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Scientific principles of the formation and functioning of agri-food systems under modern conditions

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The article summarizes and deepens the scientific principles of the functioning of the agri-food system (AFS). It is emphasized that achieving balanced development of the AFS is attributed to ensuring the effective development of all its constituent elements on the basis of a rational sectoral structure in accordance with the requirements of the country's food security. It is proved that the food supply of the country's population must be studied not only from the standpoint of its essence as a business process, but also from the point of view of a systemic approach - as an agri-food system.

The AFS structure is analyzed based on institutional, reproductive-functional and sectoral approaches. It is revealed that the use of a systemic approach in studying the AFS structure requires adherence to the following principles: integrity and unity; hierarchical construction; structuring, which allowed considering the AFS as a holistic set of elements, which is characterized by the orderliness of connections and relationships, as well as the presence of structured subsystems.

The influence of the laws of system organization on the AFS in static and dynamic contexts is generalized, which deepens the theoretical and methodological principles of the system's functioning. It is concluded that the institutional structure of the AFS includes participants with a certain level of freedom and their own goals, as well as subjects that coordinate their activities.

The theoretical essence of the AFS is specified, taking into account the cyclical nature of the reproductive process as a set of interconnected links - subsystems and components that function in a unity of principles and are subordinated to achieving a single goal. It is substantiated that the sectoral structure complements the institutional and reproductive-functional structure of the AFS, allows for a comprehensive study of the social division of labor, agro-food chains and the creation of added value at the level of each participant.

Key words: agri-food system (AFS), institutional structure of AFS, functional and reproductive structure of AFS, sectoral structure of AFS, food security, agri-food chains.

Problem statement and analysis of recent research. The development of the national agro-food system is one of the most important components of the state's economic policy in the conditions of martial law and the intensification of global, national and corporate challenges and threats. This is explained by the need for uninterrupted provision of the population with agro-food, requiring the prompt resolution of complex management tasks, especially in the front-line territories of the country. It is obvious that in the conditions of the country's post-war reconstruction, the intensification of global climate risks, the demographic crisis and other

challenges, it is necessary to ensure a balanced approach by the state to solving environmental, economic and social problems in the agro-food sector of the country. This is explained by the fact that agro-food systems and agriculture as their primary link most need to achieve balanced development. It is known that today, in order to solve the issue of food security and regulate the reproduction of food products, the state uses social institutions with appropriate functions, which are combined into an organized, orderly set, consisting of interconnected links, the activities of which are subordinated to a single goal. These institutions represent a system that includes subjects participating in the agri-food supply process, namely: consumers of agri-food (urban and rural population, public catering establishments, etc.), subjects producing agricultural products, food industry subjects (organizations that process and process agricultural products into food products), distribution logistics subjects that carry out storage and transportation, distribution and sales of food products (food products), state, regional bodies and services responsible for supplying food to the population in a specific territory. The agri-food system, which is considered as an organized structure integrated with the system of state regulation at the level of the national economic system, is composed of the above-listed subjects [1; 2].

The agri-food system (AFS) is in continuous development by changing its state in accordance with the functions performed in order to achieve the set goals, which are functionally related to the goals of the strategic program for the development of the agrarian sector of the economy. It should be noted that the agri-food strategy is a systematic and purposeful plan of management measures to ensure the country's food security, developed taking into account long-term goals with optimal use of resources and achievement of expected results. In market conditions, the AFS is considered as systematically organized business processes that implement the following functions: determining the needs of the country (region) in agri-food resources; forming food resources for a given period of time; distributing food resources in a certain territory. It is obvious that an important task in achieving balanced development of the agri-food system is to ensure the effective development of all its constituent elements on the basis of a rational industry structure that meets the requirements of the country's food security and allows you to form an export offer without violating national interests. We share the opinion of the Ukrainian scientist O. Borodina that «… Large-scale commercial cultivation of export crops takes away land and other resources from traditional local food producers, leaving communities and entire countries dependent on exports or food supplies from other countries. … In addition, such states lose domestic agricultural science or cannot develop national systems of scientific support for their own agriculture and processing industry» [3, p. 40]. Therefore, in order to achieve balanced functioning of national agri-food systems, it is necessary to develop theoretical and methodological foundations, analytical tools, information support and systematized empirical data in order to achieve its rational structure, which will contribute to the implementation of the Sustainable Development Goals.

