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AGRICULTURAL ECONOMICS

TEXTBOOK

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The features of agricultural development in Ukraine are highlighted. Much attention is paid to the problems of increasing the efficiency of land and material resources utilization, as well as the main directions of agricultural development on the basis of intensification of production, deepening of specialization and concentration, rational use of natural resources.

For university students, bachelors, specialists and masters.

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CONTENT

INTRODUCTION

In recent years, the rural economy has reached a stable positive dynamics all over increasing rates of development . The formation of the structure of production and the system of its organization in the process of agrarian reform were almost completed . Further development of the industry , which is one of the most important in the economy of Ukraine , needs high-quality transformations that are capable of improving the competitiveness of agricultural production and food security of the state .

Execution of the tasks associated with formation of the scientific world , requires systematization of theoretical , methodological and applied aspects of the economy of the rural economy as a special branch of knowledge , which examines the socio-economic side attraction of financial and natural capital in the reproduction process . According preparing training manual and on the economy of the rural economy, in view of modern trends of development , is urgent and important work in this field .

The manual, designed according to the educational program of discipline "Economics of rural economy" and consists of entry and 1 8 topics that logically grouped into three thematic sections . Training orientation handbook requires compliance with specific requirements as regarding the structure and semantic parts. In compliance with specified requirements in the first section of the manual reveals the scientific bases of formation of economy of the rural economy as a special field of expertise , after which contains separate sections , which reveal its contents and the relevant components .

The substantive part of the first section of the textbook includes ten logically related topics that formulate the conceptual foundations of the agricultural economy as a science, material resources of this industry , the state and level of use of the main means of production - land resources . Were shown problems of rational use of other natural resources, which ensure the effective functioning of the rural economy on the principles of sustainable development and the greening of the industry .

The second section of the training manual includes four topics are devoted and economy sectors of crop. In particular, using a large array of statistical and scientific information reveals the state, current trends and economic efficiency of production of cereals, industrial crops, potatoes, vegetables, fruits and berries .

The third section of the peer-reviewed paper also presents four topics that logically reveal the scientific basis for the functioning of livestock industries. In this section thoroughly examined economics of production and use of feed as foundations for successful development of the industry. Particular attention is paid to the economic evaluation of fodder crops, feeds and diets and ways to optimize feed costs, which currently occupy the largest share in the cost structure of production in the industry. In these subjects solved the issue of development, allocation and economic efficiency of the production output of beef and dairy cattle, pig breeding, poultry farming. Paid attention to other sectors of livestock, in particular, sheep breeding, goat farming, beekeeping, which to some extent is a niche in today's conditions , however , are significant prospects for further successful development of the agricultural sphere .

Each theme educational handbook backed questions and test tasks , which give the opportunity to better assimilate presented material and perform a self-test of knowledge . Logically training manual completed glossary of basic economic terms , which provide a clear understanding of their content .

Objective need for creating theoretical and methodological framework of stabilization and further development of the national agricultural sector makes to the student youth and graduate students need mastery of fundamental knowledge of economic , social , environmental , technological problems functioning field of rural economy .

With the development of entrepreneurship and competition only highly qualified professionals in a position to provide the intensive development of the rural economy and its industries , high profitability and competitiveness of agricultural products . In terms of today's professionals rural economy must have advanced knowledge of the conditions of production on the basis of innovative developments , to anticipate the prospects of agribusiness with regard global and national trends in economic development . A key challenge is the need for formation in the Ukraine , already in the short term , innovative model of rural economy , capable to ensure its sustained rapid growth .

Co-authors of the textbook are: Professor Rogach S.M. - introduction , topics - 1, 3 , 6, 10 ; Associate Professor Sulima N.M. topics - 7,8,9,11,14,15,17 ; Associate Professor Gutsul T.A. topics - 4,5,13,16,18 ; Associate Professor Ilkiv L.A. topics a - 2, 12.

SECTION 1. AGRICULTURE DEVELOPMENT AND LOCATION

THEME 1. SUBJECT MATTER, METHOD AND TASKS OF SCIENCE

1.1. Agriculture as a branch of national economy

1.2. Features of agricultural production

1.3. The subject and tasks of science

1.4. Research methods of agricultural economics

1.1. Agriculture as a national branch of agriculture

The countryside occupies an exceptional place in the socio-economic development of the country. It is one of the main spheres of the national economy that provides food and is a crucial condition for the development of society. Agricultural products and manufactured goods made from agricultural raw materials make up 75% of the consumer consumption fund.

The leading role in the development of the productive forces of the country belongs to the fields of industry, but an indispensable means of social and economic advancement is to increase the efficiency of agriculture.

Ukraine, by its productive potential, is an agricultural country, in which the land is the major and decisive asset and the basis for the development of the agricultural sectors. Therefore, solving the agrarian question is the key that unlocks all the directions of revival and development of our country's economy.

