of the article is to determine the priority directions for the development of the mechanism of financing the production of agricultural products in the context of modern trends in the implementation of the common agrarian policy of the EU countries. Analyzing the patterns of development of agricultural production in the EU countries, the convergence of financing, the effectiveness of the implementation of the Common Agricultural Policy of the EU and the trends of its transformation, the priorities of additional financing for the restoration and development of agricultural production in Ukraine will be determined. The results of the study will contribute to the effective integration of the agricultural sector of Ukraine into the EU system.

METHODS

The article uses the following scientific methods:

1. Data collection and analysis. Statistical data on the results of agricultural activities, prices for agricultural products, and volumes of financing of agricultural production by European countries and Ukraine were collected. Information bulletins about the European Union (Fact Sheets on the European Union? 2022) and European countries are the source of information on the results of agricultural activity and prices for agricultural products. Information on the results of agricultural activity in Ukraine was obtained from the website of the State Statistics Service (Economic accounts of agriculture, 2022). For comparability, data on the volume of agricultural products in Ukraine (in comparable prices of 2016) are converted into euros at the average annual exchange rate of the NBU (Official exchange rate of the hryvnia to foreign currencies, 2023).
2. Regression analysis. A regression analysis was conducted to establish the interdependence of the basic index of prices for agricultural products and the production cost of agricultural products for European countries and for Ukraine.
3. Cluster analysis. A cluster analysis was performed using the k-means method based on Euclidean distances to establish the existence of patterns in the development of agricultural production by European countries.
4. Comparative analysis. A comparative analysis of additional financing for the production of agricultural products by clusters of European countries was carried out to determine the convergence of financing and shortcomings in the implementation of the Common Agricultural Policy of the CAP in achieving its priorities.
5. Synthesis. Development directions for financing the production of agricultural products in Ukraine have been determined based on the synthesis of previous research results, taking into account the specific problems of the development of the agricultural sector of Ukraine.

RESULTS

The basis of additional financing for the development of agricultural production in European countries is determined by the Common Agricultural Policy. Currently, the mechanism of financing the agricultural sector through the CAP is implemented with the help of direct payments to agricultural enterprises when they achieve cross-compliance (Scown et al., 2020), to which 77% of the budget is directed. In turn, only 5% goes to improving market mechanisms. The fulfilment of cross-compliance requirements includes certain rules for both the production of agricultural products and the maintenance of land. As a result, agricultural enterprises receive separate direct payments related to both the size of the farm and compliance with cross-compliance conditions. This determined significant differences between the amount of subsidies received by farms both within individual national economies of the EU and within the EU as a whole. External and internal convergence do not achieve their goal of equalizing additional funding depending on the area of "rich" and "poor" agricultural regions of Europe. In addition, the payment rates for the countries that joined the EU after 2005 were set at a much lower level than for the countries that were in the EU from the day of its foundation. Consequently, the inequality of payments has determined significant differences between European countries in financing the production of agricultural products, which is confirmed by the following research results.

The first stage of the research was the establishment of interdependence $PI \leftrightarrow pv$ (PI – basic price index for agricultural products (in 2015 prices), price index; pv – production value of agricultural products (also in 2015 prices), value of product). The specified interdependence does not have a cause-and-effect nature, since the "arrow of time" is not established for it, and the time shift is not confirmed by the results of correlation-regression analysis. A similar approach was also used in work (Khalatur et al., 2023). Probabilistic analysis and entropy calculation cannot be applied, since comparable raw data are given by European countries only for the period 2013–2022 (Fact Sheets on the European Union, 2022). The content of establishing such interdependence consists in determining the variability of prices for agricultural products from changes in the volume of its production on national markets, as stated in the classical law of supply. Calculations are made for 31 European countries: Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, Iceland, Norway, Switzerland, United Kingdom. The dependence was established $PI(pv) = a_0 + a_1 \cdot pv$ since the confidence level for nonlinear approximations was lower than for linear approximations. In all considered cases, the reliability of linear regression exceeded 95% according to univariate analysis of variance. Confirmation of the existence of dependence $PI(pv) = a_0 + a_1 \cdot pv$ also defines:

- the existence of a minimum volume of production of agricultural products (a_0), at which the correspondence "volume \rightarrow price" occurs, and, therefore, the possibility of market regulation of prices for agricultural products appears;
- linear elasticity of changes in prices for agricultural products to changes in the volume of its production as dPI/dpv (a_1).

Of course, establishing such dependence separately for national economies is somewhat conditional, since the movement of agricultural products within Europe is extremely wide and exports are significant.

The obtained dependences $PI(pv) = a_0 + a_1 \cdot pv$ by geographical regions of Europe are shown below (Table 1).