By agri-food system we mean a socio-economic system that is formed in the form of an ordered set of interconnected links, on the basis of which the organization and regulation of the economic activities of economic entities of the agri-food reproduction cycle is carried out [4]. This cycle includes successive stages: production, distribution of agri-food resources, exchange and consumption of food products. We believe that the regenerative approach to studying the agri-food system is advisable to use in order to obtain a comprehensive macroeconomic assessment of its state and development, as well as to achieve a balance of interests of all its entities. It is obvious that the aggravation of geopolitical, environmental, financial and economic problems, including the war in our country, exacerbate the imbalance of natural ecosystems, the increase in the cost of energy carriers, and contribute to the degradation of the regenerative potential of agri-food supply. According to preliminary estimates, the agricultural sector of Ukraine suffered losses and losses from Russian aggression in the amount of 80.1 billion dollars. USA, which led to a shortage of agricultural products worldwide, an increase in prices for them and high food inflation [5]. This situation has worsened the level of food security not only in our country, but also throughout the world, and requires, in the conditions of the country's military recovery, to ensure the repositioning of Ukraine in the global food system, which means its transition from the position of an exporter of raw materials to a supplier of high-quality and safe products with increased added value [6]. That is why there is a need for a comprehensive and complete theoretical generalization of the essence of the agro-food system and its structure, as well as the features of its functioning in order to clearly define strategic priorities at the level of each of its participants.

The aim of the research is to generalize the theoretical and methodological principles of the formation and functioning of the agri-food system and to clarify its institutional, functional-reproductive and sectoral structure.

Material and methods of research. The theoretical basis of the study was the works of domestic and foreign researchers on the problems of development of the agro-food sector of the economy and agro-food systems, as well as food security of the population. The

methodological basis was the provisions of dialectics, in particular, a systemic approach based on the principles of dynamism, interaction of all elements of the agro-food system, which ensure the integrity and complexity of this study.

The following methods were used in the preparation of the article: abstract-logical and monographic in the process of theoretical generalization and formulation of conclusions; the method of system analysis, abstract-logical, deduction and induction, formalization, which allowed to generalize approaches to determining the constituent elements of the agro-food system and justify their functions, as well as the relationships and interdependencies between them.

Research results and discussion. The study will be based on a systemic approach, which will provide a complete knowledge of the phenomena and processes under study. It is known that the system approach requires understanding such important parts of any material object as an element, connection, interaction, goal-setting, structure. We note that an element is a component «part of any complex whole» [7], which is in the interconnection and interdependence of the properties of some elements of the system with the properties of other elements. At the same time, connections determine interactions, that is, relationships between the properties of elements that complement each other.

The presence of goal-setting is inherent to the system, which means setting a goal, that is, the result that the system seeks in its development, as well as its own structure. We note that one and the same system can be characterized by different structures, depending on the level of its knowledge and the aspects that are being studied. Therefore, a system is a unity consisting of individual elements that have a common goal, are in interaction and interdependence, generate new qualities that are not inherent in each of these elements separately. We believe that the food supply of the country's population should be studied not only from the standpoint of its essence as a business process, but also from the point of view of a systemic approach - as an agro-food system. Thus, based on adherence to a systemic approach, we can single out the concept of «agro-industrial complex», which was introduced into scientific circulation in the middle of the last century and was considered as a set of economic sectors related to the production of food and consumer goods from agricultural raw materials and their supply to the population [8]. The agro-industrial complex included three areas: a group of industries that produce means of production for agriculture and its logistical support; agricultural production itself; a group of industries that ensure the movement of products from agriculture to the end consumer.

In modern interpretations, the agro-industrial complex is considered as «… a complex integrated socio-economic system of interconnected industries for the production, distribution, exchange and consumption of agricultural products, which is characterized by specific (certain) functional features that reproduce the productive forces and production relations» [9, p. 36]; «… a set of technologically and economically interdependent industries, the general ultimate goal of which is the most complete satisfaction of society's needs for food» [10, p. 63]. These researchers believe that for an effective solution to the food security of the country's population, it is advisable to allocate the agro-food complex, which is the main element of food security, within a single system of agro-industrial production. The agro-food complex is defined as «… a regulated economic system consisting of three interconnected components: an organizational and economic mechanism, processes of production, storage, transportation and sale (trade) of food products and the food market» [11, p. 254]. Thus, the definition of «agri-food complex» and «agri-food system» as socio-economic systems differ from the agro-industrial complex in terms of the purpose of functioning and development, as well as in its structure. Thus, the main goal of the agro-industrial complex is to fully provide consumers with agro-industrial products, both food (food products) and non-food, and the main goal of the agro-food complex and agro-food system is to fully provide food for the country's population.

Let us analyze the structure of the agro-food system based on a combined approach, which includes institutional, reproductive-functional and sectoral aspects. It should be noted that the use of a systemic approach in studying the structure of the agro-food system requires adherence to the following principles:

- integrity and unity - the agri-food system as a single and integral set of interconnected multi-level elements, and simultaneously as a subsystem (national or regional);
- hierarchical construction - the presence in the agri-food system of elements that are placed on the basis of subordination of lower-level elements to higher-level elements;
- structuring - the study of the agri-food elements system and their relationships in the context of a certain organizational structure (morphological, functional, industry), due to the fact that the development of the system is determined not only by the properties of its individual elements, but also by the properties of the structure. It should be noted that the listed principles are theoretical foundations that must be followed when forming and operating the AFS.

In the philosophy, a system is understood as a set of elements that are interconnected and interact with each other, forming a certain

integrity, unity [11]. For any system, not only organization by essence is characteristic, that is, the presence of connections and relationships between the elements that form it, as well as unity with environmental factors, under the influence of which the system maintains integrity.

