The paper summarizes the most common mathematical methods used in the analysis, planning, organization, and management of economic activities of agricultural enterprises. It is determined that mathematical methods in combination with qualitative, logical methods of analysis contribute to the correct assessment of production efficiency or assessment of individual economic phenomena. It is a set of methods that turns analysis into truly scientific means of production management. It is proved that the most important universal method of research of economic activity of the enterprise is the method of modeling and construction of mathematical model of economic object. The study of economic processes in agricultural enterprises with the help of economic and mathematical modeling allows to assess the level of efficiency of the enterprise for the past period and to predict the effect of the implementation of certain management measures. Particular attention is paid to the principle of classification of economic and mathematical models on various grounds used in agricultural production during management decisions. The optimization models which make the widest group of models are considered and are intended for a choice of an optimum variant which will provide the maximum efficiency of the enterprise. Different approaches to the choice of basic parameters for building models to determine the resource potential are presented. It is revealed that during modeling it is necessary to follow the system approach, considering not only separate components and their interrelations, but also all system as a whole. It is advisable to use a system of models of parameters, characteristics, condition, and behavior in the external environment of interconnected economic processes, taking into account the complex structure of the organization, which will increase the adequacy and accuracy of results obtained in management decisions by managers of agricultural enterprises. It is established that economic-mathematical modeling allows to effectively solve specific economic problems and practical problems in the field of enterprise management in order to minimize the negative economic consequences.

Keywords: mathematical methods, economic and mathematical modeling, management, agricultural enterprises, agricultural production.

Analysis of recent research and publications. In today’s economic environment, making management decisions in any segment of the agricultural sector is a challenge, because in addition to the main indicators of production, it is also necessary to consider random unforeseen factors. Formation of a mechanism for improving enterprise management, which will contribute to the adaptation of the management system to changes in the external environment and ensure its high productivity and competitiveness, is quite relevant. Management decisions are the result of analysis, forecasting and evaluation of the situation, choosing the best alternative to achieve the goal. At the same time, it is the result of the management’s choice of course of action, aimed at solving the problem in the current or projected situation [1].

Decision-making technology is a set of actions consisting of individual stages, procedures, operations. Under such conditions, economic and mathematical methods and modeling are important tools for making managerial decisions.
Mathematical methods accelerate economic analysis, contribute to a fuller consideration of the impact of performance factors and increase the accuracy of calculations. Analysis using economic and mathematical methods allows to predict the further development of an economic process, which will increase the efficiency of agricultural production. Economic-mathematical methods are a set of mathematical methods (mathematical statistics, probability theory, mathematical programming, etc.), used to solve various economic problems in science and practice [2; 3].

**The aim of the study** – deepening the essence and highlighting the varieties of the most common mathematical methods and models, which are used in the analysis, planning, organization, and management of economic activities of agricultural enterprises and substantiation of different approaches to the choice of parameters for building models for determining resource potential. That is why the study of the use of economic and mathematical methods and models in the management of economic activity of agricultural enterprises is relevant in the current environment.

**Materials and methods of research.** The material of the study was the work of domestic scientists on the use of economic and mathematical methods and models in enterprise management. The following methods and techniques were used to achieve this goal: selective (when selecting economic-mathematical methods and models for analysis), comparative (in the study of cost management concepts, to find similarities and differences between them), abstract-logical (during the formation of conclusions), system analysis (for the correct choice of system tools in order to solve the problem) and generalization (to generalize the results of research of domestic scientists and the formation of logical conclusions).

**Results and discussion.** Mathematical methods of analysis contribute to a reasonable assessment of the efficiency of production or individual economic phenomena only in organic unity with qualitative, logical methods of analysis. It is the combination of quantitative and qualitative methods that transforms analysis into truly scientific means of production management. Analyzing the economic activity of enterprises often combine balance sheet and factor methods. It is noted that the balance sheet method is used as a way to compare interrelated indicators of economic activity in order to determine and calculate their mutual influence, as well as the calculation of reserves to improve production efficiency. Factor analysis is a method of finding and classifying factors by identifying causal relationships, affecting the change of specific indicators of economic activity. Methods of multiple and pair correlation analysis, which are used to study the relationships of correlation-related variables, have become widespread in economic analysis [4].

