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Negative Factors Influencing the Policy of Public Administration Development of the Agriculture in the Region: The Example of Poland

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ABSTRACT

The main purpose of the article is to determine the level of importance and influence of the main negative factors influencing the formation of an effective policy for the development of agriculture in the region. And also, to formulate appropriate recommendations for overcoming or adapting modern agricultural development policies based on these factors. The set purpose is achieved through the use of a specific methodology, which includes the method of expert survey and analysis of hierarchies. As a result, seven key negative factors were identified that have the greatest negative impact on the formation of an effective policy for the development of agriculture in the Poland region. For a better understanding of the proposed methodology, we chose a separate region of Poland-Podkarpackie Voivodeship. Ultimately, the most appropriate recommendations were proposed to improve agricultural development policies for the region. The study has a limitation because it includes an analysis of region-specific negative factors. Given this, their level of influence and importance, as well as the prevailing recommendations, are highly specific to this region. In the future, it is planned to expand the analysis of factors and the formation of recommendations across the entire EU sector.

KEYWORDS: Agriculture, State, Environmental Changes, State Policy, Food Security, Climatic changes, Public Administration, Agricultural Innovations.

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Factores negativos que influyen en la política de Administración Pública del desarrollo agrícola en una región: El ejemplo de Polonia

RESUMEN

El objetivo del artículo es determinar el nivel de importancia e influencia de los principales factores ambientales negativos que influyen en la formación de una política eficaz para el desarrollo de la agricultura en la región. Y también formular recomendaciones apropiadas para superar o adaptar las políticas modernas de desarrollo agrícola basadas en estos factores. Este objetivo se logra mediante el uso de una metodología específica, incluido el método de encuesta de expertos y análisis de jerarquías. Como resultado, se identificaron siete factores negativos clave que tienen el mayor impacto negativo en la formación de una política eficaz para el desarrollo de la agricultura en Polonia. Para comprender mejor la metodología propuesta, elegimos una región separada de Polonia: el Voivodato de Podkarpackie. Finalmente, se propusieron las recomendaciones más adecuadas para mejorar la política de desarrollo agrícola en la región. El estudio tiene una limitación porque incluye un análisis de factores negativos específicos de la región. Por ello, su nivel de influencia e importancia, así como las recomendaciones predominantes, son bastante específicas para esta región. En el futuro, está previsto ampliar el análisis de factores y la formación de recomendaciones en todo el sector de la UE.

PALABRAS CLAVE: Agricultura, Estado, Cambios Ambientales, Política de Estado, Seguridad Alimentaria, Cambios Climáticos, Administración Pública, Innovaciones Agrícolas

Introduction

Chernozems are known for their fertility and high agronomic potential. They provide optimal conditions for the cultivation of a wide range of crops. Effective agricultural policies in such regions can significantly increase agricultural productivity, promoting economic growth. This creates conditions for increasing the country's export potential, strengthening its position in the international agricultural market. Chernozems are an important natural resource that requires careful management and conservation. Agricultural policies should include measures to conserve soils and prevent soil erosion and depletion. Consideration of environmental aspects is key to ensuring sustainable development of the agricultural sector.

Agricultural policy in regions with black soils also has great social significance. It has an impact on the lives of local communities, creates jobs and improves the standard of living of the rural population. In addition, taking into account the interests of small and medium-sized farmers helps preserve rural communities and prevent the outflow of population to cities.

Agricultural policy aims to address the needs of the local agricultural sector, while at the same time taking into account global trends and challenges. This includes developing policies that stimulate agricultural development, increase productivity and competitiveness, and ensure sustainability and environmental sustainability. An important aspect is to take into account negative external influences, such as climate change, economic crises, global market fluctuations, political instability and epidemiological threats. These factors can have a significant impact on agricultural regions, disrupting business as usual and requiring rapid and flexible responses. In response to these challenges, modern agricultural policy is focused on strengthening the resilience of the agricultural sector to external shocks. This means implementing sustainable farming practices, supporting innovation and using cutting-edge agricultural technologies. Agricultural research and development play an important role in helping to adapt to climate change and other environmental challenges. In addition, effective agricultural policies require the creation of strong institutional frameworks, property rights, access to resources and financing. This also includes infrastructure development, training and support for farmers, especially in conditions where external negative factors may pose a threat to their activities.