Therefore, the agri-food system is characterized by the integrity of the set of elements that make up it, the orderliness of connections and relationships between them, as well as the presence of structured subsystems.

Let us consider the aspects of the influence of the laws of system organization on the agri-food system, both in a static and dynamic context. Thus, static organization includes: the law of composition implies the need to synchronize the goal-setting of all links of the agri-food system, the definition of the goals of which must correlate with the main goal of the system - ensuring the physical and economic availability of food for the population and increasing the country's food security; the law of proportionality implies the proportions and relationships between the elements of the AFS (scale, correspondence and dependence); the law of the least implies that the stability of an organized whole is determined by the degree of the least relative resistance of all parts of the whole at any point in time; the additive (total) stability of the system in relation to the external environment is the result of the stability of each link of the system and the level of its resistance to various influences; the development (progressive or regressive) of the system depends on the most backward part of the system, which must be given special attention in order to strengthen the AFS. Such systems, according to the law of the least, develop regressively; the law of synergy implies that the sum of the properties of an organizational system is not identical to the arithmetic sum of the properties of each of the elements included in the system. Synergetics makes it possible to understand how the development of an AFS is affected by the regularities of the processes of transition from chaos to order and in the opposite direction, that is, the processes of self-organization and self-initiated disorganization [13]; the law of unity of analysis and synthesis implies the study of the processes of structuring, detailing, decomposition (i.e., analysis) in dialectical unity with the opposite process of generalization (i.e., synthesis); the law of individuality implies that the agro-food system develops in the context of an organizational and management structure that is optimal for it and inherent only to it. Despite the general principles of organization, it is impossible to find two absolutely identical agro-food systems; the law of social harmony means that a comprehensive solution to the issue of food availability and raising the standard of living of the population will contribute to the growth of satisfaction of economic interests and the interest of all AFS subjects; The law of optimal load implies that for the links of the AFS there are their own optimal load norms (tariff-price, credit-interest, tax), if observed, it functions with maximum efficiency. The load should be optimal to meet the interests of both the state and economic entities. The listed provisions must be taken into account in the process of developing practical measures to organize the work of all elements of the agri-food system at any level. As for the dynamic organization of systems, they influence the AFS in the following context: the law of information-orderliness is that the main factor that unites the elements of the system is orderly information. The organization and orderliness of information contribute to the formation of a reliable basis for analyzing the quantitative and qualitative characteristics of the AFS and allow making informed management decisions; the law of self-preservation implies that any system seeks to maintain its integrity, stability and efficiency, using all available opportunities for this. When developing and adopting certain management measures, the human factor plays a decisive role, therefore it is important to ensure such qualities of management personnel as professionalism, discipline, responsibility, and high communication culture; the law of increasing costs provides that the creation of goods (gross product) is always accompanied by an increase in the quantitative and qualitative costs of resources. Quantitative costs of agri-food systems increase in proportion to the increase in the value of the gross product. Qualitative costs provide for an increase in the cost of the gross product due to the price factor and an increase in material, capital, energy, and labor intensity; the law of competition requires systematic control of the quality of agricultural products and food, as well as a decrease in their specific price due to the need to strengthen competitive advantages.

Study, analysis and consideration of the specifics of the manifestation of these laws regarding the functioning of the AFS contributes to the development of theoretical and methodological principles for understanding the nature of the AFS and determining ways to achieve their balanced development. Therefore, the AFS must be considered in static and dynamic aspects. Statically, this system has a structure and morphological structure, that is, a set of parts that are interconnected and interact, and dynamically - it has functions, that is, actions that are implemented by its components.

An important property and feature of the system is the spatial structure - the morphological structure, which assumes the presence of institutions that provide food, that is, the morphological structure is an institutional structure. It should be noted that institutions establish rules, restrictions and requirements,

thanks to which it is possible to ensure and maintain the balance of economic interests of all subjects of the agro-food system. The institutional structure is based on economic relations and civil liability to the population of state, municipal and private institutions that supply the population of the relevant territory with food products in the required quantity and high quality. Each institutional link is a separate group of subjects of this system that interact and form its integrity. Thus, the Food and Agriculture Organization (FAO) includes all participants and their interrelated activities in the institutional structure of the AFS in terms of creating added value in the primary production of food and non-food agricultural products, as well as all activities related to storage, harvesting, post-harvest processing, transportation, processing, distribution, sale, disposal and consumption of food products, including non-agricultural products [14]. Therefore, the institutional structure of the AFS includes participants who have a certain level of freedom and their own goals, as well as entities that coordinate their activities, focused on full-fledged food security for the population of the country and region, namely: producers of agricultural products (agricultural enterprises, personal farms); entities that carry out post-harvest processing and processing of agricultural products into food products (food products); entities that store and transport agricultural products and food products; entities that distribute, sell and dispose of food products; consumers of food products (households, public catering establishments, etc.); state (regional, local) bodies and services responsible for supplying the population with food. The economic and social «return» of institutions is determined by their organizational and infocommunication interaction, that is, the quality of the performance of functions by each of them in the process of achieving the main goal of the agri-food system - providing the population with safe, high-quality food products in the required volume and assortment.