Western Europe	Northern Europe	Southern Europe	Eastern Europe
Austria = $-63,45 + 0,023 \cdot pv$	United Kingdom = $0,788 + 0,003 \cdot pv$	Greece = $-24,15 + 0,011 \cdot pv$	Bulgaria = $13,67 + 0,024 \cdot pv$
Belgium = $-64,57 + 0,020 \cdot pv$	Denmark = $-47,81 + 0,014 \cdot pv$	Spain = $-54,09 + 0,003 \cdot pv$	Poland = $-104,91 + 0,009 \cdot pv$
Luxembourg = $-57,23 + 0,39 \cdot pv$	Estonia = $-65 + 0,19 \cdot pv$	Italy = $-37,18 + 0,002 \cdot pv$	Romania = $20,30 + 0,006 \cdot pv$
Netherlands = $-54,66 + 0,005 \cdot pv$	Ireland = $-53 + 0,020 \cdot pv$	Malta = $72,02 + 0,18 \cdot pv$	Slovakia = $-31,84 + 0,062 \cdot pv$
Germany = $-2,72 + 0,002 \cdot pv$	Iceland = $121,58 - 0,044 \cdot pv$	Portugal = $-62,54 + 0,022 \cdot pv$	Hungary = $-231,54 + 0,042 \cdot pv$
France = $-42,69 + 0,0019 \cdot pv$	Latvia = $-90,08 + 0,13 \cdot pv$	Slovenia = $-64,83 + 0,135 \cdot pv$	Czech = $-141,32 + 0,051 \cdot pv$
Switzerland = $41,45 + 0,012 \cdot pv$	Lithuania = $-135,83 + 0,083 \cdot pv$	Croatia = $-51,18 + 0,072 \cdot pv$	
	Norway = $-90,08 + 0,13 \cdot pv$	Cyprus = $-42,77 + 0,21 \cdot pv$	
	Finland = $-9,00 + 0,025 \cdot pv$		
	Sweden = $-101,51 + 0,033 \cdot pv$		

The next stage of the research was the clustering of dependency parameters $PI(pv) = a_0 + a_1 \cdot pv$ for each of the analyzed countries. Usually, clustering methods are not applied to the obtained functional dependencies. Their field of application is the grouping of objects according to objective comparable characteristics. However, in this case, it is more about the division of statistical correspondences $PI \leftrightarrow pv$ into classes and the determination of the regularities of the process in each of the classes. The expediency and algorithm of this kind of research are given in the work (Faizah et al., 2020). In this study, the method of k-means based on Euclidean distances was used. Dispersion of objects (individual national economies) according to the characteristic patterns of correlations between the volume of agricultural production and the price index for it is shown in Figure 1.

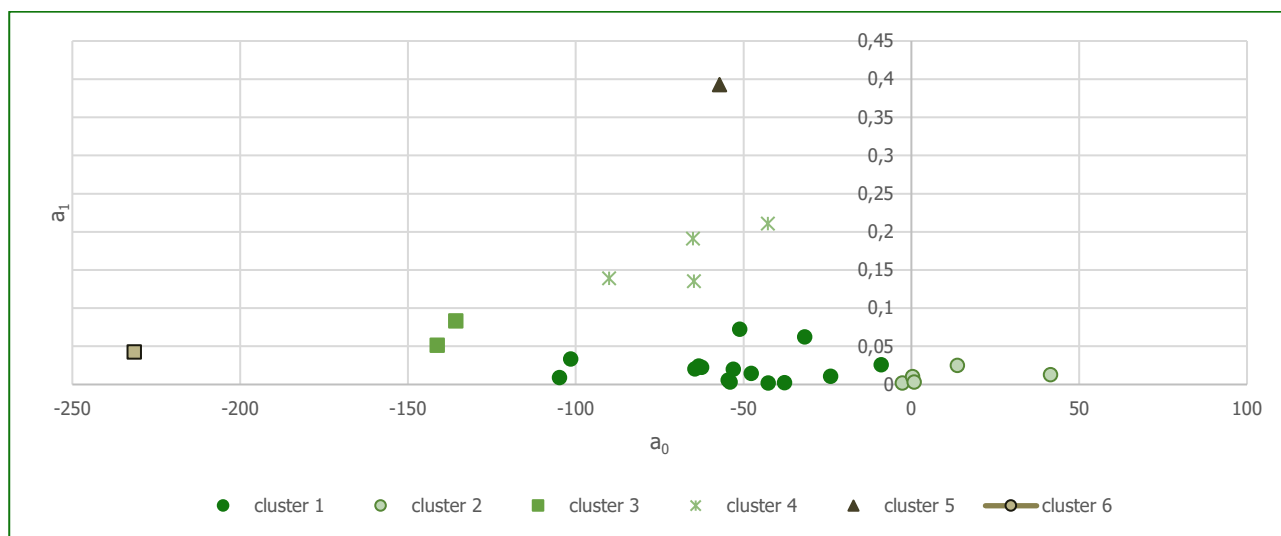


Figure 1. Dispersion of dependence $PI(pv)$ type $PI(pv) = a_0 + a_1 \cdot pv$, where PI – price index, pv – product. (Source: depending on the author's discretion)

