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Strategy for Effective Management of Organizational Change for Agricultural Enterprises

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ABSTRACT

The main purpose of the article is to form the strategy for effective management of organizational change for agricultural enterprise. The set purpose is achieved through the use of a specific methodology, which includes the method of functional modeling of the IDEF0 standard. The object of the study is the functioning system of a separate agricultural enterprise. As a result of the study the most optimal strategy was formed. This methodology will not only optimize the work of modern agricultural enterprises, developing their safety and engineering aspects, but also, to some extent, normalize the development of the regional agricultural sector in which the enterprise operates. This strategy has three key directions, the implementation of which will fully ensure the normal functioning and development of the agricultural enterprise. The study has its limitations, since to form this model only the activities of one agricultural enterprise in Poland were taken into account; this model may be somewhat limited in use for other enterprises. In this regard, the prospects for subsequent research should be to expand the boundaries of the use of this model to the specifics of the functioning of the agricultural sectors of other countries.

KEYWORDS: Agriculture, Agricultural Enterprises, Agricultural Technologies, Food Security, Sustainable Development and Management, Environmental Aspects, Engineering Solutions.

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Estrategia para la gestión eficaz del cambio organizativo de las empresas agrícolas

RESUMEN

El objetivo principal del artículo es formular una estrategia para una gestión eficaz del cambio organizacional en empresas agrícolas. El propósito planteado se logra mediante el uso de una metodología específica, que incluye el método de modelado funcional del estándar IDEF0. El objeto del estudio es el sistema de funcionamiento de una empresa agrícola independiente. Como resultado del estudio se formó la estrategia más óptima. Esta metodología no sólo optimizará el trabajo de las empresas agrícolas modernas, desarrollando sus aspectos de seguridad e ingeniería, sino que también, hasta cierto punto, normalizará el desarrollo del sector agrícola regional en el que opera la empresa. Esta estrategia tiene tres direcciones clave, cuya implementación garantizará plenamente el funcionamiento y desarrollo normal de la empresa agrícola. El estudio tiene sus limitaciones, ya que para formar este modelo sólo se tuvieron en cuenta las actividades de una empresa agrícola en Polonia; este modelo puede tener un uso algo limitado para otras empresas. En este sentido, las perspectivas para investigaciones posteriores deberían ser ampliar los límites del uso de este modelo a las características específicas del funcionamiento de los sectores agrícolas de otros países.

PALABRAS CLAVE: Empresas agrícolas, tecnologías agrícolas, seguridad alimentaria, desarrollo y gestión sostenible, aspectos ambientales, soluciones de Ingeniería.

Introduction

In the modern world, characterized by a significant level of uncertainty and change, change management is a key part of the survival and development strategy of any enterprise. Agricultural enterprises are no exception. Enterprises operating in the agricultural sector today face a significant number of challenges and threats, requiring them to implement operational mechanisms and strategies for adapting to changes occurring in both the internal and external environment. The ability of an agricultural enterprise to effectively and quickly implement change management strategies today is a key condition for ensuring economic sustainability and food security (Piñeiro, et al., 2020).

Today, food security, taking into account new challenges and risks, has become a determining condition for the stable development of society, its agricultural sector and the economy as a whole. Modern food security directly depends on the productivity of the

agricultural sector and agricultural cluster. In turn, the latter require constant updating of production capacities and other engineering aspects, as well as the implementation of new management practices.

The global COVID-19 pandemic has exposed new challenges for the agricultural sector, demonstrating how vulnerable supply chains can be and how quickly market conditions can change. Government support in the form of subsidies, loans and other incentives has become even more important in supporting the agricultural sector, but often does not cover all losses from unforeseen circumstances, in particular from the harmful effects of extreme weather conditions (Roopaei, Rad, Choo, 2017).

No less important is the environmental aspect, which occupies a prominent place in modern state and regional policies of most countries in the world. This is due to new global trends regulating the importance of a balance between improving the productivity of the agricultural sector and preserving existing natural resources. According to the modern theory of agricultural sciences, it is agriculture that acts as the main springboard for the fight against negative environmental consequences and every year is forced to transform its activities in accordance with the needs of modern society.