A number of economic and mathematical methods are based on the concept of normal distribution law. Therefore, for the correct application of economic and statistical methods requires verification of the normality of the laws of distribution of variables. One of the methods of multidimensional analysis is cluster analysis, which is used to group (cluster) certain objects by a set of features. Grouping of economic objects is important for the identification of similar enterprises in order to develop general standards for planning and evaluation of objects based on the results of economic activity [5].

The most important universal method of studying the economic activity of the enterprise is the method of modeling. Modeling and construction of a mathematical model of an economic object make it possible to concentrate the economic analysis of production processes to mathematical analysis and effective decision-making. Therefore, the revision of theoretical and methodological principles and the development of promising areas of economic and mathematical modeling and outlining effective mechanisms for their application in solving practical problems and problems becomes especially important [6].

The model is usually different from the object of study, but, of course, has similarities with this object, especially in terms of those characteristics that are to be studied and predicted [7].

There are various economic and mathematical models used in research. The most common are the laws of correlation and regression analysis, production functions and systems of economic equations. For the most part, current research in economics and management focuses on data analysis using a single tool.

The application of mathematical modeling of economic and production processes allows you to effectively use the available resource base in the process of achieving the strategic goals of the agricultural enterprise and take into account significant sources of uncertainty and minimize negative economic consequences [8; 9].

Development of models should be carried out according to a certain algorithm. First formulate the purpose
of modeling, then express a hypothesis that represents a qualitative description of the system, choose the type of model and mathematical methods of its description depending on the goal. The final stage is to create a model and test it for the reliability of the description of the process, object or phenomenon [10].

An important point of the simulation is a clear definition of the criterion according to which the different solutions will be compared. In economic analysis, such criteria may be: the highest profit, the lowest production costs, maximum equipment load, labor productivity, etc. If the results do not correspond to the real production conditions, it is necessary to make an economic analysis of the reasons for non-compliance. This may be the lack of reliability of information, and the inconsistency of mathematical methods to the characteristics of the economic object being studied. Once the cause is identified, adjustments are made to the model and the problem-solving process is repeated [11].

The study of economic processes in agricultural enterprises with the help of economic and mathematical modeling makes it possible to assess the level of efficiency of the enterprise for the past period and predict the effect of the implementation of certain management measures [12].

Economic and mathematical models used in agricultural production are classified according to various characteristics:

- by the general purpose: theoretical and analytical (to study the general properties and patterns of economic processes), applied (for solving specific economic problems);
- by the degree of aggregation: microeconomic (reflect the activities of agricultural enterprises), macroeconomic (reflect the functioning of the economy as a whole);
- by a specific purpose: optimization models (needed to choose the best option available), simulation models (necessary for the use of computer simulation of processes), gaming models (required for the object of simulation in the uncertainty of the parameters studied);
- by the time factor: statistical, dynamic [8; 13].
- by the approach to the object, there are normative models that reflect the processes of purposeful regulation, and descriptive models that allow analysis to explain the facts being investigated;

The broadest group of models that can be developed using mathematical programming methods are optimization models. Such models are designed to select the optimal (best) option from a variety of options, which will best meet market conditions and ensure maximum efficiency of the enterprise [15].

The optimization economic and mathematical model is based on the limitations of the agricultural enterprise. Constraints are in the form of linear inequalities or equations. The economic meaning of restrictions is diverse and depends on the content of the tasks. The most typical of the restrictions are: restrictions on the volume of production; restrictions on production resources. Constraints of the first and second types in the problem can be many: for each type of material, fuel, energy, equipment, number of employees, financial resources, capacity of enterprises, etc. Therefore, the most important factor influencing the quality of strategic analysis in agriculture is to determine the limitations of the enterprise and the correctness of their reflection in the form of equations and inequalities [16].

For the stable development of each agricultural enterprise the key is to provide the necessary amount of material and technical resources. At the same time, it is important to conduct timely economic-mathematical and statistical analysis of their presence. Given the limited availability of material and monetary resources, there is an urgent need for a more thorough study of economic indicators based on the use of mathematical methods of research and development of complex economic and mathematical models [8].