In response to these challenges, modern agricultural policy is focused on strengthening the resilience of the agricultural sector to external shocks. This means implementing sustainable farming practices, supporting innovation and using cutting-edge agricultural technologies. Agricultural research and development play an important role in helping to adapt to climate change and other environmental challenges. In addition, effective agricultural policies require the creation of strong institutional frameworks, property rights, access to resources and financing. This also includes infrastructure development, training and support for farmers, especially in conditions where external negative factors may pose a threat to their activities.

In general, modern agricultural policy is designed to harmonize the needs of local agricultural communities with global challenges, creating conditions for sustainable and resilient development of the agricultural sector.

Public administration plays a key role in the formation and implementation of agricultural policy. Thanks to legislative, financial and regulatory instruments, the state can promote innovation in agriculture, support scientific research and development of new technologies. It is also important to create conditions for effective market circulation of products, guaranteeing property rights and regulating land relations. Public administration must also strike a balance between commercial interests and the needs of society, taking into account the environmental and social aspects of agricultural policy. This includes protecting the interests of small and medium-sized producers, supporting environmentally sustainable practices and ensuring food security for the population.

Overall, the development and implementation of effective agricultural policies in regions with high black soil soil is important not only from the point of view of economic development and food security, but also from the point of view of natural resource conservation, social well-being and environmental sustainability.

Thus, the main purpose of the article is to determine the level of importance and influence of the main negative factors influencing the formation of an effective policy for the development of agriculture in the region. And also to formulate appropriate recommendations for overcoming or adapting modern agricultural development policies based on these factors.

The structure of the article consists of the following elements: an introduction, including a structural overview of the selected topic, a review of scientific sources on the topic, a description of the research methodology, a presentation of the main results of the study, a discussion of the results and conclusions.

1. Literature review

Examining modern scientific research on the formation of agricultural development policy, a number of key elements can be noted. So, most of them play a key role in ensuring the effectiveness of public administration in the agricultural sector, especially during periods of significant social transformations. They cover a wide range of aspects from organic farming

and sustainable use of resources to financial mechanisms and legal aspects in the agricultural sector. These studies not only contribute to understanding the impact of global economic and environmental changes on agriculture, but also provide important guidance for the development of effective, adaptive and sustainable policies that can support food security, economic growth and social demands in a regional context.

For example, the study by Ahmed, Thompson, Turchini (2020) and Guiné, Florença, Barroca, Anjos (2020) focuses on the adoption of organic farming, which provides insights into sustainable agricultural practices that are important for formulating policies that balance environmental sustainability and agricultural productivity. In the context of our study, this may contribute to the understanding of modern aspects related to organic farming and its role in the development of the regional agricultural sector.

At the same time, Bellemare, Barrett, Just (2013) and Nikmatul, Ratya, Nuhfil, Wahib (2020) note the importance of identifying key factors influencing the development and ensuring the effectiveness of public administration in the issue of agricultural development. In particular, these studies deal with the financial aspect of the development of the agricultural sector, which today is an important condition for the survival of any agricultural enterprise.

The issue of studying modern aspects of the regional agricultural development policy as a factor in ensuring the effectiveness of public administration during the period of transformation of society is also actively studied in the works of De Bon, Parrot, Moustier, (2010) and Linderhof, Janssen, Achterbosch (2019). These authors review and analyze current practices and strategies that can be used to develop regional agricultural policies. These studies are relevant in the context of obtaining information about the integration of agricultural practices into urban settings, which is important for regions experiencing social transformations.

It is interesting in the context of our research to examine the issue of environmental aspects of the modern agricultural development policy as a factor in the effectiveness of public administration in the period of societal transformation. Thus, the authors like Liučvaitienė (2007) and Smith et al. (2019) studied this issue in the context of organic farming. They determined that an effective environmental policy and appropriate state management will

make it possible to maintain an optimal balance between environmental sustainability and agricultural productivity — two key aspects in the formation of effective agrarian policy during social transformations.