All the problems and challenges that modern agricultural enterprises face today are becoming more complex and increasing in number every year. This is due to increased prices for agricultural equipment, raw materials and other production materials. This situation requires not only the implementation of new management techniques, but also the creation of qualitatively new strategies for adapting to various kinds of changes and challenges, which today is not only a trend and a condition for better development, but also a basic necessity for any agricultural enterprise.

The purpose of the study was to solve the following scientific problems:

1. Identification of key elements that have the greatest impact on the management system of organizational changes in agricultural enterprises.
2. Using a specific method of modeling and visualization and systematization of the strategy for managing organizational changes in agricultural enterprises.

The structure of the article consists of the following elements: an introduction that includes a structural overview of the selected topic, a review of scientific sources on the subject, a description of the research methodology, a statement of the main results of the study, the formation of a model, a discussion of the results and their comparison with existing research, and conclusions.

1. Literature review

In modern scientific discourse (Balafoutis, 2017; Hena, Jingdong, Rehman, Zhang, 2019), much attention is paid to research covering agricultural issues, recognizing its integral role in ensuring food security and stability at the national and global levels. Agriculture, a major economic sector, impacts the lives of millions of people by providing food and providing the basis for rural economies.

The great interest of modern scientists (Fountas, Carli, Sørensen, Tsiropoulos, Cavalaris, Vatsanidou, Tisserye, 2015; Fama, Conti, 2022) in the activities of agricultural enterprises is directly related to their exceptional importance for the world community. This area is welcome for any state, since self-sufficiency and preservation of the country's sovereignty, as well as its place in the world market, directly depend on it.

At the same time, a large number of scientists (Rezaei-Moghaddam, Izadi, 2019; Vdovenko, 2022) note that the increase in the world population has led to the active expansion of the agricultural sector in different countries and an improvement in its productivity. This expansion led to inevitable problems in the environmental sphere, which in turn forced a large number of scientists to form new paradigms of agricultural activity and create new areas of activity of agricultural science.

The issues of assessing the readiness of agricultural enterprises for changes are a pressing issue for the scientific community. Thus, Toma, Barnes, Sutherland, Mathews, Stott (2014) and Yang, et al. (2021) in their works proposed the use of modern agricultural enterprise management strategies, which are actively used by agricultural enterprises around the world. The particular scientific interest of these studies is a comprehensive assessment of existing strategies and methods for constructing them.

One of these areas was engineering technology and principles of sustainable development. Engineering, in turn, provides valuable tools to implement these changes through the creation of new types of agricultural technology, energy-saving systems and other innovative solutions that increase crop yields without increasing the burden on the environment. The introduction of such technologies can revolutionize approaches to agriculture and ensure greater adaptability of agricultural enterprises to rapidly changing market conditions and climatic factors (Sylkin, Buhel, Dombrovska, Martusenko, Karaim, 2021; Kitney et al, 2019).

Thus, the activities of agricultural enterprises are inextricably linked with risks and threats that are formed both in the external and internal environment of its existence. At the same time, most scientists note that adaptation or resistance to change is possible only with the implementation of effective management paradigms. At the same time, in scientific sources there is still no clear basis that would regulate the process of forming a strategy for effective management of organizational changes at an agricultural enterprise. Given this, this should be the scientific goal of our research.

2. Materials and Methods

To formulate a strategy for effective management of organizational changes for agricultural enterprises, we chose to use the functional modeling methodology of the IDEF0 standard. This methodology is part of the methods of system analysis, which focuses on the study and visualization of the key functions of the system and the internal relationships between its elements. In the context of agricultural enterprises, this approach allows the interaction between various processes of management, production, supply and distribution, as well as other key functional areas, to be considered.