It is obvious that the AFS should have a humanistic character, since the main participant in this system is a person. Firstly, these are food consumers, the level of satisfaction of whose needs depends on their purchasing power and the level of efficiency of the system's functioning, which determine the level of food availability. Secondly, a person acts as a producer and seller in the agri-food market, who are oriented towards commercial benefit, that is, obtaining profit and other economic and non-economic interests, which determines the efficiency of the functioning of this system. Thirdly, a person organizes food security with his or her competencies, skills and management decisions. Such a diversity of the role of a person in the formation and development of the agri-food system necessitates the balance of interests of all its participants. Market principles of management imply that it is important to achieve unanimity between the social motives of food security, which determine the physical and economic availability of food products, and the financial and economic motives of the subjects of the agri-food market. In this case, an important role is assigned to the relevant institutions, mechanisms that contribute to achieving a balance of interests of all participants in the agri-food system through the performance of functions.

It is important to clarify the theoretical essence of the AFS, taking into account the cyclical nature of the reproductive process as a set of interconnected links - subsystems and components that function in unity of principles and are subordinated to achieving a single goal. A subsystem is understood as a part of the system that is distinguished by a functional characteristic and has relative independence. The main elements in the subsystem "Formation of food resources" are agricultural producers and food industry enterprises; and in the subsystem «Determination of needs in food products» - households, catering establishments and others. In the subsystem «Distribution of food resources» the elements are organizations of distribution infrastructure, wholesale and retail trade enterprises; in the subsystem «Resource-targeted regulation of the AFS» – state bodies responsible for organizing its effective development at the appropriate level (Fig. 1).

The reproductive-functional structure shown in Fig. 1 is distinguished by a dynamic and integrated approach, which allows us to study the development of the AFS based on the study of the interrelationships of the spheres of functioning of subsystems and the stages of the reproductive cycle. Thus, the AFS as an open dynamic system has an «input», «process» and «output». «Input» is a set of resources that are used to achieve the goal. «Process» is the cyclical transformation of resources into the results of the system's activities, that is, the production of agricultural products and food products. «Output» is the results of achieving the goal.

At the consumption stage in the sphere of «Consumption of food resources by the population», the function of determining the needs for food resources is implemented through the subsystem «Determining the needs for food resources». At the production stage in the sphere of «Production of agricultural products based on resource potential», the function of creating food funds is performed through the subsystem «Formation of food resources» by creating food reserves. At the distribution stage, the function of distributing food funds is performed. Surpluses of produced products are exported to other regions or for export. This stage is followed by the stages of exchange and consumption, where food products are bought and sold. This is carried out

in the area of «Consumption of food resources by the population», which is closely related to the distribution subsystem. When distributing food, it is important to ensure its physical and economic accessibility for all social strata of the population. At all stages of the reproductive cycle, coordination and regulation functions are implemented through the «Resource and Target Management of the AFS» subsystem. At the same time, all economic processes are focused around consumption, that is, the solvent demand of the population.