Rational use of production assets is one of the most important tasks, the solution of which helps to increase the efficiency of agricultural production. In solving economic problems, taking into account the provision of the enterprise with resources is of particular importance, because any type of resource at a particular time is limited. The main principle of optimal development of agriculture is to ensure the maximum effect with the rational use of limited resources [17].
With this in mind, consider the model of resource optimization as an important tool for determining the resource potential and management of economic activity of the enterprise.

In general, the problem of rational use of resources is formulated as follows: the company produces \( n \) types of products, using \( m \) types of resources; the matrix of specific resource costs has the form: \( A = [a_{ij}] (i = 1, m; \ j = 1, n) \), where \( a_{ij} \) – the number of units of the \( i \)-th type of resources, spent on the production of the \( j \)-th type of product unit; resource reserves are expressed as \( b_j (i = 1, m) \), \( c_j (j = 1, n) \), and the desired planned production of the \( j \)-th type \( x_j (j = 1, n) \). Then the objective function, which expresses the requirement to maximize the total profit \( Z \), takes the form:

\[
Z = c_1x_1 + c_2x_2 + \ldots + c_nx_n \quad (\text{max}).
\]

Constraints that reflect the fact that resource costs cannot exceed their inventories are:

\[
\begin{align*}
ax_1 & + ax_2 + \ldots + ax_n \leq b_1; \\
ax_1 & + ax_2 + \ldots + ax_n \leq b_2; \\
\ldots & \\
ax_1 & + ax_2 + \ldots + ax_n \leq b_n.
\end{align*}
\]

Variables are also subject to non-negative conditions: \( x_1 \geq 0; x_2 \geq 0; \ldots; n \geq 0 \).

The solution to the problem is to determine the non-negative values of the variables \( x_1, x_2, \ldots, x_n \), which satisfy the system of basic constraints and give the maximum of the target function [18].

When building an economic-mathematical model must be taken into account: characteristics of changing external conditions, a certain set of internal parameters that are necessary and can in accordance with the purpose of modeling to characterize a particular economic process, as well as the parameters or characteristics of the process to be obtained [19; 20].

Different experts choose different parameters as determinants and offer different approaches to building models. To determine the resource potential for the pooling of disparate resources into one indicator, some economists take as a basis the resource indices obtained by the ratio of the actual value of each resource to its average as a whole, or their scores, other economists – their valuations, others take into account the cost of working time (direct and indirect), fourth – the number of workers, both actually employed in agriculture and required for the manufacture of fixed and current assets. At the same time, it should be borne in mind that agriculture is an open system, so its modeling should follow a systematic approach, considering not only the individual components and their relationships, but also the system as a whole [14].

Economic and mathematical modeling is one of the most effective ways to form optimal parameters for the management of agricultural enterprises. The choice of management decision-making model depends on the specific situation and is determined by a combination of factors, which affect this situation and this management decision.

In the management of economic activity of the enterprise economic and mathematical modeling should be used to solve problems such as: 1) determining the range of products, as well as optimizing production for a certain long period; 2) distribution of available material and financial resources by type of activity; 3) determining the price that will provide the required (or optimal) level of profit; 4) determining the size of allocations for the purchase of equipment and its equipment; 5) determining the needs for loans to be attracted, etc. [21].

In agriculture, there are typical models that are experimentally verified and bring high effects. Such models include the optimization of the structure of sown areas, the use of arable land and fertilizers, reclamation measures, the combination and specialization of agricultural sectors. The use of tools of mathematical methods and models makes it possible to better justify the process of making managerial decisions, which is necessary for optimal planning and search for reserves to improve the efficiency of production activities of agricultural enterprises [8].

Economic and mathematical model, even carefully calculated, is not able to fully adequately reflect the patterns of agricultural production. Therefore, it is advisable to use a system of models, parameters, characteristics, state and behavior in the external environment of interconnected economic processes taking into account the complex structure of the organization, which will increase the adequacy and accuracy of the results obtained during management decisions by managers of agricultural enterprises.