The advantages of the functional modeling method in the context of developing a strategy for effective management of organizational changes for agricultural enterprises are:

1. Systematicity. This methodology allows you to include the largest possible number of aspects of the activities of modern agricultural enterprises, while reflecting internal and external functional connections.

2. Visualization. The basis of this methodology are diagrams and diagrams filled with blocks and arrows. Such simple visualization allows you to better understand the complex processes of an agricultural enterprise.

3. Versatility. This model can be used to simulate the activities of agricultural enterprises in different countries.

4. Adaptability and shiftability. Existing models can be changed partially or completely, while maintaining the basic modeling paradigm and their goals.

The disadvantages of the functional modeling method in the context of developing a strategy for effective management of organizational changes for agricultural enterprises are:

1. Static. Although the methodology can be updated, the models themselves are static and cannot always adequately reflect the dynamics of real processes.

2. Limitation in taking into account the human factor. A focus on functionality can undermine understanding of the role of human input and culture.

The use of this model will take place in three key vectors:

- planning, which will allow identifying key business processes that determine the need for change in an agricultural enterprise;

- implementation. The formation of a model will make it possible to create detailed instructions and procedures for implementing changes in the activities of an agricultural enterprise;

- assessment and adjustment. Using this methodology will allow for periodic assessments of effectiveness and subsequent changes to improve efficiency.

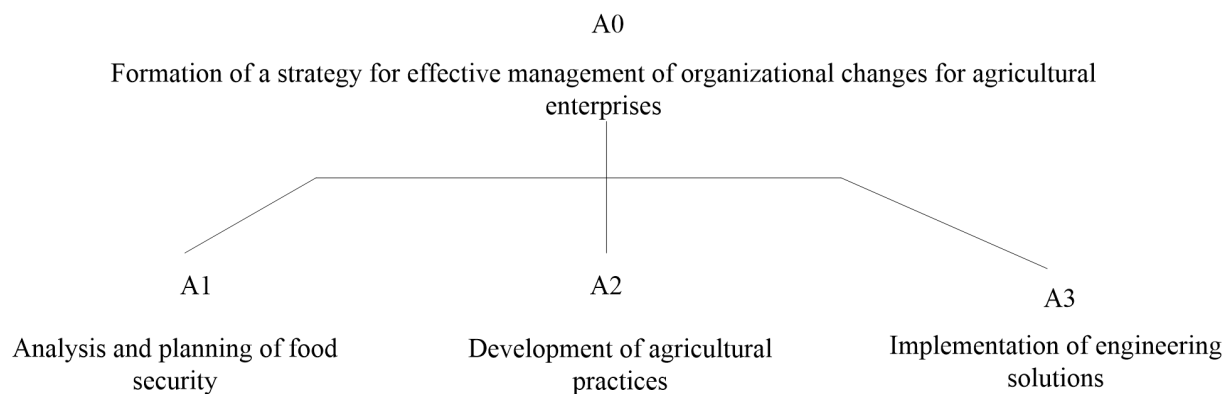
For better clarity, we decided to formulate a strategy for effective management of organizational changes for agricultural enterprises in Poland, in particular in the Podkarpackie Voivodeship. The reason for choosing this country was that the authors live on this theory and have direct and indirect connections with representatives of the agricultural sector and state and regional authorities. Thus, the use of this methodology will make it possible to introduce an integrated approach to change management, which will take into account both strategic and operational aspects of the work of agricultural enterprises.

3. Research Results

Thus, having described and determined that this methodology can be used in the context of forming an optimal strategy for effective management of organizational change for agricultural enterprises, the next step will be the direct formation of models.

First of all, it is important to formulate a diagram of the elements of forming a strategy for effective management of organizational changes for agricultural enterprises (Fig. 1).

