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ECONOMIC PLANNING AT AGRICULTURAL ENTERPRISES: UKRAINIAN EXPERIENCE OF INCREASING THE AVAILABILITY OF DATA IN THE CONTEXT OF FOOD SECURITY

Purpose. *The purpose of the research is a comparative assessment of the state of data availability for planning the economic activity of agricultural enterprises, as well as the development of a model for increasing data availability based on the established correlation between socio-economic factors of internal and external influence of agricultural enterprises and readiness to disclose information when receiving consulting services.*

Methodology / approach. *The study is based on the results of a survey of agricultural enterprises' (farms') managers, collected based on a random sampling, the volume of which satisfies the requirements of representativeness. The results of the research made it possible to conduct a correlation analysis of the dependence model for increasing data availability based on the established correlation between socio-economic factors of internal and external influence of agricultural enterprises and readiness to disclose information when receiving consulting services. The obtained results of the analysis made it possible to confirm the research hypotheses and obtain answers to several research questions.*

Results. *The study reveals several dependencies and trends in the formation of openness and availability of data at agricultural enterprises (farms) for the implementation of economic activity planning by third-party consultants/experts. A strong direct connection was established between the unwillingness of enterprises to share management accounting data with third-party experts precisely because of the lack of practice of collecting such data, and not because of privacy concerns or negative past experiences. It was established that at enterprises characterized by a low level of openness to the dissemination of management accounting data, planning work is conducted directly by managers without qualified support of experts or planning is not conducted at all. The results suggest a number of solutions to ensure better access to the data needed for effective planning.*

Originality / scientific novelty. *The study concerns the problems of data availability at agricultural enterprises (farms) for the implementation of planning of economic activities by external consultants/experts and uses the method of correlation analysis to establish relationships between variables of the model. The data collection paradigm of agricultural enterprises for planning their activities has been developed. For the first time, the relationship between a number of socio-economic factors and the openness of agricultural enterprises and farms to management consulting was established.*

Practical value / implications. *The study formulates a number of proposals for improving the data availability at agricultural enterprises (farms) for the implementation of economic activity planning by third-party consultants/experts, which can be used by regional and state development agencies; state and private scientific institutions; governmental and non-governmental organizations; product manufacturers; legislators, etc., when developing support programs for*

agricultural producers to motivate them to use more effective planning tools, as well as when determining areas of activity for the regional advisory centers, taking into account the priority tasks in the sphere of planning data collection and analysis at agricultural enterprises and farms. Further studies of the data availability for planning the economic activity of agricultural enterprises are possible on the basis of the current study.

Key words: *data availability, planning, food security, agricultural enterprises, consulting in agriculture.*

Introduction and review of literature. Systematic planning of the economic activities of agricultural enterprises is the basis of their effective functioning and therefore creates prerequisites for better ensuring the food stability of entire regions. The planning of the activities of agricultural enterprises is carried out not only for the purpose of assessing the availability of the necessary resources for the start of the production process but also for further control of the achieved results. Planning in agricultural production must take into account seasonality and a high level of risk in this area. The development of plans concerns various spheres of activity at agricultural enterprises: production management, personnel management, enterprise finance management, management of marketing and trade activities, management of standardization and safety, etc. [1]. As a rule, the economic planning of the activities of agricultural enterprises is classified by the time and purpose of implementation and is divided into short-term planning (mainly focuses on problems of a production nature), medium-term planning (mainly concerns the tactical level of decision-making in the organization) and long-term planning (includes the strategic aspect of the enterprise in terms of different spheres of his activity).

At all stages of planning the economic activity of agricultural enterprises, information resources are used, which mainly relate to the internal or external environment of the organization. Thus, the internal environment of the organization generates information used in management accounting, analysis and planning based on the achieved indicators. Enterprises can transfer internal information to external consultants for more thorough analysis and comprehensive planning based on [2]. In turn, external sources of information are mainly used to obtain reference and normative information, statistical reports, and estimates of forecasts developed by state information services and international organizations.

Business planning of enterprises can be carried out by them independently (directly by the manager or full-time employees) or with the involvement of third-party experts and organizations (outsourcing firms, consulting companies, advisory services, scientific institutions, etc.) [3]. In the case of engaging third-party experts for the planning of economic activities of agricultural enterprises, the presence and availability of information that must be provided by enterprises, adhering to the principles of openness, reliability and confidentiality, plays a major role. The experience of different countries of the world, which is based on differences in the legislation regarding the protection of confidential information and the practices of obtaining information services by agricultural enterprises, needs additional study in order to identify and adopt the best practices.

Modern scientists [1–5] pay great attention to the study of the interaction of agricultural enterprises as institutes that generate information for conducting field research, and consulting agencies, universities, advisory services and other actors that produce analytical reports based on primary data. At the same time, scientists [6–10] emphasize the importance of obtaining primary information from agricultural enterprises for planning not only at the micro level (production output, total costs, marginal profit, break-even threshold, payback period, development and diversification scenarios, etc.) but also at the macro level (aggregation of indicators of individual producers to obtain an overall picture of the production process in the industry with its problems and prospects affecting the formation of food security in the region).

Particular attention is paid to the assessment of the availability of data on the planning of land use by agricultural enterprises [11–12], which allows regulating the creation of support programs for certain groups of commodity producers and prevents the irrational use of natural resources. Optimizing the process of centralized collection of primary data from local agricultural enterprises is considered through the prism of certain key areas of ensuring food security [13–15] through the facilitation of integrated planning for the production of organic products, the provision of plant raw materials for green energy, ensuring compliance with the principles of sustainable production with minimal interference in the environment for preservation of water and land resources.

Some authors note the need for the centralized involvement of agricultural enterprises in scientific clusters for conducting experimental research and forecasting systemic changes in the industry, followed by the development of updated normative indicators and their use in planning, taking into account modern trends in the agricultural sphere. According to scientists [16–18], the deepening of cooperation between scientific institutions and agricultural enterprises will create prerequisites for a timely response of lawmakers and related sectors of the economy to the challenges facing agriculture to minimize food security risks.

Innovative changes taking place in the field of information technologies allow us to observe revolutionary shifts in agriculture, the financial sector, insurance and other areas, which have always been characterized by gradual and slow progress towards development. Scientists [19–21] suggest using modern information technologies to facilitate the collection, processing and interpretation of primary data received from agricultural producers. At the same time, special attention is paid to ensuring the security of transmission and storage of such data.

In addition to the positive impact of integrated planning of the activities of agricultural enterprises on the state of food security in the region, a number of scientists [22–24] consider the threats that arise in the process of ensuring food security in the absence of an effective approach to planning the economic indicators of agricultural enterprises. At the same time, among the main problems that arise in the process of comprehensive planning of the economic activity of agricultural producers, there is a lack of motivation to conduct independently long-term planning,

a lack of involvement in state consulting support programs, mistrust of analytical institutions that collect primary data, etc.