A key element of a modern system of public management of the agricultural sector is ensuring long-term security. This topic is actively discussed in the work of Willer, Lernoud, Huber, Sahota (2019) and Espolov et al. (2023). The authors in these studies note that food security is a fundamental issue affecting the stability, health and economic well-being of a nation. In times of change and instability that accompany societal transformation, ensuring sustainable access to quality and sufficient food resources becomes even more critical. Agricultural development policies that integrate food security principles help reduce the risk of hunger, improve domestic nutrition, stabilize markets and reduce vulnerability to economic or climate shocks. Taking these aspects into account in public administration not only improves the quality of life of citizens, but also contributes to social justice, economic growth and sustainable development, which is especially important during periods of transition and reform.

Thus, the topic of forming a policy for the development of agriculture in the region as a factor in ensuring the effectiveness of public administration during the period of transformation of society is today a relevant topic of modern research. But despite this, today most studies are of a general descriptive nature and do not provide specific data on the influence of one or another factor on the development of agricultural development policy in the region.

In connection with this research question of our work, we will determine the influence of the main negative environmental factors influencing the formation of an effective policy for the development of agriculture in the region and form appropriate recommendations.

2. Materials and Methods

The research methodology involves the use of an expert analysis method to determine the main negative environmental factors influencing the formation of an effective policy for the

development of agriculture in the region. The hierarchy analysis method was used to order these factors at the level of significance of influence.

The expert analysis method involves the involvement of qualified specialists with deep knowledge and experience in the field of agricultural policy and farming. Within this method, experts evaluate various aspects of the external environment that can negatively affect agriculture, for example, climate change, economic conditions, stability, technological innovation, etc. Experts can conduct assessments through interviews, questionnaires, or discussion panels where they share their thoughts and findings.

The hierarchy analysis method is used to systematize the factors identified by experts according to the degree of their importance and influence. This method allows you to objectively order factors, establishing a hierarchy from the most significant to the least important. The process includes the construction of a hierarchical structure, where at the top level there is the final goal of the study (for example, the formation of effective agricultural policy), and at subsequent levels there are factors influencing this goal. Experts rate the importance of each factor relative to others, allowing them to determine which aspects deserve special attention in policy development.

3. Research Results

The process of formulating agricultural development policy in regions with high levels of black soil is complex and multifaceted, taking into account economic, environmental and social aspects. These policies are implemented at different levels of government, including state bodies, local authorities, the private sector and public organizations. The objectives of agricultural development policy are to create conditions for the efficient and sustainable use of agricultural resources, support innovation and technological development in the agricultural sector, as well as protect the interests of small and medium-sized farms. This includes developing legal and financial mechanisms to support agricultural activities, as well as ensuring access to markets and resources.

The impact of the policy on agriculture is to increase productivity and efficiency of agricultural production, ensure sustainable use of land resources and prevent land

degradation. Effective policies also contribute to the development of the agricultural sector as a whole, increasing its competitiveness in domestic and international markets.

The level of food security largely depends on the quality of agricultural policy. Ensuring access to high-quality and affordable food for the population is one of the key tasks. This includes not only increasing production volumes, but also ensuring the safety and quality of agricultural products. Challenges in policymaking may include lack of funding, difficulties in regulating land relations, limitations in access to new technologies and necessary resources. Other important challenges are environmental protection, biodiversity conservation and adaptation to climate change.

The influence of agriculture on transformation processes in society is significant. Agriculture contributes to regional economic development, job creation, preservation of cultural traditions and contributes to social stability. It also plays a key role in rural development, improving the living standards of farmers and promoting rural-urban integration. Agricultural policies that effectively respond to environmental challenges can significantly contribute to sustainable development, adaptation to climate change and reduction of environmental impact. In general, agricultural development policy should be comprehensive, take into account the needs of different population groups and be aimed at achieving long-term goals of sustainable development.

The impact on agriculture is to optimize production processes, increase productivity and resource efficiency. Due to the high fertility of chernozems, policy must ensure the rational use of land, preventing its degradation and reducing the impact on the environment. This may include support for organic farming, environmental practices, water conservation and other sustainable practices.

The development of agricultural products should be aimed at improving the quality and competitiveness of products in the domestic and international markets. This includes the implementation of quality standards, product certification, development of processing plants and support for marketing and exports. Particular attention should be paid to the diversification of agricultural products, which will help reduce risks associated with market fluctuations and climate change.