The development of agriculture is characterized by the volume of production of its gross production and the rate of its growth. Average annual production of gross agricultural output (at comparable prices in 2010) increased from UAH 179.7 billion. in 2005 to UAH 249.2 billion. in 2017, or 1.4 times (Table 1.1). Gross output (at comparative prices in 2010) also increased in agricultural enterprises (from UAH 72.8 billion to UAH 140.6 billion or 1.9 times) and in households (from 106.8 UAH billion to UAH 108.6 billion or 1.1 times).

Table 1.1

Gross agricultural production in different categories of farms

(at comparative prices in 2010, billion UAH)

Indicators	2005p.	2010 p.	2015 p.	2016 p.	2017 p.	2017 in % to	
						2005.	2010.
All categories of enterprises							
Gross production,	179,7	187,5	239,5	254,6	249,2	138,7	132,9
inculding plant growing	114,4	120,6	168,4	185,1	179,5	156,9	148,8
animal husbandry	65,3	66,9	71,0	69,6	69,7	106,7	104,2
Agricultural enterprises							
Gross productions,	72,8	90,8	131,9	145,1	140,6	193,1	154,8
inculding plant growing	55,7	64,9	99,6	113,4	108,6	195,0	167,3
animal husbandry	17,1	25,9	32,3	31,7	31,9	186,5	123,2
Households							
Gross productions,	106,8	96,7	107,5	109,5	108,6	101,7	112,3
including plant growing	58,8	55,7	68,9	71,7	70,9	120,6	127,3
animal husbandry	48,0	41,0	38,7	37,9	37,7	78,5	92,0

[1] Hereinafter, data for 2010-2017 are given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, Sevastopol, as well as for 2014-2017 without taking into account part of the temporarily occupied territories in Donetsk and Luhansk regions.

The level of agricultural production determines the pace of development of the country's economics as a whole. More than 60% of agricultural production comes from the processing industry, which accounts for about 30 light and food industries.

The main tasks of agriculture are to ensure intensive development and increase the efficiency of all industries in order to increase production and improve the quality of production, while providing greater incentives for production.

Resolution of this problems depends on usage of scientific and technical progress, deepening of agricultural relations with all branches of agriculture, radical transformations in economic relations and intensification of social redevelopment of the village.

1.2. Features of agricultural production

The aggregate of industries of the national economy becomes the economy of the country. All sectors of the national economy are differentiated by environmental laws that will operate in society. At the same time, rural economies have specific environmental and social-economic features that distinguish them from other industries and determine the specificity of the effects of objective environmental measures, in particular:

1. Agriculture is differentiated on the basis of different ownership forms and types of management. In 2017, 50184 enterprises were founded in the rural economy of Ukraine.

The level of management and the nature of the economic isolation of these economies determine the specific features of their relationship with the state and certain differences in the ways in which the mechanism of action of the economic measures is used.

2. Unlike other sectors of material production, land in agriculture is the main and indispensable source of production. With the rational use of agricultural products in the process of production, the land properties are not only preserved but also improved. This peculiarity of the land for the sake of production is one of the rational systems of agriculture.

3. The economic process of opening up in agriculture is closely linked and invariably intertwined with the natural process of development and reproduction of plants and animals (and they are the means of production of this industry). In order to increase the efficiency of agricultural production, it is necessary to take into account the effect not only of economic measures, but also of the nature, for example, biological features of opening animals. This peculiarity of agriculture determines the specificity of agricultural production technology.

4. The significant difference between the production period and the production period of the agricultural production leads to its seasonal nature. The manufacturing period is determined by the time the product is in the production, and the working period is only the time during which the product is exposed to labor. Moreover, the period of production involves the time of direct action of human labor, and also time, if it is carried out on the basis of growth and development of living organisms and does not require laborious expenses.

The seasonal nature of agricultural production causes the uneven use of production power, machines and implements, the receipt of production and the receipt of benefits from its implementation.

5. Agricultural production in the area of production is dispersed, resulting in large volumes of domestic transportation of goods (grains, feeds, fertilizers, consumables and supplies).

6. Unlike production, part of the production obtained is used in a further manufacturing process as a means of production. These are seeds, feeds, animal feeds and other products that account for more than 20% of the agricultural output of the farm. Therefore, increasing the volume of agricultural products depends not only on the efficiency of the production means of production but also on the productivity of the means open to the industry. Other agricultural products cannot be completely factory-owned, and farms need to have specialized premises and storage facilities for production stocks.

7. Natural minds are an extraordinarily important factor in manufacturing, with a great deal of influence on the final results and the level of its efficiency. Production is created in the process of production as a result of the natural functioning of living organisms - plants and animals. The non-standardity of the objects of labor complicates the manufacturing process and poses special requirements for the formation of the machine system.

Moreover, the specificity of agricultural production has an objective character. In this connection, the differences between industry and agriculture remain, and the industrial development of agriculture will never have all the characteristics that are inherent in agriculture.

The peculiarities of agriculture as a national industry determine the structure of production, the level of supply and use of technology, the composition of labor force, the nature of the division of labor and the form of its organization, the determination of the complexity of the organization. Hence the peculiar nature of the effects of environmental protection in agriculture, the specificity of its opening and development.