Unlike the planning tools used directly by agricultural enterprises, scientific institutions and consulting agencies can provide a wider and more comprehensive range of planning based on forecasts and models. Scientists [25–26] note that the effectiveness of using mathematical models when forecasting the key areas of economic activity of agrarian enterprises makes it possible to achieve more accurate results in planning.

The management system and approaches to the internal audit of enterprises play a significant role in achieving the efficiency of the use of economic planning by agricultural enterprises. Scientists [27–29] note that the presence of an established system of monitoring, diagnostics and control over the enterprise's activities can increase the effect of using the developed plans several times. In addition, scientists [30–31] emphasize the importance of using modeling and forecasting methods in the decision-making process by representatives of the top management of enterprises. It is noted that managers inclined to use complex models in decision-making are able to ensure better organization and planning of the activities of agricultural enterprises at the tactical and strategic levels and, as a result, make a greater contribution to ensuring food security at the macro level.

The latest studies [32–34] testify to the determining role of agricultural enterprises in the general system of ensuring food security of the country. The main directions of ensuring the efficiency of agricultural enterprises in the context of guaranteeing food stability relate to increasing the efficiency of the use of natural resource potential, ensuring minor price fluctuations for agricultural products, achieving the required level of food quality, increasing exports while meeting domestic needs and reducing food imports. Scientists [32–34] propose to achieve all these goals on the basis of comprehensive planning of the economic activity of agrarian enterprises using management accounting data and various external sources of information.

In addition to the direct planning of economic activity by agricultural enterprises, scientists [35–36] focus attention on the role of state planning of agrarian policy at the institutional level. Such planning, according to scientists, will ensure the use of financial instruments to stimulate agricultural producers and provide the necessary support to enterprises for the development of activities and protection from adverse conditions that may occur as a result of natural changes or fluctuations in the market.

The nutritional properties of food, which form the basis of food security, are determined not only by the quality and availability of food products for the consumer but are also a consequence of the planning of agricultural producers [37]. Sown areas, the use of fertilizers and plant protection products, and other factors that determine the quality of food are determined by the planned calculations of producers and are part of their production program [38].

All information related to farming can be divided into four key blocks: soil,

weather, operations and crops. Information about soils, weather conditions, and operations is essentially the cause, and information about crops is its effect. In order for all the information described above to turn into data, it must be digitized and structured. Scientists [39–41] suggest using the big data technique to increase the efficiency of operations with data arrays, on the basis of which planned programs of agricultural production are drawn up. According to scientists, big data can be used for forecasting, but first of all, it is necessary to analyze the results of production in order to find ways to increase its efficiency.

As already mentioned, the effectiveness of collecting primary data at agricultural enterprises creates prerequisites for quality planning of their economic activities, which, as a result, contributes to better production results and allows for ensuring food security at the highest level. At the same time, according to scientists [42–44], agricultural enterprises should take into account the principles of sustainable production in the process of planning economic activities, since it is environmental safety and production stability that can ensure a high level of food security not only for the current generation but also for future generations.

The articles by Ukrainian scientists devoted to the problem of ensuring food security through various approaches, including the rationalization of planning and accounting work at enterprises, are especially relevant in modern conditions [42–44]. Thus, the research by O. Kotykova et al. [45; 46] substantiates the feasibility of improving the practice of collecting and processing information at agricultural enterprises in the context of ensuring the goals of sustainable development and food security, in particular. Thus, according to scientists, the systematization of planning at agricultural enterprises will allow reducing non-productive costs and production losses, which will lead to an increase in output and create better conditions for the development of the national economy.

In addition, A. Karnaushenko et al. [47] proposed the use of blockchain technologies in various fields of agriculture, including the intellectualization of planning processes at enterprises. According to scientists, the development of information and analytical tools will make it possible to increase the efficiency of the processes of collecting, processing and using information at agricultural enterprises.

Scientists from all over the world are engaged in studying the problems of agricultural production through the prism of various industry specifics. Thus, only in 2022, about one hundred thousand scientific works on the subject of agriculture were published, which are indexed in the scientometric database Scopus. At the same time, narrowing down the scope of the search for scientific works by refining the search query, we see that in 2022 about 25,846 scientific works were published that would relate to planning problems in agriculture, of which only 24,020 focused on the problems of collecting the necessary information, of which only 6,328 articles were relevant to farms. Of these works, only 2,575 items (or 2.6 % of the total number of academic works devoted to agriculture) are scientific articles related to the problems of ensuring food security through the formation of a system of information flows quality management of planning data in agricultural enterprises (Figure 1).

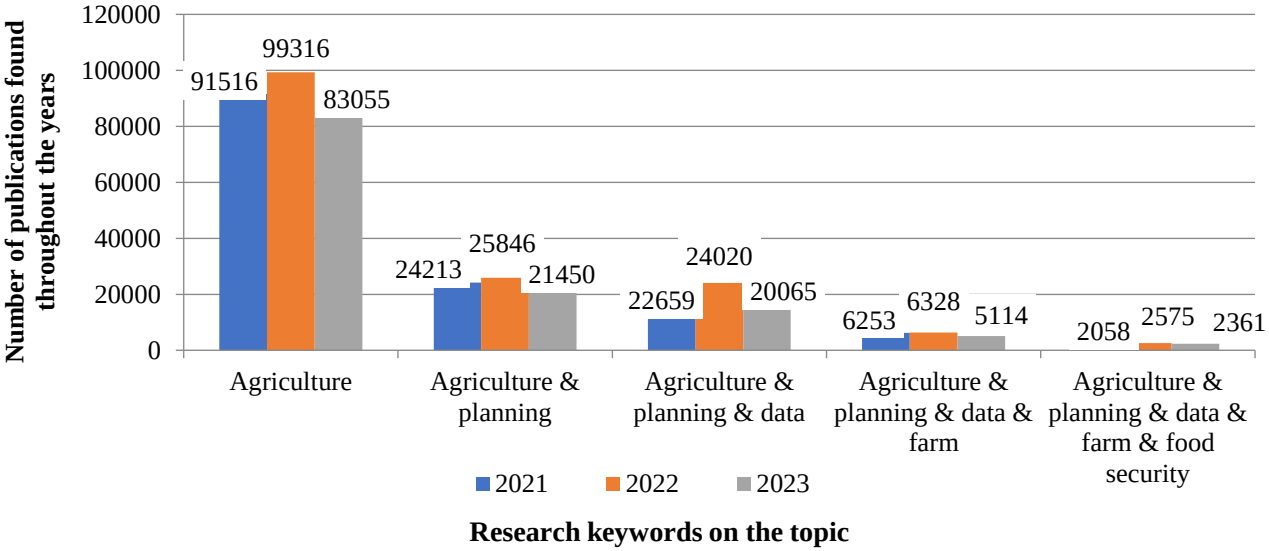

Figure 1. Dynamics of changes in the number of publications on issues of ensuring food security due to the effective use of planning data in agricultural enterprises

Source: constructed by the authors using the Scopus database.