Figure 1. Scheme of the elements of forming a strategy for effective management of organizational changes for agricultural enterprises



Formed by authors

So, in Fig.1. depicts the main elements that play the most important role in the formation and implementation of an effective change management strategy in agricultural enterprises. Let us consider the essence of these elements in more detail:

A1 - At this stage, the emphasis is on processes to ensure food security. It is implemented through a detailed analysis of market trends, consumer needs and demands, and an assessment of risks that may affect the level and stability of supplies of agricultural products. Based on the information received, a clear action plan is formed in the agricultural enterprise, which includes the formation and implementation of new agrotechnical methods, diversification of crops for which the enterprise is specified. In addition, this plan may include the formation

and implementation of alternate logistics supply routes to prevent possible shortages of raw materials.

A2 - During this adaptation phase, advanced agricultural techniques and practices are integrated to optimize production processes and increase productivity. Modern land cultivation methods are being introduced, high-quality seed materials are being used, and water management systems are being improved. There is also a special focus on staff training and strengthening agroecological aspects to ensure sustainable use of natural resources and conservation of biodiversity.

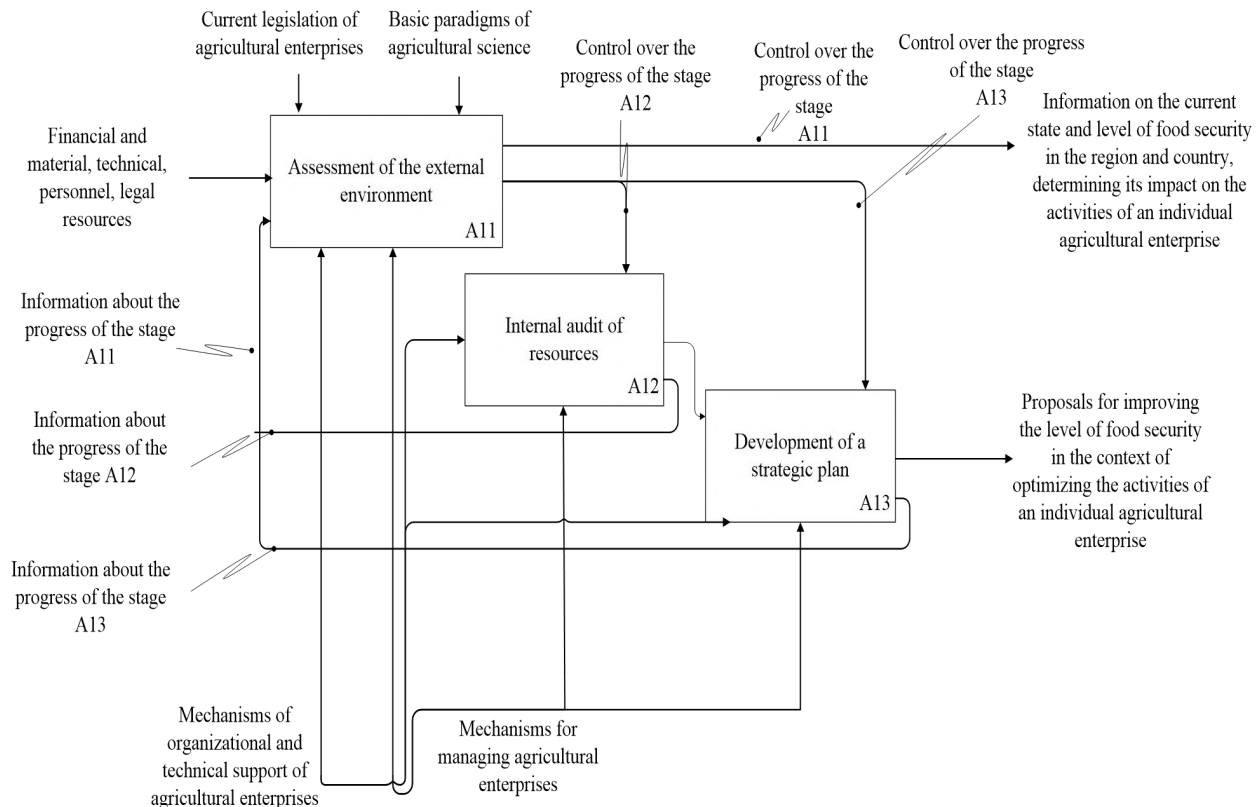
A3 - This stage includes the use of modern and innovative engineering technologies and techniques aimed at improving production efficiency. This area includes such engineering technologies as the integration of intelligent agricultural enterprise management systems, the use of automated production means, as well as digital platforms for monitoring and analysis of the agricultural enterprise. With this help, the agricultural enterprise will have the opportunity to effectively respond to external challenges and dangers.