We will carry out modeling and determine the most significant factors of negative influence on the formation of an effective policy for the development of agriculture in the region. As an example, we will select a separate region in Poland – Podkarpackie Voivodeship. Let us highlight the main negative factors influencing the formation of an effective agricultural development policy in the region:

R1. Climate Change: Climate change, such as an increase in the frequency and intensity of droughts, rainfall, or extreme temperatures, negatively impacts agricultural conditions, reducing yields and crop quality.

R2. Social challenges Labor migration from rural areas, an aging population and insufficient support for young farmers are also factors limiting agricultural development.

R3. Limited water resources: The water crisis caused by overuse of water resources, pollution and climate change seriously threatens the stability of agricultural products, especially in regions with limited access to clean water.

R4. Political instability and imperfect legislation Political instability and insufficiently developed legislative framework can create obstacles to the implementation of effective agricultural policies, especially in the context of land relations and investments.

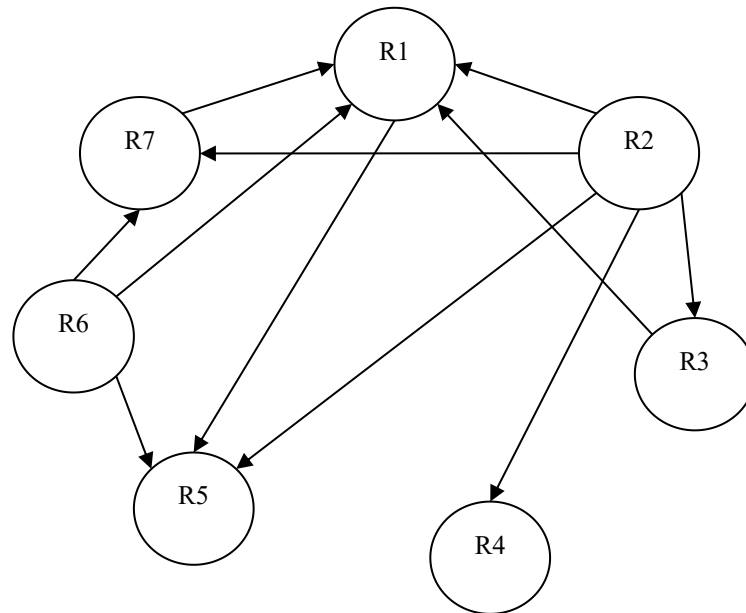
R5. Soil degradation: Intensive farming, excessive use of chemical fertilizers and pesticides can lead to decreased soil fertility, erosion and pollution.

R6. Economic Constraints: Insufficient funding for the agricultural sector, high production costs and unstable market prices can make innovation and technological improvements difficult.

R7. Technological limitations: Insufficient access to modern technology, innovation and research can hinder progress in the agricultural sector and reduce its competitiveness.

Next, we build a graph of connections between the set list of negative factors that make up the following set: $R = \{R1, R2, R3, R4, R5, R6, R7\}$ (Fig. 1).

Figure 1. Graph of possible connections between the determined factors of influence on the formation of agricultural development policy in the region



Formed by authors

Further, taking into account the data in Fig. 1, we can build two key matrices: the reach and dependencies between factors that negatively influence the formation of agricultural development policy in the region. In this case, the dependence matrix must satisfy condition (1):

$$R_{md}=1 \text{ if connects is real; } 0 \text{ its no connections} \quad (1)$$

For the reach matrix, a certain condition must also be met, (2):

$$R_{mr}=1 \text{ If you can get from one variable to another; } 0 \text{ if not} \quad (2)$$

Next, we build certain matrices for our list of factors factors that negatively influence the formation of agricultural development policy in the region in the amount of 7 by 7 (Table 1).