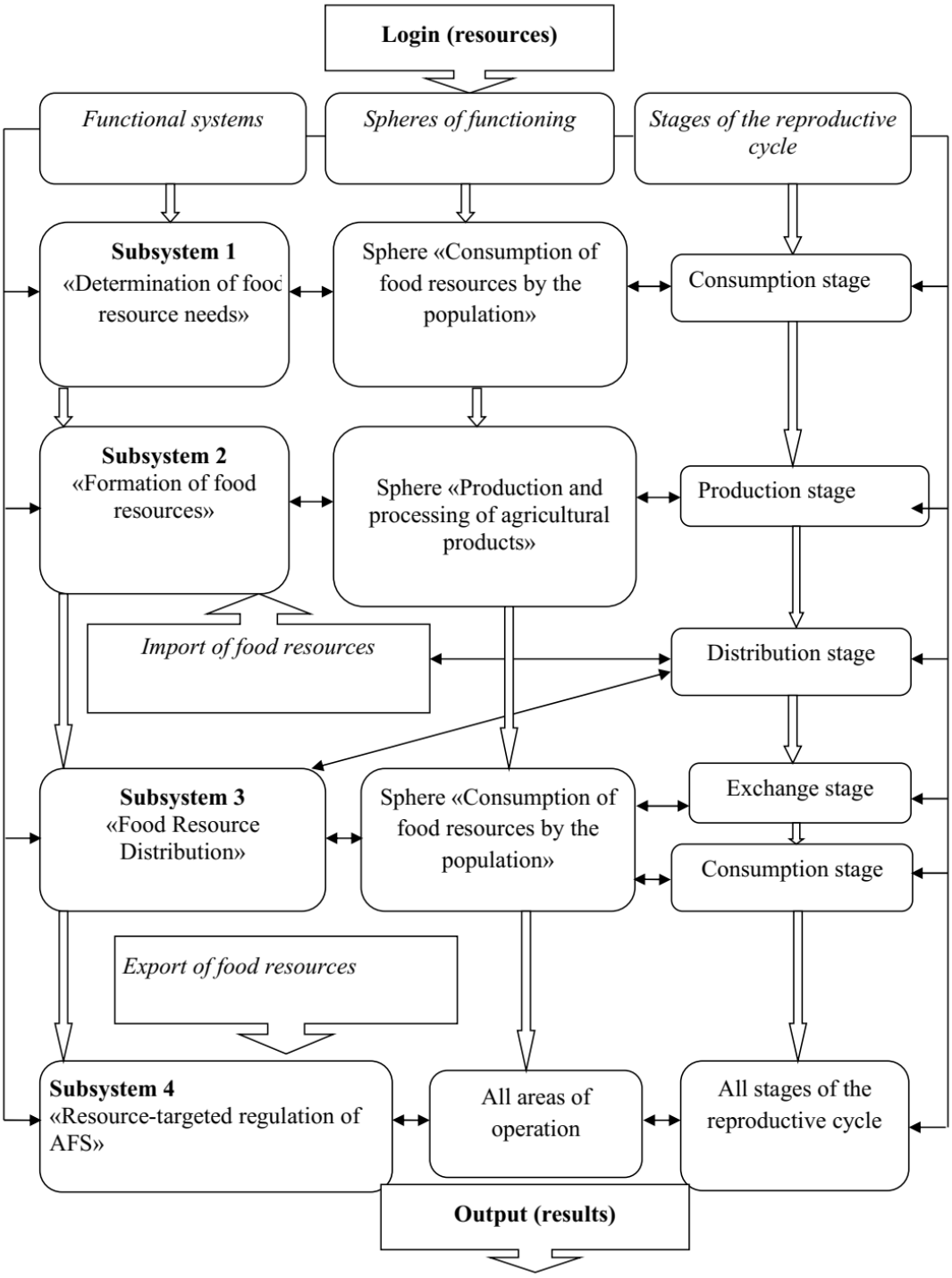

Fig. 1. Reproductive and functional structure of the agri-food system

Source: constructed by the author.

It should be noted that the functioning of the AFS within the reproductive cycle is carried out on the basis of specified parameters of place and time, as well as the determining criterion of reasonable physiological norms of food consumption for humans. Obviously, it is impossible to find identical agro-food systems in different regions, each of them has its own characteristics.

Institutional and functional elements of the AFS are closely related, since certain functions in the reproductive process are performed by the corresponding institutions. Functional elements (links) are spheres and subsystems, which are areas of performance of specific functions by the corresponding institutions at certain functions by the corresponding institutions at the corresponding stages of the reproductive cycle.

The functioning of the agro-food system is oriented towards the full (according to medical standards) provision of the population with basic food products, which, according to the law of synergy, are most successfully carried out through the interaction of all subsystems. As the main resource element in the formation of food resources, local production and processing capacities of agricultural products should be considered. Economic science has substantiated that it is economically expedient for the region (local territory) to produce types of agricultural products with reasonable costs, except for poorly transportable products.

In the subsystem «Distribution of food resources» the exchange (purchase-exchange) and consumption of food products is carried out based on the use of distribution infrastructure organizations. Consumption parameters depend on the physical and economic availability of basic food products for the population and are determined by the level of satisfaction of their needs in accordance with rational norms. Physical availability (actual availability of food in retail chains) is primary, if it is not provided in a certain territory, then economic availability cannot be ensured. In turn, economic availability is determined by the solvency of end consumers to purchase the necessary (according to rational norms) volume and assortment of food products.

That is why in the AFS, in order to coordinate and synchronize the functions of all its links, a special role is assigned to the subsystem «Resource-target regulation of the agro-food system», which performs the function of coordinator of effective cooperation of all subsystems to achieve a synergistic effect in the process of implementing certain goals through rational use of production potential. In accordance with the requirements of the law of information-ordering, an indispensable condition for the successful interaction of the elements of the AFS is infocommunication support, which is implemented by the subsystem «Resource-targeted regulation of the agro-food system». The organization and orderliness of information form a reliable, reliable basis for the analysis of the quantitative and qualitative parameters of the AFS and allow the adoption of justified measures to solve the relevant tasks. In modern conditions, infocommunication processes in any system, in particular in the AFS, are carried out on the basis of digital technologies, which also contributes to increasing the efficiency of all links of the system.

According to the law of synergy, conflicts in the AFS can be resolved within the following approaches: the goals of the system dominate, that is, the interests of the elements of the system must be subordinated to its main goal; the dominance of the goals of certain subsystems, that is, the system takes into account the interests of all or some of its elements; the dominance of the goals of the external environment, that is, the goals of the system are determined by the requirements of the external environment.