To detail the above elements using the IDEF0 standard, we formed decomposition models for the implementation of the latter. So Fig.2. shows a decomposition model of the implementation of element A1 – « Analysis and planning of food security».

Let us consider the essence of these elements in more detail:

All - Assessment of the external environment. At this substage, the agricultural enterprise must conduct a full environmental analysis. The analysis under consideration should include determining the state of the market and market conditions, demand and supply of agricultural products, consumption trends, as well as determining the basis of modern public administration policy in the agricultural sector. At the same time, this stage includes an analysis of potential and existing threats to the activities of an agricultural enterprise, such as climate change, emergency crisis situations, crises of an economic and other nature.

Figure 2. Decomposition model of the implementation of element A1 – « Analysis and planning of food security»



Formed by authors

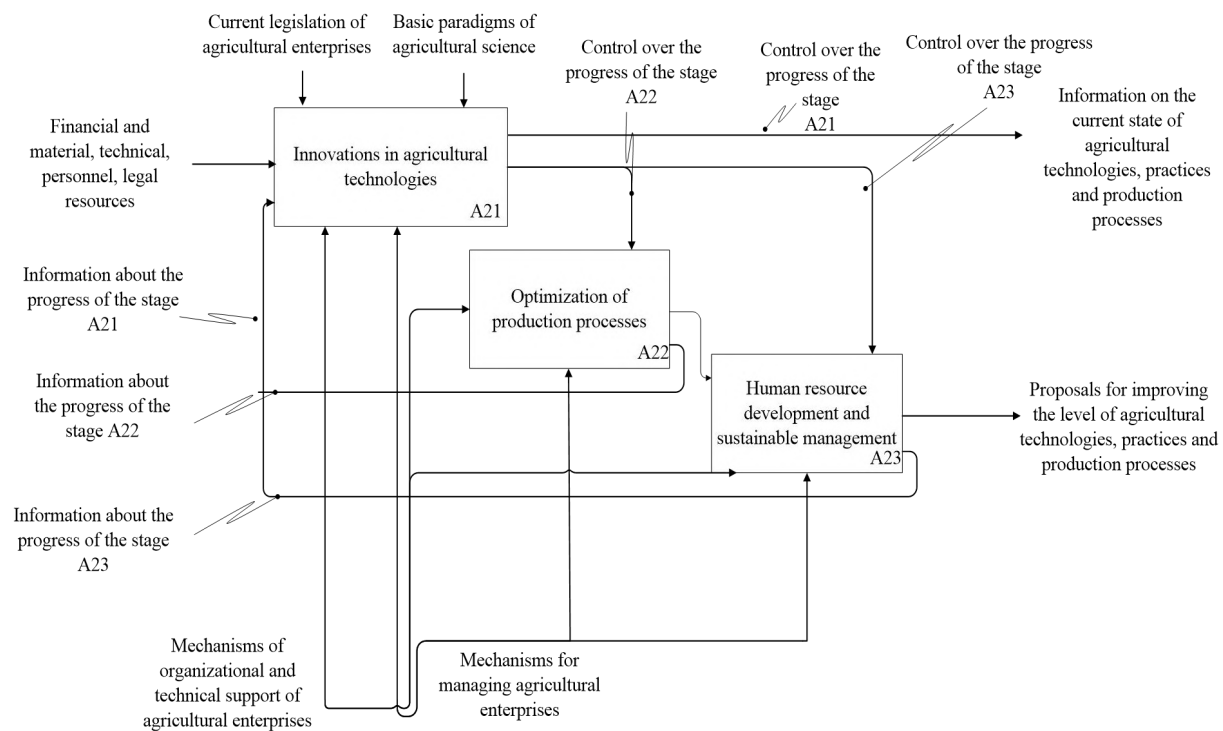
A12 - Internal audit of resources. This substage involves an in-depth study of the enterprises internal resources, including its financial condition, human resources, technical equipment and infrastructure. It is important to assess the extent to which current resources can facilitate or hinder the implementation of an adaptation strategy. This audit also analyzes supply chains, inventory availability and the company's ability to quickly switch to alternative sources of raw materials or materials in the event of disruptions in usual supplies.