Of all the academic works devoted to the problems of ensuring food security through the formation of a system of quality management of information flows of planning data in agricultural enterprises, which were indexed in the scientometric database Scopus in the period from 2000 to 2023, the absolute leadership in terms of number is taken by research publications, followed by chapters in books and reviews (Figure 2).

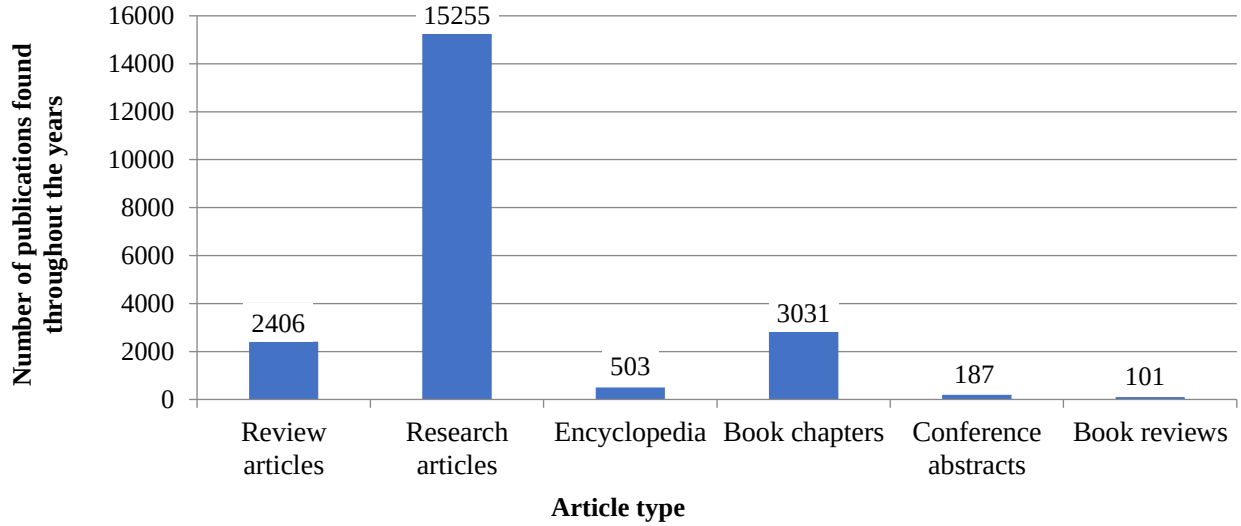

Figure 2. The main categories of scientific publications on the issues of ensuring food security through the effective use of planning data in agricultural enterprises in the period from 2000 to 2023

Source: constructed by the authors using the Scopus database.

The majority of publications of academic texts devoted to the problems of ensuring food security through the formation of a system of quality management of information flows of planned data in agricultural enterprises concern applied studies,

the empirical nature of which indicates that this topic is relevant for development and application in the real sector of the economy. At the same time, it is worth paying attention to journals that take leading positions in terms of the number of publications on the subject under study (Figure 3).

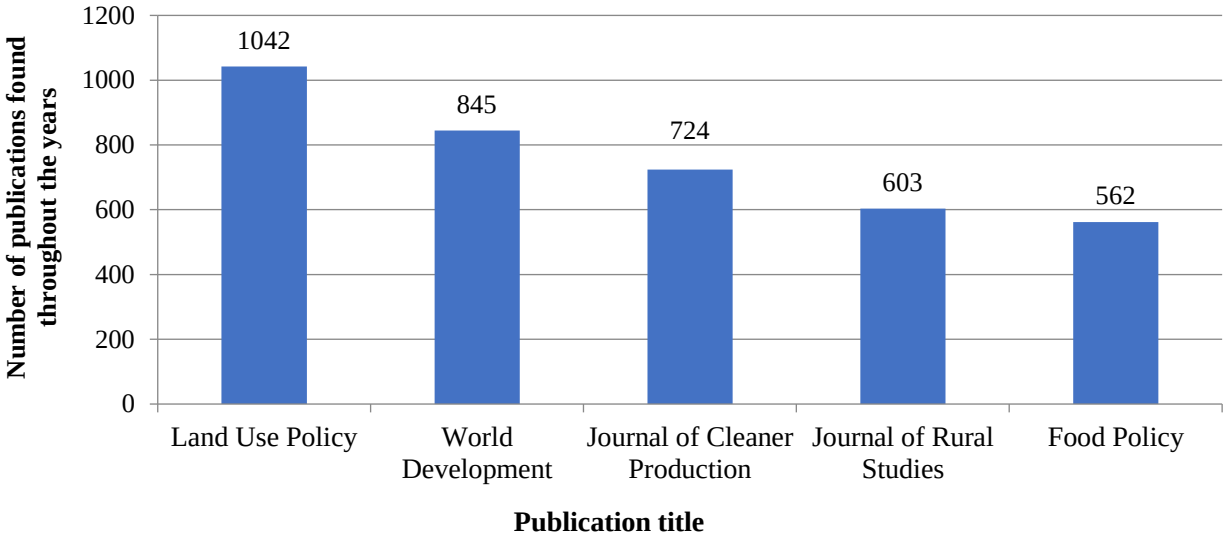

Figure 3. Leading journals by the number of publications on issues of ensuring food security through the effective use of planning data in agricultural enterprises in the period from 2000 to 2023

Source: constructed by the authors using the Scopus database.

The study of issues of ensuring food security through the effective use of planning data in agricultural enterprises is at the intersection of various subject areas, as evidenced by the distribution of the total number of academic papers by scientific field, which includes journals presented in Figure 4.