As a result, six clusters were obtained:

- *Cluster 1* – countries Belgium, Denmark, Ireland, Greece, Spain, Croatia, Italy, Netherlands, Austria, Poland, Portugal, Slovakia, Finland, Sweden, France. Dependence $PI(pv) = a_0 + a_1 \cdot pv$ for Cluster 1 has the form $PI(pv) = -53,56 + 0,022 \cdot pv$;
- *Cluster 2* – countries Bulgaria, Germany, Norway, Switzerland, United Kingdom. The dependence $PI(pv) = a_0 + a_1 \cdot pv$ for Cluster 2 has the form $PI(pv) = 10,7 + 0,011 \cdot pv$;
- *Cluster 3* – Czech Republic, Lithuania. The dependence $PI(pv) = a_0 + a_1 \cdot pv$ for Cluster 3 has the form $PI(pv) = -138,58 + 0,067 \cdot pv$;
- *Cluster 4* – Malta, Romania, Estonia, Cyprus, Latvia, Slovenia. The dependence $PI(pv) = a_0 + a_1 \cdot pv$ for Cluster 4 has the form $PI(pv) = -42,77 + 0,169 \cdot pv$;
- *Cluster 5* – Luxembourg. The dependence $PI(pv) = a_0 + a_1 \cdot pv$ for Cluster 5 has the form $PI(pv) = -57,23 + 0,39 \cdot pv$;
- *Cluster 6* – Hungary. The dependence $PI(pv) = a_0 + a_1 \cdot pv$ for Cluster 6 takes the form $PI(pv) = -231,54 + 0,042 \cdot pv$.

According to the obtained clusters based on the ratio between the volume of agricultural production and the price index for it, a classification of countries is proposed according to the level of the objectively necessary volume of additional financing (initial subsidy). Additional financing of the production of agricultural products in the amount a_0 depending $PI(pv) = a_0 + a_1 \cdot pv$ on the dependence is objectively necessary for the development of agriculture, as it creates prerequisites for flexible pricing on the market of agricultural products.

Classification according to the level of initial subsidy of agriculture:

1. *Extremely subsidized.* The agriculture of the country of cluster 6, Hungary, belongs to the extremely subsidized. The volume of necessary subsidies for the production of agricultural products to maintain balance ranges from EUR 186 million to EUR 277.1 million. The amount of necessary subsidies is determined outside of Cluster 6 by parameter a_0 .
2. *Subsidy* The group of countries with subsidized agriculture includes the countries of Cluster 3 (Czech Republic, Lithuania). The amount of necessary subsidies for the production of agricultural products for these countries ranges from EUR 119.5 million to EUR 186 million.
3. *Minimal subsidy.* Includes countries belonging to Clusters 1, 4, and 5 (Belgium, Denmark, Ireland, Greece, Spain, Croatia, Italy, Netherlands, Austria, Poland, Portugal, Slovakia, Finland, Sweden, France, Estonia, Cyprus, Latvia, Slovenia). In this classification group, the countries of three clusters are combined, since for these clusters the boundaries of parameter a_0 intersect. The volume of necessary subsidies for the production of agricultural products ranges from EUR 5.9 million to EUR 119.5 million.
4. *Non-subsidized.* This cluster includes countries belonging to Cluster 2 (Bulgaria, Germany, Norway, Switzerland, United Kingdom). Agriculture in these countries is characterized by the absence of subsidies or insignificant subsidies in the amount of up to EUR 5.9 million. The upper limit of the parameter a_0 for this cluster is EUR 88.8 million.

Also, on the basis of the parameter a_1 dependence $PI(pv) = a_0 + a_1 \cdot pv$, a classification of the production of agricultural products is proposed according to the correspondence between changes in prices for agricultural products and changes in the volume of their production:

1. *Market.* With the growth of the production of agricultural products in this group of countries and the provision of the necessary minimum amount of subsidies, the prices of products will change significantly depending on the increase in production. Luxembourg, the only country in the cluster, belongs to this group. The limits of this classification group according to the parameter a_1 for dependence $PI(pv) = a_0 + a_1 \cdot pv$ vary from 0.28 to 0.5.
2. *Adjustable.* This group is characterized by a weaker, but noticeable dependence of prices for agricultural products on the volume of their production. The parameter varies from 0.28 to 0.05. The group includes the countries of Clusters 3 and 4.
3. *Non-market.* Within this group there are countries for which the prices of agricultural products depend minimally on their production. The parameter a_1 varies from 0.05 to -0.16. The group is the widest and includes the countries of Clusters 1, 2, and 6.