A13 - Development of a strategic plan. At the final stage, a strategic plan for ensuring food safety of the agricultural company is formed. This plan should contain goals, objectives and goals that must be achieved to ensure a consistently high level of long-term safety of the agricultural enterprise. Undoubtedly, this plan should contain methods and vectors for

assessing the improvement of mechanisms for ensuring food security. In addition, the plan should contain scenarios for responding to possible threats and dangers.

The next step will be the formation of similar models for elements A2 and A3. So Fig.3 shows a decomposition model of the implementation of element A2 – «Development of agricultural practices».

Figure 3. Decomposition model of the implementation of element A2 – «Development of agricultural practices»



Formed by authors

Let us consider the essence of these elements in more detail:

A21 - Innovations in agricultural technologies. At this stage, agricultural enterprises conduct a detailed analysis of existing innovative agricultural methods and techniques, test compatibility with the activities of their own enterprise, and then attempts are made to introduce the latter. Thus, these techniques include such methods as natural farming, organic production, innovations associated with biotechnology and the creation of new types of crops that are more resistant to unfavorable climatic conditions.

A22 - Optimization of production processes. At this stage, existing production processes are analyzed and rethought in order to optimize them. Particular attention is paid to improving logistics, reducing costs and improving the quality of final products. Important aspects are the rational use of resources and minimizing losses at each stage of production, from sowing to harvesting and storage.

A23 - Human resource development and sustainable management. Ultimately, the vector of activity of an agricultural enterprise in this area comes down to the development of human capital and the adaptation of the principles of sustainable development and management. At the same time, comprehensive training and constant professional and personal development of personnel becomes a key element of the management system of an agricultural enterprise. A culture of continuous learning will be an important element in this. At the same time, the introduction of sustainable development practices into the operating system of an agricultural enterprise, in particular in the field of agriculture, will contribute to the development of the latter's competitiveness and increase its efficiency.