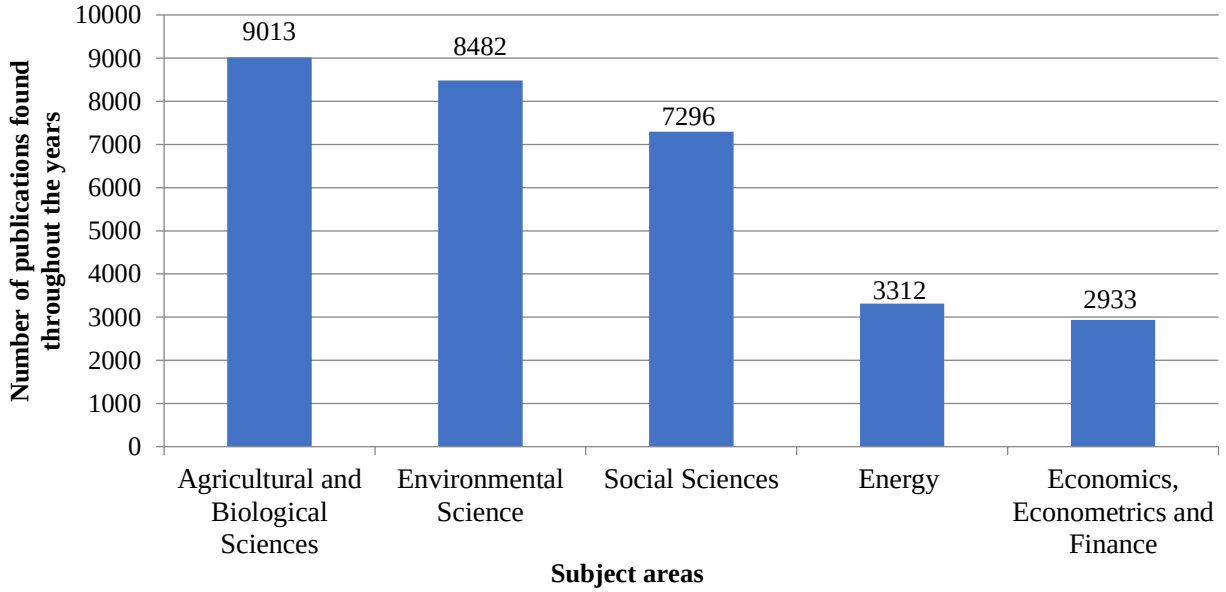

Figure 4. Ranking of subject areas by the number of scientific publications on issues of ensuring food security due to the effective use of planning data in agricultural enterprises in the period from 2000 to 2023

Source: constructed by the authors using the Scopus database.

Thus, the researches that were conducted and the results of which were published in the period from 2000 to 2023 related to ensuring food security through the formation of a system of quality management of information flows of planning data in agricultural enterprises and, accordingly, mainly related to such subject areas as agricultural and biological sciences, environmental sciences, social sciences, energy, economics, econometrics and finance.

The purpose of the article is a comparative assessment of the state of data availability for planning the economic activity of agricultural enterprises, as well as the development of a model for increasing data availability based on the established correlation between socio-economic factors of internal and external influence of agricultural enterprises and readiness to disclose information when receiving consulting services.

Methodology. The focus of this article is on an interdisciplinary study of the problem of information support for planning and research in agriculture, due to the necessity to improve the decision-making process, which will affect the improvement of profitability and stability indicators, will provide additional competitive advantages, will lead to an increase in the capitalization of the enterprise, etc., which in the end will allow creating a basis for achieving the goals of food security based on the regulatory activity of state bodies. The purpose of this article is to establish the dependence between the socio-economic parameters that form the profile of agricultural enterprises and the openness of management accounting data, which is an essential element of obtaining consulting support.

The defined circle of research helped to focus on the subject of research – the availability of data for planning the economic activity of agricultural enterprises. During the processing of literary sources on the specified problem, the main research hypotheses were established:

H1: The degree of openness and availability of information that agricultural enterprises, in particular farms, are ready to provide to external consultants for analysis and use in the planning process depends on a group of social, organizational and economic factors, including the level of education and the gender of the head of the agricultural enterprise (farm); the availability of previous experience in consulting for assistance in economic planning activities; the size of the agricultural enterprise (farm); the availability of experience in participating in development programs aimed at supporting agricultural producers and provided by the state or international institutions; the availability of qualified employees engaged in collecting data necessary for economic planning at agricultural enterprises; the availability of agricultural enterprises' (farms') data for planning with the involvement of external consultants/experts, concerning the reasons that may hinder it; the degree of managers' awareness of the importance of economic planning for the efficiency and performance of agricultural enterprises (farms); the development of the methodological approach for economic activities' planning at agricultural enterprises (farms), etc.

H2: The confidential status of information, a negative experience regarding the

security of information dissemination, or the lack of practice of collecting and using data for planning at agricultural enterprises affect the degree of openness of enterprises to providing access to consultants for the use of internal data.

H3: Agricultural enterprises (farms) that have had experience in using consulting services in the planning of economic activities testify to the presence of a positive impact on business.

Therefore, to build a correlation model and establish relationships between the studied phenomena, with the subsequent confirmation or refutation of research hypotheses, an endogenous variable was chosen – the degree of openness and availability of data of agricultural enterprises, as well as a number of exogenous variables, including the level of education and the gender of the head of the agricultural enterprise (farm), the availability of previous experience in consulting for assistance in economic planning activities; the size of the agricultural enterprise (farm); the availability of experience in participating in development programs aimed at supporting agricultural producers and provided by the state or international institutions; availability of a specialist engaged in data collection necessary for economic planning at agricultural enterprises.

The degree of openness and availability of data of agricultural enterprises is measured on a scale from 1 to 3, where 1 – enterprises are not ready to provide information at all; 2 – enterprises are ready to provide information by their own choice; 3 – enterprises are ready to provide all types of information necessary for planning business activities.

The level of education of the head of an agricultural enterprise (farm) varies on a scale from 1 to 3, where 1 is a low level of education (complete secondary school education); 2 – the average level of education (the level of a junior bachelor or a bachelor); 3 – high level of education (master's level or PhD).

The gender of the head of the agricultural enterprise (farm) is determined by a binary variable, where 1 corresponds to the male gender, and 2 corresponds to the female gender.

The availability of previous experience in consulting for assistance in the economic planning of the enterprise (farm) is determined by a binary variable, where 1 corresponds to the absence of such experience, and 2 corresponds to the presence of relevant experience.

The size of the agricultural enterprise (farm) varies on a scale from 1 to 3, where 1 – the area of agricultural land of the farm is less than 50 hectares; 2 – the area of agricultural land of the enterprise is in the range from 50 to 100 hectares; 3 – the area of agricultural land of the farm exceeds 100 hectares.

The availability of experience in participation in programs of development aimed at support of agricultural producers provided by the state or international institutions is determined by a binary variable, where 1 corresponds to the absence of such experience, and 2 corresponds to the presence of relevant experience.

The availability of qualified employees engaged in collecting data necessary for economic planning at agricultural enterprises is determined by a binary variable,

where 1 corresponds to the absence of such a specialist, and 2 corresponds to the presence of a required specialist.