Potentially, according to the proposed classification systems, twelve types of agricultural production can be created, however, six of them were actually identified, corresponding to the resulting clusters: extremely subsidized, non-market (Cluster 6); minimally subsidized, non-market (Cluster 1); regulated, subsidized (Cluster 3); regulated, minimally subsidized (Cluster 4); regulated, non-subsidized (Cluster 2); minimal subsidy, market (Cluster 5).

A coordinated policy for the development of rural areas is implemented within the European Union, which includes six priorities: transfer of knowledge and innovations; profitability and competitiveness of the farm; food chain organization and risk management; restoration, protection and improvement of ecosystems; resource-efficient and climatically sustainable economy; social integration and economic development. Financing of rural development policy is carried out within the framework of these priorities and the system of 23 measures corresponding to the CAP. Each country independently chooses its own system of measures for which additional funding is provided as a whole or for individual regions, depending on the most acute problems of the development of rural areas. Sources of financial resources to ensure the implementation of the Common Agrarian Policy can be: targeted funds from the European Union; grants received for financing certain targeted programs; national funding; co-financing by the European Union and the national government; co-financing by the national government and the recipients of the funds. Among these 23 measures, measures that directly, in the short-term perspective, affect the volume of agricultural production:

- 01 – knowledge transfer and innovative measures;
- 04 – investments in physical assets;
- 05 – restoration of agricultural production;
- 06 – farm and business development;
- 11 – organic farming;
- 13 – payments to territories facing natural or other specific limitations;
- 14 – animal welfare.

The European Network for Rural Development systematizes information on the implementation of the Common Agricultural Policy, the problems of agricultural development in each country, resources, sources of financing and directions for the use of additional funds and publishes the relevant Summaries (RDP Summaries. European Network for Rural Development). It should be noted that the Summary of the implementation of the Common Agricultural Policy is not provided for several countries (Norway, Switzerland). Also, the European Network for Rural Development notes that information on the implementation of CAP in the United Kingdom may be inaccurate. The analysis of the Summary of the European Policy for the Development of Rural Areas (2023) made it possible to obtain quite interesting results regarding the financing of measures that affect the volume of agricultural production (Figure 2):

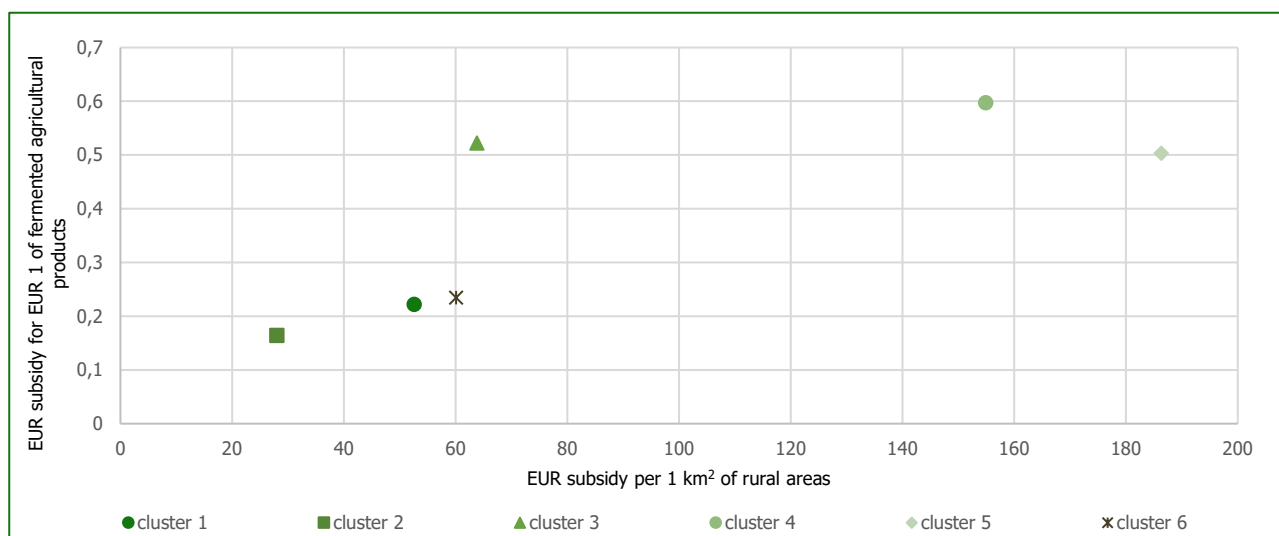


Figure 2. Subsidization of agricultural production in clusters of European countries. (Source: depending on the author's discretion)