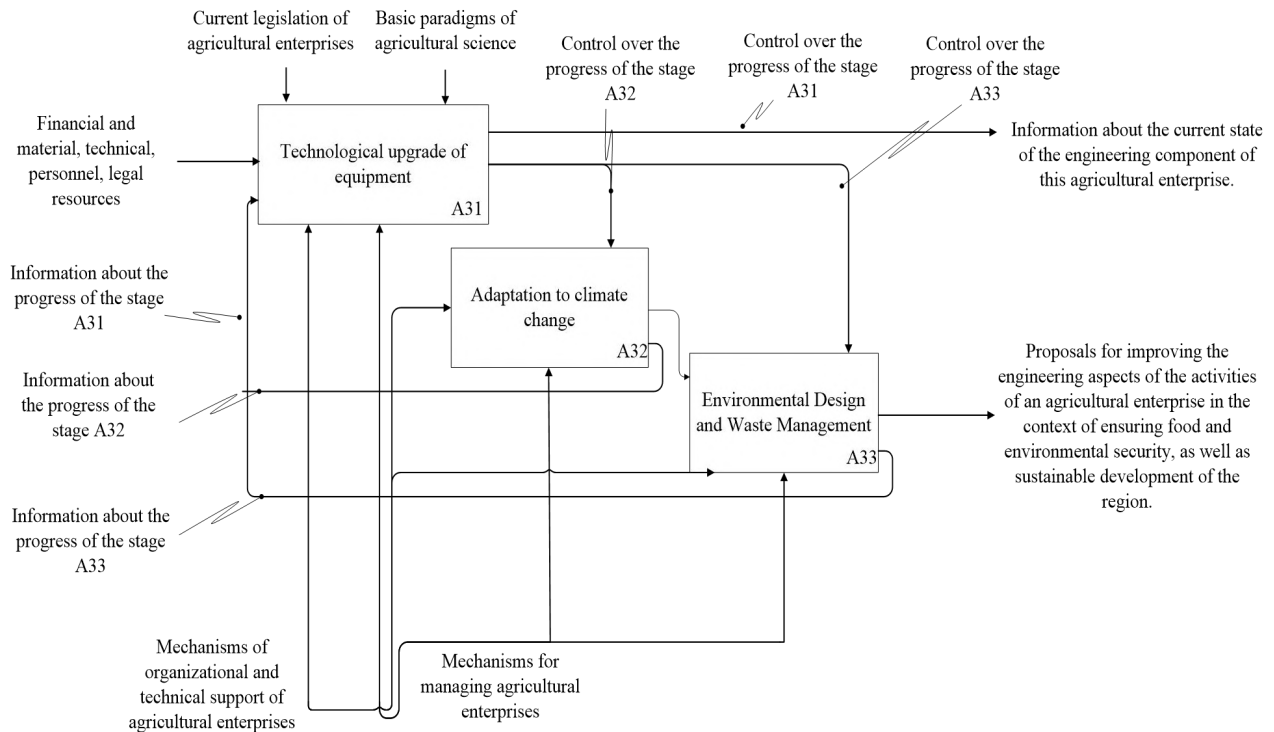
Ultimately, form a similar model for element A3 – «Implementation of engineering solutions» (Fig.4).

Let us consider the essence of these elements in more detail:

A31 - Technological upgrade of equipment. At this stage, a comprehensive assessment of the existing technical equipment of agricultural enterprises is carried out. At the same time, it is necessary to evaluate the level of integration of modern engineering technologies, process automation, as well as the level of attraction of renewable energy sources.

A32 - Adaptation to climate change. Agricultural enterprises must adapt their production strategies to rapidly changing climate conditions. This sub-phase involves the introduction of engineering solutions to modify the microclimate (for example, drip irrigation systems, climate-controlled greenhouses), as well as the development and use of crops that are resistant to extreme conditions. An important aspect is also the development of effective methods for collecting and storing water resources.

Figure 4. Decomposition model of the implementation of element A3 – « Implementation of engineering solutions»



Formed by authors

A33 - Environmental Design and Waste Management. This final stage has a vector towards the environmental aspect of engineering in the activities of an agricultural enterprise. Thus, agricultural enterprises form and implement specific mechanisms for greening key elements of production and management, with the goal of reducing the level of negative impact of polluting agents and preserving resource provision. This group includes measures for proper waste management, recycling of intermediate production products, as well as the replacement of traditional energy sources with renewable ones. Thus, the implementation of green engineering ring solutions that simultaneously ensure efficiency and sustainable development becomes the basis for the long-term competitiveness of an agricultural enterprise.

Thus, we have formed a strategy for effective management of organizational changes for agricultural enterprises. It should be noted that this strategy includes only basic elements of efficiency. These elements were determined by the authors based on a detailed analysis of the

modern theory of agricultural science and systematized in accordance with the rules for constructing the model.

4. Discussions

Thus, we have formed a strategy for effective management of organizational changes for agricultural enterprises. In this context, it is also important to compare our research and its results with existing research on this topic.

The issue of developing models for effective management of agricultural enterprises is quite relevant and is the subject of research by a large number of scientists (Shepherd, Turner, Small, Wheeler, 2020). A number of scientists have also resorted to the formation of similar models, which include both the principles of effective operation and the principles of sustainable development. The difference between our research and others is that it brings understanding not so much to the paradigm of formation of management strategies for agricultural enterprises, but to the understanding of the dynamics of adaptation of agricultural enterprises to changing and often unstable external and internal conditions.