The reasons that may hinder the availability of agricultural enterprises' (farms') data for planning with the involvement of external consultants/experts vary on a scale from 1 to 3, where 1 is a low level of organization or a complete absence of the appropriate data collection practices; 2 – a moderate hindering effect of previous negative experiences or failures in data collection practices; 3 – a high level of suspicion due to confidentiality reasons.

The degree of managers' awareness of the importance of economic planning for the efficiency and performance of agricultural enterprises (farms) vary on a scale from 1 to 3, where 1 is a low level of acknowledgement of the helpfulness of the planning practices; 2 – a moderate level of acknowledgement of the helpfulness of the planning practices; 3 – a high level of acknowledgement of the helpfulness of the planning practices.

The development of the methodological approach for economic activities' planning at agricultural enterprises (farms) also vary on a scale from 1 to 4 according to its advancement, where 1 stands for no planning conducted; 2 – planning becomes one of the head-manager's duties; 3 – planning is systematically conducted by a qualified staff member; 4 – planning is outsourced and carried out by external consultants.

In addition, in the course of the research, it is planned to obtain answers to several research questions, namely:

RQ1: What is the main reason that prevents agricultural enterprises (farms) from sharing data for economic planning by third-party experts without restrictions?

RQ2: How is the process of planning economic activity at agricultural enterprises conducted and carried out?

RQ3: How important do farmers consider business planning for business success and development?

The research was conducted at Mykolayiv National Agrarian University (Ukraine). On the basis of Mykolayiv National Agrarian University, a homogeneous sampling of 100 enterprises of the Mykolayiv region, which acted as respondents during the survey, was selected as the information base for conducting research on establishing the availability of data for economic planning at agricultural enterprises (farms). The size of the random sampling was determined by a statistical method based on the formula:

$$n = \frac{t^2 S^2 N}{\Delta_x^2 N + t^2 S^2}, \quad (1)$$

where n – the sampling size;

t^2 – normalized deviation, which is determined based on the selected confidence level;

N – the volume of the general research object group;

S^2 – variance of a random variable;

Δ – the permissible margin of error.

According to the Table of normal distribution for an acceptable margin of error of 10 %, t = 1.64 [48]. In the absence of statistical information, we accept S = 0.5, as this gives the maximum variance and, accordingly, increases the reliability of the results.

$$\frac{1.64^2 \cdot 0.5^2 \cdot 2825}{0.1^2 \cdot 2825 + 1.64^2 \cdot 0.5^2} = 65.68.$$

Therefore, in order to obtain reliable research results, taking into account that the permissible error is 10 %, and the number of farms registered in 2021 in the studied region (Mykolaiv region, Ukraine) was 2,825 units [49] (10.6 % of the total number of registered farms in Ukraine), the minimum required number of surveyed respondents should be 66 farms.

The questionnaire for collecting respondents' answers was sent to the e-mails of enterprises available in open information resources [50]. In addition, the questionnaire was shared in the social networks of universities and non-governmental organizations of an agrarian sphere. The collection of information as part of the survey lasted from August 1 to September 1, 2023, as a result of which 53 responses were collected by e-mail out of 100 questionnaires sent out, and another 21 responses were received through the publication of the questionnaire in open information resources. The responses received were sufficient to form a sampling for conducting the study and obtaining a reliable interpretation of the results.

After processing the primary information and converting it into numerical format, the tools of JASP software were used to conduct a correlation analysis and establish dependencies between the studied variables, which made it possible to answer the research questions and confirm the previously formulated hypotheses.

Results and discussion. The verification of the formulated hypotheses of the research involved the collection of answers from the respondent enterprises regarding the availability of the use of data necessary for planning the economic activities of farms. The results of the information analysis collected during the survey are presented in Table 1, the most influential of which are visualized in Figure 5 of this paper to form the empirical agenda of the causal factors network.

Thus, according to the survey results of 74 agricultural enterprises (farms) in the Mykolaiv region (Ukraine), it was established that 50 % of respondents agree to provide all types of data for planning economic activities, in which external experts are involved; another 32.4 % of respondents agree to share information by their own choice, while 17.6% of respondents are not ready to share data at all.

Among the surveyed managers, more than a third had a higher level of education (master's or Ph.D. degrees), almost half of the respondents had a basic higher education (junior bachelor's or bachelor's degrees), the rest of the respondents had a low level of education (complete secondary school education or specialized technical education). Among the interviewed managers of agricultural enterprises (farms), women made up only one-third of the entire group of respondents.