1. *Cluster 1* (minimally subsidized, non-market). The specified cluster is characterized by a great diversity of the market for agricultural products and the conditions in which they are produced. However, the typical problems of the countries included in this cluster are the existence of natural restrictions on the development of agriculture, loss of biodiversity and territorial imbalance, unemployment and ageing of the population. In some countries, there is also reduced efficiency of agricultural production and its small scale. The amount of additional financing for the production of agricultural products for this cluster is 52.53 EUR/km² of agricultural land, or EUR 0.22 of subsidies are needed to generate EUR 1 of produced agricultural products;
2. *Cluster 2* (regulated, non-subsidized). The countries of this cluster are characterized by the efficient organization of agriculture and the intensive nature of its management. But at the same time, each of these countries has certain obstacles in terms of increasing the growth potential of agriculture. For example, in Norway, there are significant restrictions on the development of agriculture, in Bulgaria, the quality of agricultural resources is rapidly losing, in Germany, natural phenomena have been observed in recent years that sharply reduce the efficiency of agricultural production. The amount of additional financing for the production of agricultural products for this cluster is 27.99 EUR/km² of agricultural land, or EUR 0.16 of subsidies are needed to generate EUR 1 of agricultural products produced;
3. *Cluster 3* (regulated, subsidized). The main problems of the development of agricultural production in the countries of this cluster are the small scale of agricultural structures, the ageing of the workforce, and the low efficiency of agriculture. The amount of additional financing for the production of agricultural products for this cluster is 63.75 EUR/km² of agricultural land, or EUR 0.522 of subsidies are needed to generate EUR 1 of agricultural products produced;
4. *Cluster 4* (regulated, minimally subsidized). The main problems of agricultural development in the countries of this cluster are determined by specific and significant limitations of natural resources (acute water shortage, a significant number of mountainous areas, infertility of agricultural land, etc.) and imperfect organization of agricultural production. As a rule, in these countries, a small amount of agricultural land is at the disposal of one farm, which prevents the development of mass commodity production. The volume of additional financing for the production of agricultural products for this cluster is 154.93 EUR/km² of agricultural land, or for the generation of EUR 1 of produced agricultural products, EUR 0.59 of subsidies are needed;
5. *Cluster 5* (minimal subsidy, market). This cluster includes Luxembourg. The general economic and demographic context is turning the country's agriculture into suburban agriculture. In addition, there is a significant loss of biodiversity, which makes intensification of production impossible. The specific nature of the organization of agricultural production determines the need to import a significant amount of agricultural products. Despite the generally market nature of agriculture and the minimal need for subsidies and subsidies, in fact, the volume of additional financing for the production of agricultural products in Luxembourg amounts to 186.23 EUR/km² of agricultural land, or EUR 0.50 of subsidies are needed to generate €1 of agricultural products produced, which is the highest among European countries;
6. *Cluster 6* (extremely subsidized, non-market), includes Hungary. The agricultural sector of the country is characterized by the presence of significant natural limitations (water shortage), ageing of the population, low efficiency of agricultural production, and low standard of living of the rural population. At the same time, the amount of additional financing for the production of agricultural products is not significant and amounts to 60 EUR/km² of agricultural land or EUR 0.23 of subsidies are needed to generate EUR 1 of agricultural products.

The results of the study prove that there is no connection between the actual amount of additional financing for the production of agricultural products and the need for such financing, based on the need to maintain balance in the market. In particular, the highest level of additional funding is observed in Luxembourg, while the need for subsidies for this country is classified as minimal. The country that needs the highest level of additional financing for agricultural production, Hungary, has the same level as most European countries in Cluster 1. The obtained results are directly consistent with the results of the study by M. W. Scown, M. V. Brady, and A. N. Kimberly (2020), who note that current CAP subsidies only increase the inequality of income formation in agriculture, increasing incomes for financially sufficient farms and insignificantly affecting incomes for small farms with low production efficiency. As for the financing of the development of the "green economy" and the preservation of ecosystems, the existing system of additional financing of the production of agricultural products in the EU also does not achieve its goals (de Ponti, T., Rijk, B., van Ittersum M. K., 2012). At the same time, for comparison, the level of profitability of investments in the development of agricultural production in the United States, as noted in an open letter of more than 130 research and scientific organizations to T. J. Vilsack, Secretary of the Department of Agriculture of the United States, is 17% (2021).