**Conclusions**

Mathematical methods and models are a tool for analyzing and managing the economic activity of the enterprise. They allow to effectively solve specific economic problems and practical problems in the field of enterprise management in order to minimize the negative economic consequences.
References

1. Ghrubjak, S.V. (2017). Suchasni aspekty rozroblennja i prijnjat’ aupravlinsjkyh rishenj [Modern aspects of development and management decisions]. Ekonomika i suspiljstvo – Economy and society, 11, 201–204. Available at: https://economyandsociety.in.ua/journals/11_ukr/33.pdf [in Ukrainian].

2. Domaskina, M.A. (2014). Zastosuvannya ekonomiko­mathematychnoho modelyuvannya dlya planuvannya silskohospodarskoho ovrobyntystva [Application of economic and mathematical modeling for agricultural production planning]. Biznes­navigator – Business navigator, 1, 172–176. Available at: http://nbuv.gov.ua/UJRN/bnav_2014_1_35 [in Ukrainian].

3. Mohylnytska, A. (2020). Priority areas of economic and mathematical modeling in the work of agricultural enterprises. Journal of Agrosvit, 17–18, 39–44. DOI: 10.32702/2306-6792.2020.17-18.39 [in Ukrainian].

4. Zos-Kior, M., Ilin, V., Kryvobik, M. (2020). Tools of agricultural enterprise performance management. Journal of Priazovskiy ekonomichny visnik, 5, 22, 73–78. Available at: https://doi.org/10.32840/2522-4263/2020-5-10 [in Ukrainian].

5. Piddubna, L.V. (2014). Kontseptualni aspekty ekonomiko­matematychnoho modelyuvannya hospodarskoi diyalnosti pidpryyemstva [Conceptual aspects of economic and mathematical modeling of economic activity of the enterprise]. Available at: http://zt.knute.edu.ua/files/2014/2(73)/uazt_2014_2_23.pdf [in Ukrainian].

6. Vertelieva, O. (2019). Mathematical modeling of economic processes in conditions of paradigmal dispatches. Investytsiyi: praktyka ta dosvid, 12, 48–56. DOI: 10.32702/2306-6814.2019.12.48 [in Ukrainian].

7. Vakulenko, Yu.V., Kopyshynska, O.P. (2013). Modelyuvannya yak zasib pidvyshchennja produktyvnosti ta prybutkovosti pidpryyemstva [Modeling as a means of increasing productivity and profitability of the enterprise]. Zb. nauk. pr. Tavriyskoho derzhavnoho universytetu. Coll. Science. Tavriya State Agrotechnological University (economic sciences), 2(2), 30–42. Available at: http://nbuv.gov.ua/UJRN/zntdau_2013_2(2)___6 [in Ukrainian].

8. Dyachenko, N.K. (2020). Osoblyvosti zastosuvannya matematychnykh metodiv ta modeley v upravlinni ahrarnymi pidpryyemstvamy [Features of application of mathematical methods and models in management of the agricultural enterprises]. Agrosvit – Agrosvit 9, 121–126. Available at: http://www.agrosvit.info/pdf/9_2020/18.pdf [in Ukrainian].

9. Kavun, H.M., Loboda, O.M. (2020). Ekonomiko­matematychni modeli dlya rozrakhunku optymalnyh planiv rozvytku zemlerobstva [Economic and mathematical models for calculation of the optimal plan for agriculture]. Tavriys’kij naukovyi visnyk – Taurian Scientific Bulletin, 4, 188–194 [in Ukrainian].

10. Krukovska, O., Borkovska, V. and Korolenko, O. (2021). Management decisions, models and methods in analysis and audit. Investytsiyi: praktykadosvid. 6, 10–16. DOI: 10.32702/2306-6814.2021.6.10 [in Ukrainian].

11. Karachyna, N.P. (2008). Modely uvannya ekonomichnoi povedinki pidpryyemstva na rivni mikroe­konomicnoho analizu. [Modeling of economic behavior of the enterprise at the level of microeconomic analysis]. The mechanism of economic regulation, 3 (2), 114–122 [in Ukrainian].