Table 1. The matrices for our list of factors factors that negatively influence the formation of agricultural development policy in the region

Dependencies							
	R1	R2	R3	R4	R5	R6	R7
R1	=0	=0	=0	=0	=1	=0	=0
R2	=1	=0	=1	=1	=1	=0	=1
R3	=1	=0	=0	=0	=0	=0	=0
R4	=0	=0	=0	=0	=0	=0	=0
R5	=0	=0	=0	=0	=0	=0	=0
R6	=1	=0	=0	=0	=1	=0	=1
R7	=1	=0	=0	=0	=0	=0	=0
Reach matrix							
	R1	R2	R3	R4	R5	R6	R7
R1	=1	=0	=0	=0	=1	=0	=0
R2	=1	=1	=1	=1	=1	=0	=1
R3	=1	=0	=1	=0	=0	=0	=0
R4	=0	=0	=0	=1	=0	=0	=0
R5	=0	=0	=0	=0	=1	=0	=0
R6	=1	=0	=0	=0	=1	=1	=1
R7	=1	=0	=0	=0	=0	=0	=1

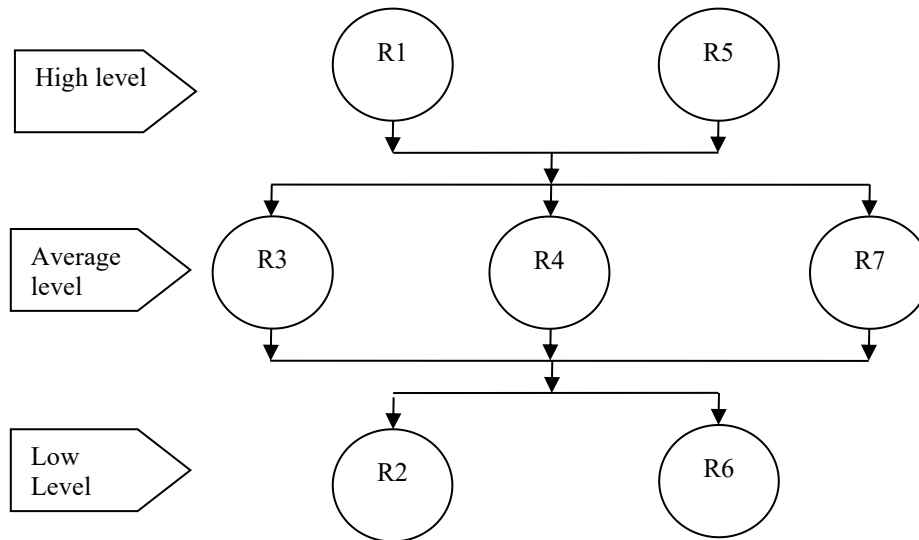
Formed by authors

Further, a factor that can be reached from another factor through Fig. 1 is one that has a path leading from one to another. Then such factor is achievable. Let's denote it as $S(R)$. If a factor becomes the predecessor of another factor, that is $P(R)$. Their cross section forms $C(R)$:

$$C(R)=P(R)\cup S(R) \quad (3)$$

If equality (3) is satisfied, then we determine the lowest level of significance of the factor's influence. This continues until we get a high level of impact. Skipping intermediate calculations, we will immediately present the model (Fig. 2).

Figure 2. Determination of the level of significance of factors influencing the formation of agricultural development policy in the region



Formed by authors

Thus, priority should be given to factors R1 and R5. To minimize the negative impact of climate change and soil degradation, the state policy strategy in the field of agriculture should be multidimensional and integrated, including various aspects of agricultural activity and natural resource management.

Adaptation to climate change involves adopting sustainable agricultural practices that can withstand extreme weather conditions. For example, the development of drought-resistant plant varieties, the use of drip irrigation systems for efficient use of water resources, and the use of conservation farming methods that reduce dependence on weather conditions and increase crop yields.

Combating soil degradation requires a comprehensive approach that includes reducing the use of chemical fertilizers and pesticides, introducing organic farming methods, and using technologies to monitor and manage soil conditions. Effective land management, such as crop rotation and the use of natural fertilizers, can help restore soil fertility and reduce erosion.

In addition to technical aspects, legislative regulation and financial support are also important. The government must develop and implement laws that promote sustainable use of land resources and limit overuse of soils. Financial support can be used to encourage farmers to adopt established practices such as organic farming, as well as research and development in agri-tech. An effective strategy must also include an education and training component for farmers. This means conducting trainings, seminars and educational programs that provide knowledge about sustainable agricultural practices, climate change adaptation and soil conservation techniques. Involving the public and local communities is also important to ensure the success of the policy. This involves taking into account the interests of various groups of the population, including small and medium-sized farmers, as well as developing partnerships between the government, the private sector and public organizations.