Ukraine is currently moving towards closer integration with the European Union, which determines the need to transform the basic principles of economic policy and bring it closer to the policy of the European Union. The imperatives of the common agricultural policy of the EU thus become relevant for our country as well. However, the range of problems inherent in the development of agricultural production in Ukraine is quite specific. Some scientists note that the development of the agricultural sector in Ukraine is characterized by the following problems (Dobrunik et al., 2022; Khalatur et al., 2023; Pasko, 2022):

- significant bureaucratization of the management process, limited financial capabilities of the agricultural sector, low flexibility and adaptability of the economic mechanism;
- a specific model of agricultural production in Ukraine, oriented towards the formation of large corporate enterprises, the main profit of which is formed due to the export of products. During the war, the export capabilities of such corporations were sharply limited, which determined a decrease in the financial results for agricultural enterprises;
- the specialization of the corporate sector in the production of plant products, and of small-scale agricultural structures - in the production of livestock products. This determines the imbalance in the production of various types of agricultural products. In addition, the experience of European countries proves that small-scale agricultural structures are less efficient;
- the destruction of the usual food chains during the war, determined by the vulnerability of certain branches of agricultural production to significant destructive influences, their dependence on the import of modern biomaterials and technologies;
- direct damages and losses from the war: loss of land in active use; loss of crops, livestock, biomaterials; losses from the stipulated simplification of technologies; loss of material assets; labour losses, etc. Thus, during the year of the war (February 2022 - February 2023), direct losses caused to the agricultural sector of Ukraine amounted to USD 8.7 billion, indirect losses – USD 31.5 billion, and demining costs were estimated at USD 37.6 billion. (Korovaieva, B., 2023).

None of the countries of the European Union currently face similar problems in the development of agriculture. The only exception is Croatia, whose national economy did not recover after the war. At the same time, it should be taken into account that the functioning of the agricultural sector of Ukraine ensures not only the integrity of its national economy and food security but also forms a significant part of the food security component of the world. There are other comments regarding the implementation of EU priorities in agricultural policy in other countries.

Considering the insignificant and uncertain effectiveness of CAP in EU countries, in 2018 the European Commission adopted "Regulation of the European Parliament and of the Council on the financing, management and monitoring of the common agricultural policy and repealing Regulation (EU) No 1306/ 2013", according to which EU member states will be responsible for adapting EU measures to national conditions and for the effectiveness of these measures: "Greater subsidiarity will make it possible to better take into account local conditions and needs, against such objectives and targets. Member States will be in charge of tailoring CAP interventions to maximize their contribution to EU objectives. While maintaining current governance structures – that must continue to ensure effective monitoring and enforcement of the attainment of all policy objectives – the Member States will also have a greater say in designing the compliance and control framework applicable to beneficiaries (including controls and penalties)" (Regulation of the European Parliament and of the Council on the financing, management and monitoring of the common agricultural policy and repealing Regulation (EU), 2023). The existence of unique problems in the development of agricultural production in Ukraine determines the relevance of this thesis for our country. At the same time, the restoration of agricultural production on the territory of Ukraine, which is part of the recovery plan of Ukraine, should still take into account the basic principles of the CAP, especially since measures to implement the Common Agrarian Policy widely take into account the national interests of each individual country.

It should be noted that for Ukraine, the existence of dependence $PI(pv)$, which took the form $PI(pv) = 124,45 - 0,0004 \cdot pv$ was also confirmed. According to this dependence, the production of agricultural products in Ukraine can be classified as subsidized non-market. Therefore, the agricultural sector of Ukraine does not belong to any of the existing types of agricultural production recorded in European countries. Additional financing of agricultural production on the territory of the EU is a common tool, therefore, it is also appropriate for Ukraine to carry out measures for such additional financing. The centre of cluster 6 (Hungary) is closest to Ukraine in terms of $PI(pv)$ dependence parameters. Taking into account the indicators of subsidization of Hungary and the fact that the area of agricultural land in Ukraine is currently 41,300 km² (the entire area, since the loss of agricultural land due to occupation or hostilities has not yet been precisely determined), the volume of additional financing for the production of agricultural products should amount to EUR 2,478 million. The minimum necessary subsidies for the development of agricultural production for Ukraine amount to EUR 124.45 million.

However, even with the existence of sufficient financing for the development of the agricultural sector in Ukraine, the question of the actual distribution of these funds and their effective use arises, since, as the experience of Europe shows, sufficient financing is not a guarantee of the expected result. At this stage, the main program document defining the orientations of Ukrainian economic policy for the recovery of the national economy is the Recovery Plan of Ukraine for 2023–2032 (Ukraine Recovery Plan, 2023-2032). Within the limits of the specified plan, the implementation of more than 850 national programs with a total amount of funding of more than USD 750 billion is foreseen. Within this plan, the following projects are aimed at the restoration and development of the production of agricultural products, as well as the infrastructure of rural areas: the construction of transshipment complexes and cross-border terminals in the west of Ukraine; construction of an irrigation system for 1 million hectares; stimulation and development of processing of products of plant origin; preservation of the agricultural sector in the conditions of blockade of ports; meat and dairy independence; fruit and vegetable Ukraine; return of agricultural land to economic circulation; development of river export of agricultural products; promoting the transition of the agro-food sector to "green" growth; operational recovery of the agricultural sector after the war; development of reclamation systems; development of seed production. The volume of state financing for the development of all sectors of the economy is currently planned at the level of USD 50 billion, which is only 6.6% of the total volume of financing. However, the implementation of this plan, starting from 2024, is still problematic.