12. Kharchenko, Y. (2021). Developing models for forecasting agricultural Enterprises sales volume. Journal of Economic space, 167, 137–139. Available at: https://doi.org/10.32782/2224-6282/167-24 [in Ukrainian].

13. Ometsynska, N.V. (2015). Kharakterystyka ekonomiko­matematychnykh metodiv y modeley pryynyatty rishen [Characteristics of economic and mathematical methods and models of decision making]. Efektyvnaekonomika– Efficient economy, 1. Available at: http://nbuv.gov.ua/UJRN/efek_2015_1_55 [in Ukrainian].

14. Vyhivska, Yu.I., Shykova O.M. (2011). Modely uvannya diyalnosti pidpryyemstv a hropromyslovoho kompleksu [Modeling of agro-industrial enterprises]. Agrosvit – Agrosvit, 16, 6–9. Available at: http://nbuv.gov.ua/UJRN/agrosvit_2011_16_3 [in Ukrainian].

15. Ushkalenko, I. (2020). Osoblyvosti modeljuvannja v siljskohospodarskomu vyrobnyctvi z vrakhuvanjam ryzyku [Features of modeling in agricultural production taking into account risk]. Ekonomika, finansy, menedzhment: aktualni pytannja nauky i praktyky – Economics, finance, management: current issues of science and practice, 1, 119–134 [in Ukrainian].
16. Kisil, M.Yu. (2010). Osoblyvosti vykorystannya metodiv ekonomiko-matematychnoho modelyuvannya v stratehichnomu menedzhmenti silskohospodarskykh pidpryjemstv [Features of the use of methods of economic and mathematical modeling in the strategic management of agricultural enterprises]. Efektyvna ekonomika – Efficient economy, 11. Available at: http://nbuv.gov.ua/UKRN/efek_2010_11_3 [in Ukrainian].

17. Kobchenko, M. (2019). Conceptual principles of organization of efficient land use of agricultural enterprises. Journal of Ukrainian Journal of Applied Economics, 4, 86–93. Available at: https://doi.org/10.36887/2415-8453-2019-4-10 [in Ukrainian].

18. Voropay, N.L., Herasymenko, T.V., Kyryllova, L.O., Korsun, L.M., Matskul, M.V., Malska, Ye.V., Mykhaylenko, A.V., Orlov, Ye.V., Chernyshev, V.H., Chepurna, O.Ye., Shynkarenko, V.M. (2018). Ekonomiko-matematychni metody ta modeli: navchalnyy posibnyk / za zah. red. V.M. Matskul. Economic and mathematical methods and models: textbook / for general. ed. V.M. Matskul. Odessa [in Ukrainian].

19. Mushenyk, I.M. (2013). Optymizacija vyrobnichykh struktury vysohotovarnykh silskohospodarskykh pidpryjemstv [Optimization of the production structure of highly marketable agricultural enterprises]. Innovacijna ekonomika – Innovative economy, 6, 71–73. Available at: http://nbuv.gov.ua/UKRN/inek_2013_6_19 [in Ukrainian].

20. Storozhuk, K.O., Bujak, L.M. (2015). Matematychni metody, modeli ta informatsiino-tehnolohihi v ekonomitse: materialy IV mizhnar. nauk.-metodych. konf. [Mathematical methods, models and information technologies in economics: materials IV International. scientific-methodicalconf.]. Chernivtsi: PrintArt [in Ukrainian].

21. Barabash Ju.O. (2009) Zastosuvannya ekonomiko-matematychnykh modelej pry pidtrymchyi pryjnjattja upravlinsjkykh rishjen [Application of economic-mathematical models in support of managerial decision-making]. Visnyk Khmelnyckogho nacionaljnoho universytetu. Bulletin of Khmelnytsky National University,1, 3, 153–155[in Ukrainian].

**Literature**

1. Грубяк С.В. Сучасні аспекти розроблення і прийняття управлінських рішень. Економіка і суспільство. 2017. № 11. С. 201–204.

2. Домаскіна М.А. Застосування економіко-математичного моделювання для планування сільськогосподарського виробництва. Бізнес-навігатор. 2014. № 1. С. 172–176. URL: http://nbuv.gov.ua/UKRN/bnav_2014_1_35.