Depending on the characteristics of the relations between the participants of the AFS, it is possible to distinguish models of its behavior, namely: active behavior - an important role is played by the own goals of the agri-food system, capable of causing changes in the external environment in accordance with needs; adaptive behavior - determined by the external environment and the function of self-regulation; reactive behavior - determined mainly by the external environment. Therefore, the development of the AFS as a set of socio-economic institutions can be based on any model of behavior listed above, due to the variability of the external environment, which contributes to the dominance of certain goals. As a result, the AFS can demonstrate an active model, i.e. it independently induces changes in the external environment, for example, due to changes in the parameters of demand for certain types of food, the development of technologies in related areas and types of activity is stimulated (inter-sectoral aspect). At the same time, in certain periods, the AFS can adhere to a proactive model, namely, it accepts the challenges of the external environment, for example, with the objective influence of the bioclimatic factor on agricultural production. The system acquires a reactive behavior model when it accepts the requirements of regulatory and legal acts.

In the process of development, in order to achieve a balance of interests of all its subjects, the AFS is forced to respond appropriately to external impulses and flexibly adapt to the established rules and conditions of operation [15]. In this case, a model of adaptive behavior is acceptable, when development is carried out under the influence of the external environment and regulation is carried out through the function of self-regulation. Self-regulation of the AFS is

a necessary tool in order to achieve balanced regulation of the complex socio-economic development of the country or individual regions, rural areas.

We believe that together with the institutional and reproductive-functional structure of the AFS, it is advisable to consider its sectoral structure (Fig. 2). The formation of the sectoral structure of the AFS is based on the elements of the classifier of types of economic activity (KVED). The sectoral structure complements the institutional and reproductive-functional structure of the AFS, since it allows for a comprehensive study of how the social division of labor occurs, agro-food chains function, and added value is formed at the level of each participant.

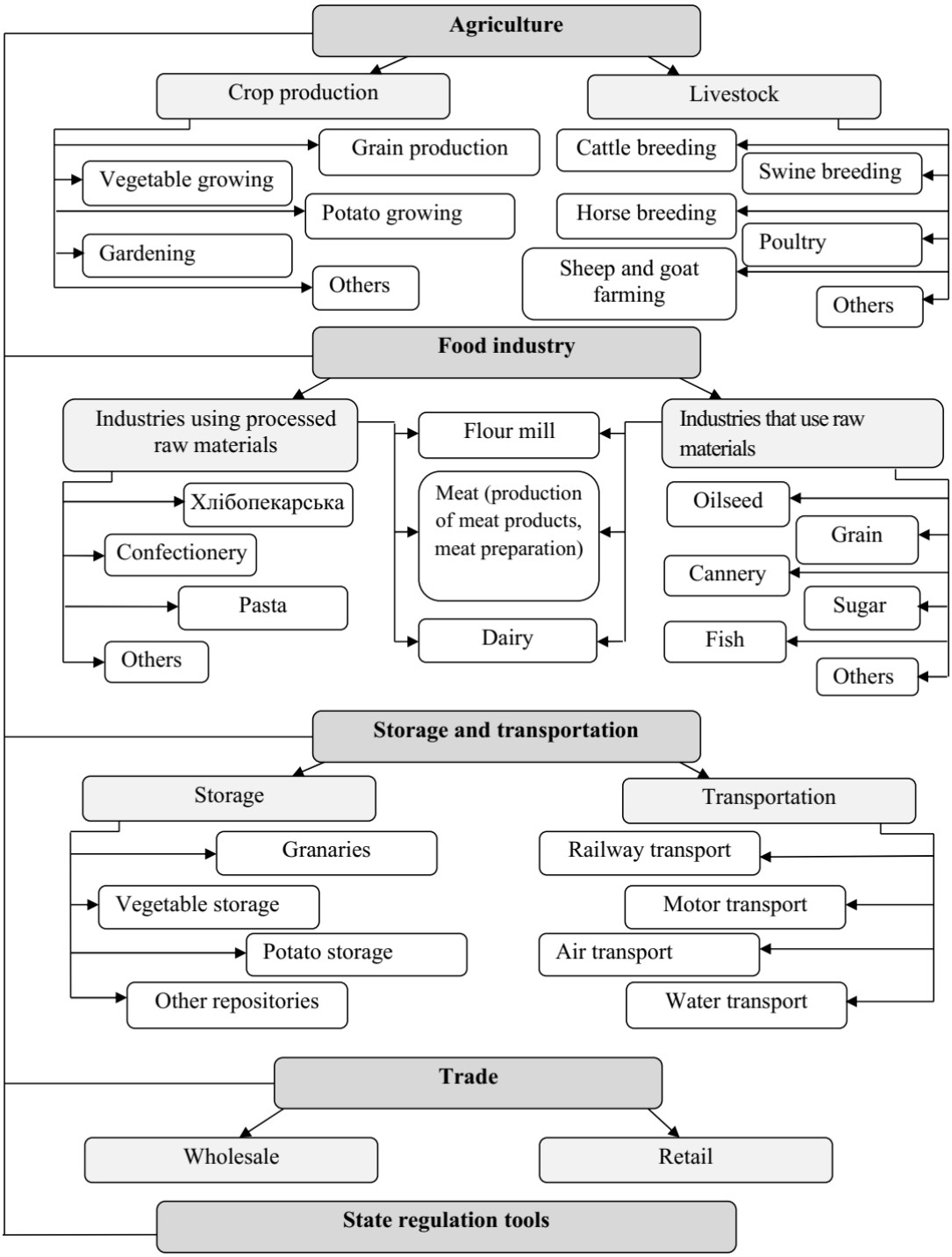

Fig. 2. Sectoral structure of the agri-food system

Source: constructed by the author.