The specified list of programs for the restoration of the agricultural sector of Ukraine does not fully correspond to the measures of the Common Agrarian Policy of the EU. In particular, according to the CAP, the priority measures for financing the production of agricultural products should be measures: for the restoration of agricultural production (05); regarding farm and business development (06); and payments to territories facing natural or other specific limitations (13). Funding of measure 06 – farm and business development should be quite careful. In European countries, the financing of this measure is usually aimed at overcoming the negative effects of small-scale agricultural production (supporting small farmers, developing agricultural cooperation and consolidating agricultural structures). For Ukraine, on the contrary, a significant share of negative effects is formed in the sphere of functioning of agricultural holdings, so the substantive emphasis of measure 06 should be shifted.

DISCUSSION

The article is devoted to the identification of priority directions for additional financing of agricultural production in Ukraine, taking into account the experience of such financing in European countries. In the process of carrying out the research and studying literary sources, the following discussion points were highlighted:

- the existing principles of additional financing (at the expense of centralized financial resources) in most European countries are regulated by the Common Agricultural Policy, which, in turn, is oriented towards the system of UN global goals. However, there are no clear quantitative criteria for achieving CAP priorities or global goals. Therefore, it is not possible to objectively assess the effectiveness of the CAP mechanism in achieving its priority tasks or in the implementation of regulated measures. Partial studies by the European Commission and the European Investment Bank on the effectiveness of financing the agricultural sector of European countries confirm its inadequacy, which necessitated the reform of the CAP mechanism. At the same time, it should be taken into account that according to individual priorities of the CAP implementation, significant changes can be achieved only in the long term;
- numerous studies confirm that the existing mechanism of additional financing of the agricultural sector of European countries contains technical deficiencies that lead, on the one hand, to inequality in the financing of agricultural producers in individual national economies, and on the other hand, to inconsistency in achieving the priority goals of the CAP. The declared convergence of countries in additional financing is not achieved. For the new EU member states, in addition, the unconditional implementation of CAP mechanisms can lead to instability in the development of agriculture, as shown in the study by M. Morcunas and P. Labucas (2020). This is also confirmed by the results of this study, when according to the obtained clusters of countries, there is no correspondence between the patterns of production of agricultural products and the amount of additional financing. However, it should be taken into account that the reform of the CAP mechanism is still ongoing and its potential changes will lead to increased effectiveness;

- the existing mechanism of additional financing of agricultural producers in Ukraine is fundamentally different from the mechanisms of the CAP, and the system of priorities has not been established. It should be taken into account that the reform of the CAP is currently aimed at providing greater freedom to national governments in the use of additional funding for the implementation of rural development policies, taking into account the specifics of national problems. The problems of developing rural areas of Ukraine and stimulating the production of agricultural products are unique, there is no experience in comprehensively overcoming them in European countries, therefore the system of CAP priorities during the integration of Ukraine into the European Community must be transformed. Accordingly, the developed national programs for the recovery of the agricultural sector of Ukraine do not fully correspond to the system of priorities of the CAP and have insufficient funding.

In conclusion, the mechanism of financing the agricultural sector in European countries through CAP instruments (despite its shortcomings) should also be applied in Ukraine with appropriate adaptation to its specific problems. However, there is a need for a new discussion regarding the list of measures to overcome these problems and their order of priority.

CONCLUSIONS

The article defines a system of priorities for the transformation of the financing of agricultural production in Ukraine, taking into account the experience of applying the financing mechanism of the Common Agrarian Policy of European countries.

The results of the study indicate a close relationship between the volume of production and the index of prices for it by European countries, the characteristics of this relationship are repeated, which indicates the existence of typical patterns of the market of agricultural products by clusters of countries. However, no relationship between the specific patterns of the market of agricultural products and the peculiarities of the implementation of agrarian policy has been determined. Volumes of additional financing aimed at the implementation of the Common Agricultural Policy also do not depend on the amount of agricultural land, which does not correspond to the declared mechanism of cross-compliance.

Thus, on the basis of the analysis of theoretical approaches, empirical research and the consequences of the application of CAP, the insufficient effectiveness of the tools and mechanism of financing the development of the agricultural sector in European countries has been confirmed. The results of the study indicate a slight convergence between the national economies of Europe in financing the production of agricultural products. The reform of the CAP is aimed at taking into account national specificity in the hierarchy of priorities of agrarian policy and achieving greater effectiveness in implementing the global goals of the UN.