3. Могильницька А.М. Приоритетні напрями використання економіко-математичного моделювання в роботі агrarianих підприємств. Агросвіт. 2020. № 17–18. С. 39–44. DOI:10.32702/2306-6792.2020.17-18.39.

4. Зось-Кіор М.В., Ільїн В.Ю., Кривобік М.В. Інструментарій управління результативністю агrarianих підприємств. Приазовський економічний вісник. 2020. Вип. 5(22). С. 73–78. DOI:10.32840/2522-4263/2020-5-10.

5. Піддубна Л.В. Концептуальні аспекти економіко-математичного моделювання господарської діяльності підприємства. URL: http://zt.knute.edu.ua/files/2014/2(73)/uazt_2014_2_23.pdf.

6. Вертелева О.В. Математичне моделювання економічних процесів в умовах податково-фіскальних зрушень. Інвестиції: практика та досвід. 2019. № 12. С. 48–56. DOI: 10.32702/2306-6814.2019.12.48.

7. Вакуленко Ю.В., Копішинська О.П. Моделювання як засіб підвищення продуктивності та прибутковості підприємства. Зб. наук. пр. Таврійського державного агротехнологічного університету (економічні науки). 2013. № 2(2). С. 30–42. URL: http://nbuv.gov.ua/UKRN/znptdau_2013_2(2)__6.

8. Дьяченко Н.К. Особливості застосування математичних методів та моделей в управлінні агrarianими підприємствами. Агросвіт. 2020. № 9. С. 121–126. URL: http://www.agrosvit.info/pdf/9_2020/18.pdf.

9. Karachina N.P. Modelowania ekonomicznej powo­dzieńki p-idriveństwa na równi miko­ekonomicznego.
аналізу. Механізм регулювання економіки. 2008. № 3 (2). Т.1. С. 114–122.
12. Харченко Ю.А. Розроблення моделей прогнозування обсягу реалізації продукції сільськогосподарського підприємства. Економічний простір. 2021. № 167. С. 134–139 DOI:10.32782/2224-6282/167-24.
13. Омецьнська Н.В. Характеристика економіко-математичних методів і моделей прийняття рішень. Ефективна економіка. 2015. № 1. URL: http://nbuv.gov.ua/UJRN/efek_2015_1_55.
14. Вигінська Ю.І., Шикова О.М. Моделювання діяльності підприємств агропромислового комплексу. Агросвіт. 2011. № 16. С. 6–9. URL: http://nbuv.gov.ua/UJRN/agrosvit_2011_16_3.
15. Ушакенко І.М. Особливості моделювання в сільськогосподарському виробництві з врахуванням ризику. Економіка, фінанси, менеджмент: актуальні питання науки і практики. 2020. № 1. С. 119–134. DOI: 10.37128/2411-4413-2020-1-8.
16. Кісіль М.Ю. Особливості використання методів економіко-математичного моделювання в стратегічному менеджменті сільськогосподарських підприємств. Ефективна економіка. 2010. № 11. URL: http://nbuv.gov.ua/UJRN/efek_2010_11_3.
17. Кобченко М.Ю. Концептуальні засади організації ефективного землеокористування аграрних підприємств. Український журнал прикладної економіки. 2019. № 4. С. 86–93. DOI:10.36887/2415-8453-2019-4-10.
18. Економіко-математичні методи та моделі: науковий посібник / Н.Л. Воропай та ін.; за заг. ред. В.М. Мацкул. Одеса, 2018. 404 с.
19. Мушенко І.М. Оптимізація виробничої структури високотоварних сільськогосподарських підприємств. Інноваційна економіка. 2013. № 6. С. 71–73.
20. Сторожук К.О., Буяк Л.М. Математичні методи, моделі та інформаційні технології в економіці: матеріали IV міжнар. наук.-методич. конф., м. Чернівці, 2015. С. 166–167.
21. Барабаш Ю.О. За стосування економіко-математичних моделей при підтримці прийняття управлінських рішень. Вісник Хмельницького національного університету. 2009. № 3. Т. 1. С.153–155.
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