It is obvious that the organized interaction of groups of participants in the agri-food system in the process of exchanging resources, information and other benefits contributes to the formation of so-called food chains, which are characterized by a set of economic agents and infrastructure facilities, consistently interacting in the process of moving food products from production to end consumers, forming production-technological and commercial relationships. Taking into account the principles of forming an institutional, reproductive-functional and industry structure, it is possible to present a generalized organizational and economic algorithm for the interaction of food chains (Fig. 3).

Under the condition of rational organization of agri-food chains, equivalent exchange relations of all participants are formed, which create added value, reduce transaction costs. Agri-food chains form the basis of the agri-food market, which is a complex of economic relations between food producers, intermediaries and consumers. Agri-food chains are dynamic systems that continuously adapt to changes in the production and processing of agricultural products, innovative technologies for sales, transportation and consumption of food products [16], especially taking into account the development of information and communication technologies, logistics services, and marketplaces that create added value.

The study of the composition, structure and system of indicators for assessing the state of the agri-food system in all its relationships confirms its strategically important organizational role in the development of rural areas, regions and sectors of the economy. The study of individual aspects of the theory and methodology for the development of the AFS as a systemic process that requires an effective organizational and economic regulation mechanism requires the definition of criteria and indicators for assessing its state and trends in its development.

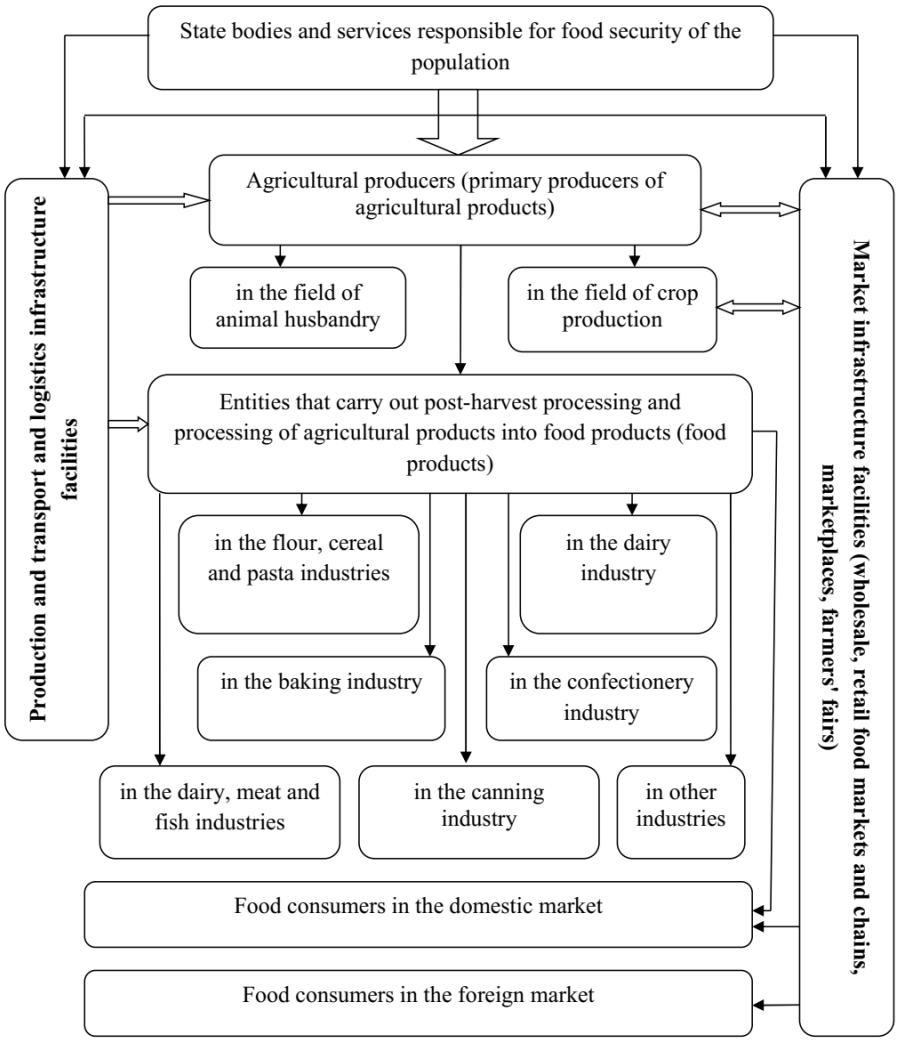

Fig. 3. Structure of agri-food chains in the agri-food system

Source: constructed by the author.