The possibilities of applying the experience of European countries in determining the priorities of Ukraine's agrarian policy are limited due to a significant number of risks and threats. However, mechanisms for financing the production of agricultural products are fully applicable, especially if they take into account the specifics of national problems. Currently, the existing set of programs for the recovery and development of the agricultural sector of Ukraine does not sufficiently take into account the system of EU priorities, which complicates the integration of the agricultural sector of Ukraine into the EU system. It is necessary to develop additional national programs within the framework of CAP measures for the restoration of agricultural production, for the development of farms and businesses, and for payments to territories facing natural or other specific limitations.

Thus, the scientific novelty of the article lies in the development of the scientific and practical foundations of financial support for the production of agricultural products in Ukraine by the state and European institutions.

Prospects for further research. This article reveals the prospects of broad investigations in the direction of improving the mechanism of additional financing of the production of agricultural products based on the study of the experience of individual countries, the development of a system of criteria for evaluating the effectiveness of the implementation of the priorities of the agricultural policy of the CAP, the assessment of the impact of additional financing of the production of agricultural products on the social and infrastructural development of rural areas, etc. In general, solving the problem of financing the development of the agricultural sector of Ukraine lies in the context of the system of global goals of the UN and requires the broad involvement of the scientific community.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

Conceptualization: *Svitlana Khalatur, Oksana Hrabchuk*

Data curation: Svitlana Khalatur, Oksana Hrabchuk, Viktoria Babenko-Levada, Oksana Pavlenko

Formal Analysis: Svitlana Khalatur, Oksana Hrabchuk, Oksana Vodolazska, Viktoria Babenko-Levada, Oksana Pavlenko

Methodology: Svitlana Khalatur, Oksana Hrabchuk, Viktoria Babenko-Levada

Software: Svitlana Khalatur

Resources: Svitlana Khalatur, Oksana Vodolazska, Viktoria Babenko-Levada, Oksana Pavlenko

Supervision: Svitlana Khalatur, Oksana Hrabchuk

Validation: Svitlana Khalatur, Oksana Vodolazska

Investigation: Svitlana Khalatur, Oksana Hrabchuk, Oksana Vodolazska

Visualization: Svitlana Khalatur, Oksana Vodolazska, Viktoria Babenko-Levada, Oksana Pavlenko

Project administration: Svitlana Khalatur, Oksana Vodolazska

Funding acquisition: Svitlana Khalatur, Viktoria Babenko-Levada

Writing – review & editing: Svitlana Khalatur, Oksana Hrabchuk, Oksana Vodolazska

Writing – original draft: Svitlana Khalatur, Oksana Hrabchuk, Oksana Vodolazska, Viktoria Babenko-Levada, Oksana Pavlenko

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The Authors declare that there is no conflict of interest.

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Халатур С., Грабчук О., Водолазська О., Бабенко-Левада В., Павленко О.

ФІНАНСУВАННЯ РОЗВИТКУ ВИРОБНИЦТВА СІЛЬСЬКОГОСПОДАРСЬКОЇ ПРОДУКЦІЇ КРАЇН ЄВРОПИ: КОМПАРАТИВНИЙ АНАЛІЗ І ДОСВІД ДЛЯ УКРАЇНИ

Сучасні тенденції розвитку сільськогосподарського виробництва зумовлюють необхідність залучення додаткових фінансових ресурсів для фінансування аграрного сектора, які є специфічними для кожної національної економіки. У роботі досліджено пріоритетні напрями розвитку механізму фінансування сільськогосподарського виробництва в Україні в контексті сучасних тенденцій реалізації спільної аграрної політики країн Європи. Проведено компаративний аналіз механізму додаткового фінансування виробництва сільськогосподарської продукції в країнах Євросоюзу при реалізації спільної аграрної політики. Здійснено кластеризацію країн Європи за існуванням типових закономірностей ринку сільськогосподарської продукції та підтверджено, що ці закономірності не визначають особливостей та обсягів

додаткового фінансування виробництва сільськогосподарської продукції. Окреслено існування дванадцяти можливих типів ринку сільськогосподарської продукції в країнах ЄС та підтверджено існування на практиці шести з них. Визначено, що існують суттєві порушення в декларованій САП політиці конвергенції фінансування агросфери. Відтак підтверджено необхідність реформування механізму реалізації Спільної аграрної політики для країн ЄС в напрямі більшої відповідності національним проблемам агросфери.

Визначено, що для агросфери України існує специфічний перелік проблем розвитку, який не повторюється для жодної з країн Європи, та сформовано власний тип ринку сільськогосподарської продукції, який також не має відповідностей. Тому в статті наголошено на необхідності формування в Україні специфічного механізму додаткового фінансування виробництва сільськогосподарської продукції з урахуванням проблем розвитку національної агросфери та в контексті Спільної аграрної політики ЄС, її пріоритетів і спрямованості реформування.

Ключові слова: виробництво сільськогосподарської продукції, спільна аграрна політика, фінансування, дотації, агросфера, конвергенція, Євросоюз

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