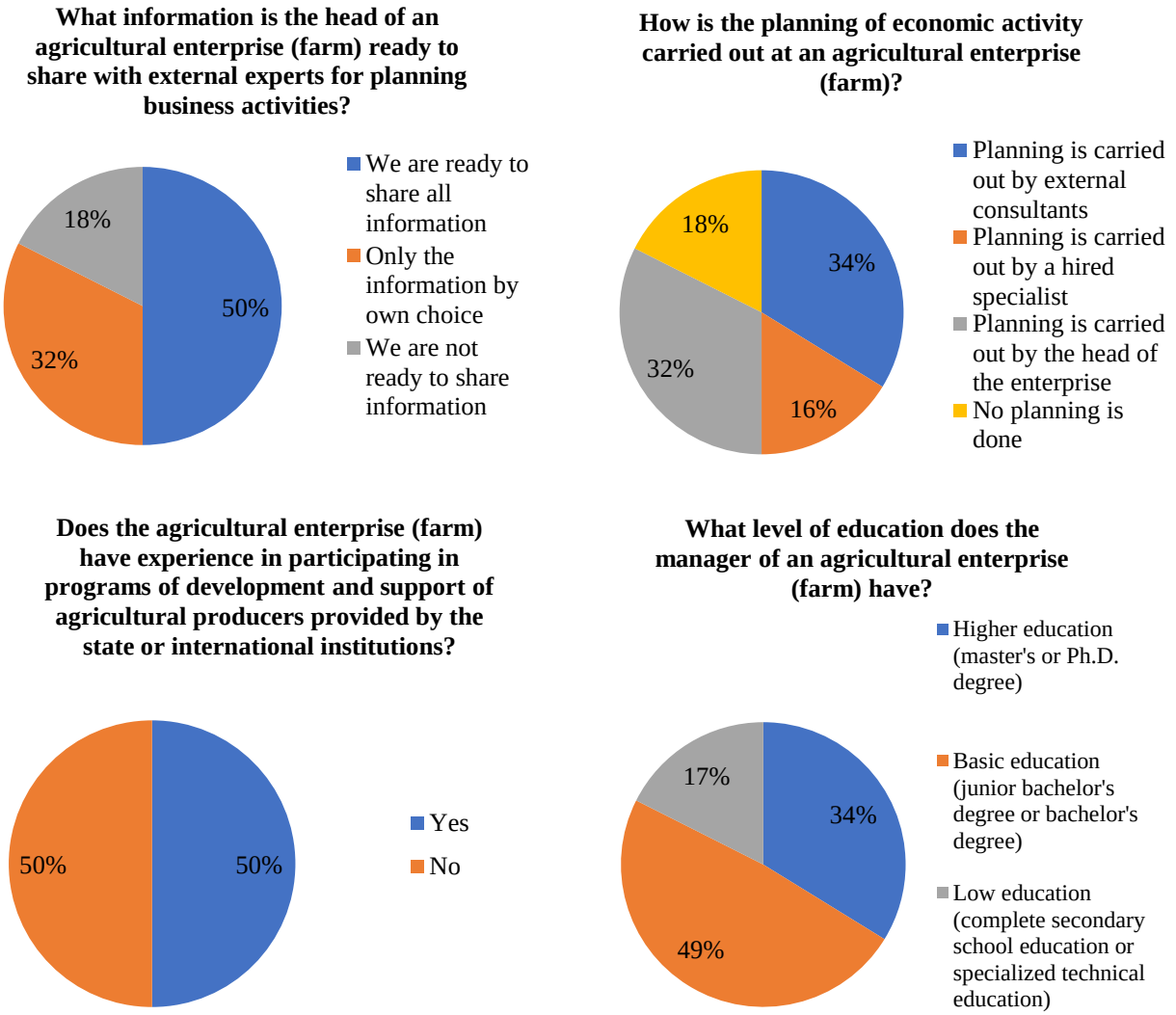

Figure 5. Key-responses visualization on data accessibility and collection practices questionnaire, 2023

Source: developed by authors based on data collected during the field research.

Half of the surveyed managers noted that their agricultural enterprise (farm) has experience in the dissemination of data for the planning of economic activities, in which external experts are involved. Half of the agricultural enterprises (farms) that formed the core of the studied sampling belong to small land areas (less than 50 hectares), while a third of the studied farms use land plots with an area of 50–100 hectares; the rest of the surveyed managers of agricultural enterprises (farms) confirmed the availability of a land fund exceeding 100 hectares. Half of the surveyed managers noted that their agricultural enterprise (farm) has experience in participating in development and support programs for agricultural producers provided by the state or international institutions, and also confirmed that the enterprise has at least one qualified employee among staff who collects data necessary for economic planning.

Among the factors that may serve as a reason preventing unrestrained access to agricultural enterprise (farm) information to third-party experts, farmers named data confidentiality (33.8 %), the availability of previous negative experience in providing

information (48.6 %) and lack of collection of necessary data procedures implemented and broadly used at the enterprise level (17.6 %).

Table 1

The summary of questionnaires' processing

№	Questions provided	Answer options	Number of responses	Share of responses in the overall structure, %
1.	What information is the head of an agricultural enterprise (farm) ready to share with external experts for planning business activities?	All information	37	50.0
		Only the information by own choice	24	32.4
		Not ready to share information	13	17.6
2.	What level of education does the manager of an agricultural enterprise (farm) have?	Higher education (master's or Ph.D. degree)	25	33.8
		Basic education (junior bachelor's degree or bachelor's degree)	36	48.6
		Low education (complete secondary school education or specialized technical education)	13	17.6
3.	What is the gender of the head of the agricultural enterprise (farm)?	Female	25	33.8
		Male	49	66.2
4.	Does the agricultural enterprise (farm) have experience in the distribution of data for economic planning, in which external experts are involved?	Yes	37	50.0
		No	37	50.0
5.	What is the size of the agricultural enterprise (farm)?	> 100 ha	13	17.6
		50–100 ha	24	32.4
		< 50 ha	37	50.0
6.	Does the agricultural enterprise (farm) have experience in participating in programs of development and support of agricultural producers provided by the state or international institutions?	Yes	37	50.0
		No	37	50.0
7.	Does the agricultural enterprise (farm) have a specialist who collects data necessary for economic planning?	Yes	37	50.0
		No	37	50.0
8.	Which of the following is/may be a reason that prevents unrestrained access to data of an agricultural enterprise (farm)?	Confidentiality reasons	25	33.8
		Negative experience	36	48.6
		No info collection	13	17.6
9.	To what extent, in the opinion of the manager of an agricultural enterprise (farm), does the planning of business activities improve work efficiency?	It has a strong positive influence	37	50.0
		It has an average effect	24	32.4
		It has no influence	13	17.6
10.	How is the planning of economic activity carried out at an agricultural enterprise (farm)?	Planning is carried out by external consultants	25	33.8
		Planning is carried out by a hired specialist	12	16.2
		Planning is carried out by the head of the enterprise	24	32.4
		No planning is done	13	17.6

Source: data collected by authors.

Half of the interviewed managers of agricultural enterprises (farms) believe that the presence of the practice of planning economic activity has a strong positive effect on the efficiency of the enterprise; another third of respondents believe that planning has an average impact on the effectiveness of business processes at enterprises; and only 17.6 % of respondents do not admit the great importance of the economic activities planning at farms.

Regarding how the economic activities planning is carried out at the agricultural enterprise (farm), the interviewed managers noted that they entrust planning work to external consultants (33.8 %); planning is carried out by a hired specialist in 16.2 % of cases; planning is carried out by the head of the enterprise independently in 32.4 % of cases; planning at the tactical and strategic levels is not carried out in 17.6 % of cases.

The next step of our research is testing the previously formed hypotheses. In order to confirm or refute the previously formulated hypotheses, as well as to find answers to the research questions, we identified the variables of the correlation matrix and found Pearson's coefficients, as well as verified their reliability (Table 2).

Table 2

Correlation matrix of model variables

Pearson's Correlation Matrix																			
		SharedInf		EduLevel		Gender		ExpDSh		FarmSize		ExpProg		DColSp		Reasons		Acknowl	
SharedInf	r	–																	
	p	–																	
EduLevel	r	0.874	***	–															
	p	<0.001		–															
Gender	r	0.185		0.366	**	–													
	p	0.114		0.001		–													
ExpDSh	r	0.895	***	0.736	***	0.029		–											
	p	< 0.001		< 0.001		0.809		–											
FarmSize	r	0.800	***	0.766	***	0.345	**	0.895	***	–									
	p	< 0.001		< 0.001		0.003		< 0.001		–									
ExpProg	r	0.895	***	0.736	***	0.029		1.000	***	0.895	***	–							
	p	< 0.001		< 0.001		0.809		< 0.001		< 0.001		–							
DColSp	r	0.895	***	0.736	***	0.029		1.000	***	0.895	***	1.000	***	–					
	p	< 0.001		< 0.001		0.809		< 0.001		< 0.001		< 0.001		–					
Reasons	r	0.874	***	0.667	***	0.366	**	0.736	***	0.766	***	0.736	***	0.736	***	–			
	p	< 0.001		< 0.001		0.001		< 0.001		< 0.001		< 0.001		< 0.001		–			
Acknowl	r	1.000	***	0.874	***	0.185		0.895	***	0.800	***	0.895	***	0.895	***	0.874	***	–	
	p	< 0.001		< 0.001		0.114		< 0.001		< 0.001		< 0.001		< 0.001		< 0.001		–	
PlanAppr	r	0.946	***	0.953	***	0.241	*	0.906	***	0.878	***	0.906	***	0.906	***	0.745	***	0.946	***
	p	< 0.001		< 0.001		0.038		< 0.001		< 0.001		< 0.001		< 0.001		< 0.001		< 0.001	

Note. * p < 0.05, ** p < 0.01, *** p < 0.001.