The issues of the methodology for assessing the AFS are of strategic importance for the system of state economic regulation and are widely presented in scientific research [17-19]. The generalization of scientific works allowed us to conclude that the main feature of assessing the AFS is the stability of providing the population of the country (region, local territory) with affordable food in sufficient quantities. It should be noted that in the methodology for assessing agri-food systems, most researchers propose to calculate the following indicators: the amount of consumption of individual types of food, the level of food security and the level of food self-sufficiency in terms of individual types of food [20]. We believe that it is advisable to assess the agri-food system by components of its functional areas and subsystems; indicators should characterize not only the state of the entire system as a whole, but also assess each subsystem. For this purpose, it is necessary to use a system of absolute and relative indicators that will allow us to obtain a comprehensive picture of its state and development trends.

Conclusions. It is substantiated that the development of national agro-food systems is under the influence of numerous destructive factors, Ukraine's war against Russian aggression, global climate change and others, which complicate the achievement of food security in the country and the overcoming of hunger in the world. Under such conditions, the issue of achieving balanced development of agro-food systems is relevant, which requires deepening the scientific principles of the functioning of the AFS in order to highlight its constituent elements and features regarding their goals, priority tasks and functions in food security of the country's population.

It is generalized that the agro-food system is characterized by the integrity of the set of elements that make up it, the orderliness of connections and relationships between them, as well as the presence of structured subsystems. Thus, the AFS as a set of economic entities that carry out business processes and activities from the production of agricultural products to its consumption, processing and disposal of waste, and also includes an institutional link that performs the function of regulation and coordination in ensuring its balanced development.

The agri-food system is characterized by cyclicity, continuity, periodic transformations and adaptations to environmental conditions. Its characteristic features are openness, relative instability, and under the influence of environmental variability, it periodically undergoes structural changes. The agri-food system is an important sign of achieving national food security. That is why, in order to positively influence the development of the agri-food system, it is advisable to use rational instruments of state regulation, the justification of which should be based on a scientifically sound methodology for qualitative and quantitative assessment of the parameters of the state and its development.

It is proposed to consider the agri-food system as an organized socio-economic structure as part of social reproduction. The study substantiates the structure of the agri-food system using an institutional, sectoral, reproductive-functional approach. It is concluded that the reproductive-functional approach is valuable for the development of organizational and economic levers of influence on the AFS, since according to it four links (subsystems) are distinguished: determining the needs for food products, forming food products, distributing food resources, and resource-target regulation. The agri-food system develops within the components of this structure, that is, the spheres of operation of subsystems and stages of the reproductive cycle. At the same time, each of the subsystems, in the process of functioning, implements its own specific functions and is focused on achieving the main goal of the AFS - providing the population with food products in accordance with scientifically substantiated medical standards.

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Наукові засади формування та функціювання агропродовольчих систем в сучасних умовах

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У статті узагальнено та поглиблено наукові засади функціювання агропродовольчої системи (АПС). Наголошено, що досягненню збалансованого розвитку АПС відводиться забезпечення ефективного розвитку всіх її складових елементів на основі раціональної галузевої структури згідно з вимогами продовольчої безпеки країни. Доведено, що продовольче забезпечення населення країни необхідно досліджувати не лише з позиції його сутності як бізнес-процесу, а також з точки зору системного підходу – як агропродовольчу систему.

Проведено аналіз структури АПС на основі інституціонального, відтворювально-функціонального та галузевого підходів. Розкрито, що використання системного підходу при дослідженні структури АПС вимагає дотримання таких принципів: цілісності та єдності; ієрархічності побудови; структуризації, що дозволить розглядати АПС як цілісну сукупність елементів, для якої властивими є впорядкованість зв'язків та відносин, а також наявність структурованих субсистем.

Узагальнено вплив законів організації систем на АПС у статичному та динамічному контекстах, що поглиблює теоретичні та методологічні засади функціювання системи. Зроблено висновок, що інституційна структура АПС охоплює учасників із певним рівнем свободи та власними цілями, а також суб'єктів, які координують їх діяльність.

Уточнено теоретичну сутність АПС із урахуванням циклічного характеру відтворювального процесу як сукупності взаємопов'язаних ланок – субсистем та компонентів, які функціюють в єдності принципів та підпорядковані досягненню єдиної цілі. Обґрунтовано, що галузева структура доповнює інституційну та відтворювально-функціональну структури АПС, дозволяє комплексно дослідити суспільний розподіл праці, агропродовольчі ланцюги та створення доданої вартості на рівні кожного учасника.

Ключові слова: агропродовольча система (АПС), інституційна структура АПС, функціонально-відтворювальна структура АПС, галузева структура АПС, продовольче забезпечення, агропродовольчі ланцюги.

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