4. Discussions

In order to emphasize the relevance and relevance of our research, we compare the obtained research results with those already existing in this topic.

Thus, a number of authors (Swinnen, Gow,1999; Pingali, 2001; Artemenko, 2022) in their works examine only certain groups of negative factors related to the formation of agricultural development policy as a factor in the effectiveness of public administration during the period of transformation of society. In the above-mentioned studies, the focus is primarily on the financial component of the agricultural sector and, accordingly, the threats in this area. While our research covers all areas of activity of the modern agricultural sector and, accordingly, its public administration.

Other authors (Guttormsen, Roll, 2014) who include several influencing factors in their research, often limit their list to the external or internal sphere of activity of the agricultural sector. And despite the fact that these studies are complete and informative, failure to take into account a significant group of factors may cast doubt on the validity of the results. The system of factors in our study contains both internal and external negative impact factors. Research on both external and internal factors influencing the formation of policy for the development of the agricultural sector is extremely relevant in the modern world. Analysis of

these factors is important for developing effective strategies for the development of the agricultural sector. Taking into account external and internal factors makes it possible to create comprehensive policies aimed at supporting the agricultural sector in the face of global and local challenges, ensuring food security, stability and sustainable development. This is especially important in an environment of rapid global change, where policy adaptability and flexibility become key to effectively responding to new challenges and opportunities.

Another group of authors (Lotter, Seidel, Liebhardt, 2003; De Almeida et al., 2010; Viana et al, 2022) who tried to cover various factors of influence on the formation of policy for the development of the agricultural sector, considered them from the point of view of equivalence of influence. In our opinion, this method is primarily erroneous, since determining the level of influence of negative factors on the system of formation and implementation of agricultural development policy is an important factor in effective public administration, especially in the context of the transformation of society. This allows governments to integrate strategic planning and forecasting to address the various challenges facing crop systems. This approach contributes to the development of more flexible, adaptive and sustainable agricultural management policies that ensure food security, sustainable agricultural development and economic stability, and helps to avoid or reduce potential negative impacts on societies undergoing significant transformation.

Conclusions

An effective agricultural development policy in the region can have a significant positive impact on society, the population, the government system and the land, especially if it adequately responds to the negative influences of the external environment.

For communities and populations, effective agricultural policies can ensure food stability by reducing dependence on imports and providing access to quality, healthy foods. This contributes to improving the overall health and well-being of the population. In addition, agricultural development can stimulate job creation and economic development in rural areas, thereby reducing migration to cities and supporting local communities. For the public administration system, successful agricultural policy means efficient use of resources,

increasing the economy's resilience to external shocks, in particular to fluctuations in global markets, and reducing social burdens due to improved living standards in rural areas.

In terms of impact on land, effective agricultural policies promote sustainable use of land resources, prevent soil degradation and promote biodiversity conservation. This is achieved through the adoption of environmentally sustainable cultivation methods, reducing the use of chemical fertilizers and pesticides and integrating modern technologies that ensure more efficient use of natural resources. Of particular importance is the ability to respond to external challenges, such as climate change, economic crises or technological innovation. Effective agricultural policies must provide mechanisms for adaptation to these conditions, ensuring flexibility and sustainability of the agricultural sector. This may include developing sustainable agricultural practices, investing in research and development, and preparing farmers to effectively adapt to change. Overall, effective agricultural development policies can have a profound and positive impact on society, the economy and the environment, creating the conditions for sustainable development and improved quality of life.

As a result of using expert survey methods and hierarchical ordering, seven key negative factors were identified that have the greatest negative impact on the formation of an effective policy for the development of agriculture in the region. For a better understanding of the proposed methodology, we chose a separate region of Poland - Podkarpackie Voivodeship. Ultimately, the most appropriate recommendations were proposed to improve agricultural development policies for the region. The study has a limitation because it includes an analysis of region-specific negative factors. Given this, their level of influence and importance, as well as the prevailing recommendations, are highly specific to this region. In the future, it is planned to expand the analysis of factors and the formation of recommendations across the entire EU sector.

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