Source: calculated by authors using JASP.

The dependent (endogenous) variable of the model – the degree of openness and data availability of agricultural enterprises – is marked in Table 2 as "SharedInf". Independent (exogenous) variables in the model are marked as the following:

- "EduLevel" – education level of the head of the agricultural enterprise (farm);
- "Gender" – the gender of the head of the agricultural enterprise (farm);
- "ExpDSh" – the availability of previous experience of applying to consulting

for assistance in economic planning activities;

- "FarmSize" – the size of the agricultural enterprise (farm);
- "ExpProg" – the availability of experience in participation in programs of development and support of agricultural producers provided by the state or international institutions;
- "DColSp" – the availability of a qualified employee engaged in collecting data that is necessary for economic planning at agricultural enterprises;
- "Reasons" – reasons that impair the availability of agricultural enterprises' (farms') data for planning with the involvement of external consultants/experts;
- "Acknowl" – the degree of awareness of the importance of economic planning for the efficiency and performance of agricultural enterprises (farms);
- "PlanAppr" – a method of economic activities' planning at agricultural enterprises (farms) which is being broadly used.

Having converted the obtained results of the respondents' survey into numerical values according to a predetermined scale, we conducted a correlation analysis of the linear model of the dependence of the model parameters based on the method of least squares, integrated into the analysis package of JASP software (Table 2). The correlation matrix contains the value of Pearson's correlation coefficient and the significance parameter p-value, where $p < 0.001$ corresponds to a high level of significance of dependence, $p < 0.01$ corresponds to a moderate level of significance of relationships between variables, $p < 0.05$ characterizes a sufficient level of significance of relationships between variables. A value of $p > 0.05$ indicates a low level of significance of established relationships between variables.

In the process of the research, we established that the "Gender" factor does not have a significant impact on the resulting feature, so it should be excluded from the model. The factors "EduLevel", "ExpDSh", "FarmSize", "ExpProg", "DColSp", "Reasons", "Acknowl" and "PlanAppr" were found to be dependent. So, the correlation model of data availability of agricultural enterprises finally included the following factors: "SharedInf" and "Acknowl" (Table 3).

Table 3

Correlation matrix of the remaining model variables

Pearson Correlations					
SharedInfo	–	Acknowledgement	Pearson's r		p
			1.000	***	< 0.001

Note. * p < 0.05, ** p < 0.01, *** p < 0.001.

Source: calculated by authors using JASP.

Interpreting the results of the correlation analysis, it is worth noting the presence of a strong correlation between the dependent (endogenous) variable and the independent variable included in the model. Thus, the level of openness of the investigated agricultural enterprises (farms) increases in direct proportion to the increase in the level of awareness of the importance of planning by the heads of agricultural enterprises, which is shown in the correlation diagram (Figure 6).

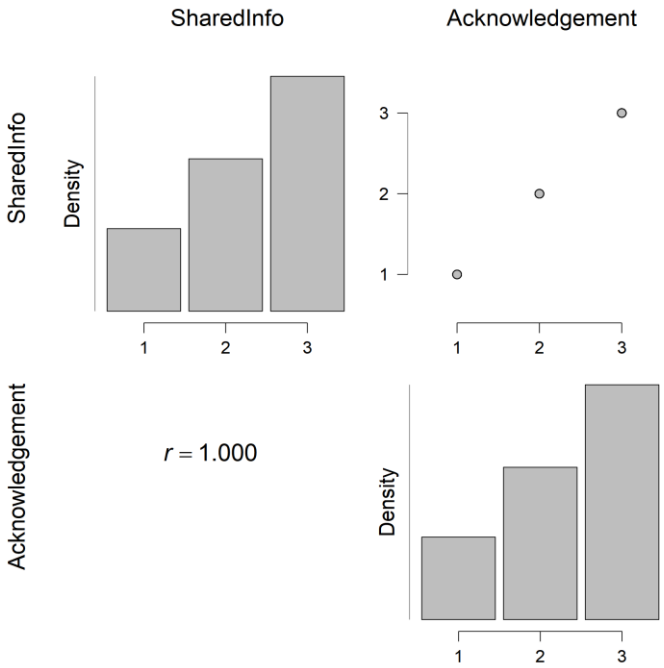

Figure 6. Correlation plot visualization on the revealed dependencies

Source: developed by authors using JASP software.

At the same time, the level of awareness of the importance of planning by the heads of agricultural enterprises increases in proportion to:

- an increase in the educational level of the head of the enterprise (managers with a high level of education demonstrated better understanding of the necessity of planning activities and showed a greater willingness to provide third-party consultants with access to the data necessary for planning business activities);
- the availability of previous experience in applying to consulting for assistance in economic planning activities;
- increasing the size of the agricultural enterprise (farm);
- gaining experience in participating in programs of development and support of agricultural producers provided by the state or international institutions;
- employment of a qualified employee engaged in data collection which is necessary for economic planning at agricultural enterprises.

In addition, a strong direct relationship was established between companies' unwillingness to share management accounting data with third-party experts precisely because of the lack of practice in collecting such data, rather than due to privacy concerns or negative experiences in past periods. Those enterprises where managers are aware of the high importance of planning economic activities to improve farm efficiency tend to be more open to the dissemination of management accounting data. At enterprises that are more open to the dissemination of management accounting data, planning work is mainly carried out by external consultants/experts or hired employees. At enterprises characterized by a low level of openness to the dissemination of management accounting data, planning work is conducted directly by managers, or planning of tactical and strategic tasks is not conducted at all.

The influence of the gender of the head of the agricultural enterprise (farm) on

the level of openness regarding the dissemination of data necessary for economic planning was not established due to the low significance of the calculated coefficient. In addition, a preponderance of the share of managers with higher education among female managers was recorded, compared to a similar share among male managers of agricultural enterprises (farms). Among the reasons hindering the dissemination of management accounting data, women more often indicated distrust of the recipient of the information and fears about confidentiality, while men more often noted the lack of practice in collecting the necessary data.