Other scientists (Leipold, Petit-Boix, 2018; Malorgio, Marangon, 2021) who have studied this issue took into account in the process of constructing change management strategies for agricultural enterprises only in the context of individual components of its activities. While our research is comprehensive, it goes beyond traditional strategies that often focus on one-size-fits-all solutions without taking into account specific local conditions and needs. Our proposed strategies cover a wide range of possible scenarios and are specifically tailored to Poland's unique socio-economic and environmental context, allowing businesses to not only survive, but thrive in a rapidly changing environment.

Other scholars (Cheng, Stough, Jackson, 2009; Izadi, Rezaei-Moghaddam, Asadollahpour, 2016) who have studied the formation of strategies for effective management of organizational change for agricultural enterprises have not fully taken into account the importance of ensuring the security aspect, in particular food security. In our opinion, food security today is a key condition for the survival and development of the region and the entire country, and we are talking not only about Poland, but also about the entire world society.

It is worth noting that when comparing our study with a number of others scholars (Rehman, Jingdong, Khatoon, Hussain, Iqbal, 2016; Schöggel, Lukas, Rupert, 2020) that also tried to create a theoretical basis for the strategy of effective management of organizational change for agricultural enterprises, our study differs in that in the latter process a specific modeling method is used - the functional modeling methodology - the IDEF0 standard. This methodology allows us to provide the most in-depth and detailed analysis of the selected issues. In addition, the defining advantage of this model is the ability to make local changes without destroying its basic structure. This methodology involves the use of advanced technologies and algorithms to accurately model the complex relationships between various factors, such as climate conditions, market fluctuations and political decisions that affect the activities of agricultural enterprises.

Thus, our study not only expands the theoretical basis of adaptation strategies in the agricultural sector, but also offers practical tools for decision-making based on in-depth analytical forecasting.

Conclusions

Summarizing the results obtained, we can note that the formation and implementation of the most effective strategies for adapting to organizational changes in the activities of an agricultural enterprise, which today are especially relevant in the context of a fast-moving and variable external and internal environment, as well as for long-term ensuring their sustainability and ability to contribute significantly contribution to the sustainable development of the region and its food security. At the same time, the very essence of change management includes a large list of conditions that must be taken into account and to which it is necessary to adapt. These are conditions such as weather conditions, pandemic challenges, the level of local and state support, the specifics of agriculture, current economic difficulties faced by an agricultural enterprise.

It must be recognized that, despite the efforts made, there are a number of unresolved problems that require further research. Particular attention should be paid to studying the

local characteristics of the agricultural sector of each country, including geographical, climatic, cultural and economic factors that influence its effectiveness.

Prospects for the activities of modern agricultural enterprises in different countries should be the formation of individual, specific or unified forecasting models that take into account regional climatic conditions and changes, their real and potential impact on agricultural cycles, as well as analysis of the impact of global economic trends on regional markets of the agricultural complex.

Given the rising prices of agricultural equipment and products, it is important to explore alternative cost reduction opportunities, including innovations in energy efficiency and renewable energy, and the development of more efficient logistics and distribution strategies. Considering this relevance and problematic nature of the topic under study, according to the authors, the most preferable way to optimize the activities of a modern agricultural enterprise would be the formation of a specific strategy for the effective management of organizational changes for an agricultural enterprise.

The strategy we have developed has three key areas, which include: innovation in agricultural technologies, optimization of production processes of an agricultural enterprise, as well as human resource development and sustainable management, the implementation of which will fully ensure the normal functioning and development of the agricultural enterprise. The study has its limitations, since to form this model only the activities of one agricultural enterprise in Poland were taken into account; this model may be somewhat limited in use for other enterprises. In this regard, the prospects for subsequent research should be to expand the boundaries of the use of this model to the specifics of the functioning of the agricultural sectors of other countries.

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