Larger agricultural enterprises (farms) showed a greater tendency to participate in programs of development and support of agricultural producers from the state or international institutions, and, accordingly, showed a greater experience of turning to consulting for assistance in economic planning activities. Managers of larger agricultural enterprises (farms) demonstrated better awareness of the importance of economic planning, compared to managers of smaller farms.

Table 4

Checking the statistical reliability of the model

Scale Reliability Statistics			
Indicator	McDonald's ω	Gutmann's λ6	Average inter-item correlation
Scale	0.999	1.000	1.000

Source: calculated by authors using JASP.

Having calculated McDonald's ω and Gutmann's λ6 coefficients, we checked the statistical reliability of the model (Table 4). Of the observations, 74 were used, 0 were excluded listwise, and 74 were provided. Since none of the elements of the sample was excluded during the test, the built model can be considered statistically reliable.

Discussion. The modern development of technologies allows farms to increase the efficiency of the processes of collecting, processing and interpreting the data necessary for conducting a basic marginal analysis of income, planning the results of operations and identifying weak points that require refinement. Economic analysis, applied to the operational activity at the number of efficient agricultural enterprises, forms a system of methods of studying, based on accounting data, reports, plans and other sources of information. Thus, modern farms are looking for possible options of its improvement in order to evaluate and control production, justify management decisions aimed at increasing their efficiency.

Planning is the initial most important stage of processing and decision-making in production management. Planned management decisions reflect program perspective and current organizational and economic tasks, determining the main direction and main parameters of the enterprise's economic activity. They affect the economy of the farm for a long time, therefore the content of these decisions at the planning stage and their validity largely determine the results of the farm.

As the research demonstrates, the majority of farms that have experience using modern technologies of economic analysis practice independent collection and

processing of information, and also consider these processes useful and contribute to increasing work efficiency. Part of the enterprises that do not have experience in working with modern techniques of economic analysis, do not have practices of collecting and processing information, and therefore need external help in this. Consulting companies, scientific institutes, state advisory centers and others can help farms in such a situation. Those farm managers, who reported the lack of understanding of the importance of economic planning, as well as the collection, preparation and provision of information necessary for this, need a more detailed explanation and demonstration of the importance of these processes.

Taking into account the specific features of agriculture, it is expedient to analyze the volume of work and the cost of their implementation in crop production every month during the year, and to calculate and analyze the cost of production by species in livestock production. The study demonstrated that greater willingness to conduct data collection, its expert analysis, evaluation and interpretation is shown by farm managers (regardless of gender) with a higher level of education, as well as a greater amount of work and responsibility associated with a larger farm size.

Conclusions. In the course of the research, the hypotheses formed at the beginning of the research based on the analysis of literary sources on ensuring the availability of data for planning the economic activities of agrarian enterprises were confirmed (fully or partially).

Thus, the first research hypothesis was partially confirmed. The study of the collected data showed that the degree of openness and availability of information that agricultural enterprises (farms) are ready to provide to external consultants for analysis and use in the planning process, depends on a group of social, organizational and economic factors, among which there are: the level of education of the head of the agricultural enterprise (farm); the availability of experience in consulting for assistance in economic planning activities; the size of the agricultural enterprise (farm); the availability of experience in participating in development and support programs aimed at agricultural producers and provided by the state or international institutions; the availability of a qualified employee engaged in collecting data which is necessary for economic planning at agricultural enterprises, etc. However, the influence of the gender of the head of the agricultural enterprise (farm) on the level of openness regarding the dissemination of data necessary for economic planning was not established due to the low significance of the calculated coefficient.

The second hypothesis of the study was confirmed, which states that the confidential status of information, a negative experience regarding the security of information dissemination, or the lack of practice in collecting and using data for planning at agricultural enterprises affects the degree of openness of enterprises to providing access to consultants for the use of internal data. Thus, among the reasons that hinder the dissemination of management accounting data, women more often indicated distrust of the recipient of information and fears about confidentiality, while men more often noted the lack of practice of collecting the necessary data.

The third hypothesis of the study was confirmed, which states that agricultural

enterprises (farms) that had experience in using consulting services in the planning of economic activities testify to the presence of a positive impact on business. Thus, those enterprises where managers are aware of the high importance of planning economic activities for increasing the efficiency of farm work tend to be more open to the dissemination of management accounting data.

In addition, the conducted research allows us to give answers to a number of questions regarding:

1) What is the main reason that prevents agricultural enterprises (farms) from unrestrained sharing data for economic planning by third-party experts?

2) How is the process of planning economic activity at agricultural enterprises organized and carried out?

3) How important do farmers consider business planning for business success and development?

Thus: 1) A strong direct connection was established between the unwillingness of enterprises to share management accounting data with third-party experts precisely because of the lack of practice of collecting such data, and not because of concerns about confidentiality or negative experiences in past periods; 2) At enterprises that are more open to the dissemination of management accounting data, planned work is mainly carried out by external consultants/experts or hired employees. At enterprises characterized by a low level of openness to the dissemination of management accounting data, planning work is conducted directly by managers or planning of tactical and strategic tasks is not conducted at all; 3) Managers of larger agricultural enterprises (farms) demonstrated better awareness of the importance of economic planning, compared to managers of smaller farms.

Therefore, in order to ensure better availability of management accounting data of agricultural enterprises and farms for use in planning economic activities with the involvement of third-party consultants/experts, it is necessary to increase the involvement of agricultural enterprises and farms in state and non-state producer support programs; to promote the obtaining of higher education by heads of agricultural enterprises and farms; promote the growth and consolidation of agricultural enterprises and farms; promote the dissemination of best practices in the collection and analysis of management accounting data at agricultural enterprises and farms, etc.

All of the above-mentioned benefits from the establishment of sustainable data collection practices for planning the activities of agricultural enterprises will have the main result – an increase in the efficiency of the work of agricultural enterprises, which in general will have a positive effect on the level of food security in the country, since the improvement of the results of each individual producer of agricultural products contributes to the improvement of national results in the food production sector.

Limitations and future research. The conducted research allows us to form an idea about the degree of openness of farms to the involvement of third-party consultants, as well as their provision of management accounting information for

comprehensive diagnostics of the financial and economic state and planning of economic activity. The object of the study was the farms of Mykolayiv region, one of the most developed agricultural regions of Ukraine. Although the problem of the availability of internal information of enterprises for planning is not specific to individual regions of the country, conducting a localized study can serve as a certain limitation for the interpretation of results and the spread of the found trends and dependencies to the territory of the entire state. Therefore, the prospects for further research include the need to scale the conducted analysis to other regions, as well as the internationalization of the research object for comparison and borrowing of successful practices.

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