1.3. The subject and tasks of science

Economics is a group of productive relations of people in the process of social production, which supports the actions of objective economic laws. All branches of material production differ from the basic actions of joint environmental laws, however, the concept of "general production" does not exist in society. Manufacturing is organized and operated in the form of industry-specific industries to produce certain products. Moreover, agriculture as a sector of material production has its own peculiarities, which determine the specificity of the action of environmental laws and the specific form of their manifestation.

Agricultural economics is a science that studies the effect of objective environmental laws and the forms of their appearance in agricultural production. This science, first of all: explores the effects of environmental laws in agricultural production with a view to their use in the public interest; studies the intricacies of the development of agriculture and selected industries, as well as the various forms and types of management; summarizes the scientific achievements and experience of the previous practices in agriculture, which make it possible to justify prospective directions of development of the industry.

The ecology of agriculture opens up the system of economic relations in the industry and substantiates the main directions of their improvement. The production relations are realized through the interests of the respective subjects, who enter into certain relations in the process of agricultural production.

The system of production relations in agriculture includes:

- State-agricultural relations with the organization and planning of procurement of production, logistics, pricing, financing and credit, level and form of involvement of agricultural enterprises in establishing a business center;
- relations between agriculture and other branches of agro-industrial complex of organization of supply and repair of machinery and equipment, land reclamation, agrochemical services, transportation, storage, transportation;
- relations between agricultural enterprises in the minds of international cooperatives on the organization of joint production and participation in the creation of profit sharing, as well as in the implementation of social activities;
- relations between agricultural enterprises and their internal subdivisions on the organization of production and material and technical support, collective leasing, on the issues of participation of employees in the creation of workers;
- relations between agricultural enterprises and their workers in the organization of production, issues of creating safe minds and appropriate remuneration, renting and providing social services.

The aggregate of these and other productive relations constitutes the economic structure of agricultural production and is a form of development for its productive forces. If the production relations correspond to the nature and the level of development of the productive forces, they stimulate scientific and technological progress and increase the efficiency of the agricultural production. Otherwise, productive relationships inhibit the development of productive forces.

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Agricultural economics explores productive relationships in close interaction and interdependence with the development of productive forces, examines changes in their development, generalizes the ancestral economy and widely utilizes the science of agriculture.

As a science, it studies industrial relations in the field, its interconnection with other spheres of material production, and generalizes its new economic phenomena, the ecology of agriculture is the development of agricultural implications and the interests of agriculture.

The main tasks of agricultural ecology are:

- justification of measures to increase the efficiency of agricultural production, in order to improve the use of land, production costs and labor resources;

- justification of intensive and economic safe agricultural development paths through innovative activities;

- determination of the efficiency of new machines and their systems, agricultural, engineering and veterinary measures implemented in the manufacture of new machines;

- solving the problems of further development of specialization and concentration of production and transfer of it to the industrial base;

- the economic grounding of rational inter-company formats for the management and agro-integration in the minds of market relations.

1.4. Research methods of agricultural economics

The economy of agriculture, similar to other sciences, involves the use of special methods of research. Identifying and studying the patterns of agricultural development are impossible without knowing the methodology of the research. The method of science involves the aggregate of means, methods and techniques of studying economic phenomena. In economic science, the method determines the content and sequence of scientific research. Methods and techniques for collecting and collecting statistical data (facts), their processing and calculations are developed, as well as the presentation and interpretation (interpretation) of research results. However, the collection and study of facts is only the beginning of scientific inquiry. On their own they do not reveal the essence of the phenomena, the intricacies of their movement and development. Such a systematization of the data is necessary, which would be able to identify the significant sides of the economic phenomena and to reveal the objective and intricate links between them.

In the economics of agriculture, the following basic methods of research are used: statistics- economic, monographic, calculation-constructive, balance-sheet, experimental and -economic. The essence and the intricacies of the development of economic phenomena are studied for the purpose of combining various methods that constitute the methodology of economic studies.

Statistics- economic methods are intended for the study of large-scale economic phenomena in agriculture. These are methods of analytical groups (simple, combinational), variance, correlation, regression, index, etc. According to their results, they make certain theoretical generalizations and form practical recommendations for production.

The mono graphic method is used in the study of particular economic phenomena. Provides a comprehensive and accurate analysis of the use of advanced methods and techniques of agriculture, the achievements of scientific and technological progress, to summarize the advance experience, to predict the development of science.

The method of calculation is used when projecting and planning the development of the industry and its components for the future. For the purpose of this method, they determine the force of action and the directions of development of the detected patterns, calculate and justify the solution of certain problems of agricultural economics.

Balancing method - the basic method of coordination and mutually agreeing of all the characteristics that reflect the essence of the investigated phenomena and thoughts and for the optimal development. This method is used to justify the attractiveness of livestock development and its feed base, to increase the production of agricultural produce and the potential for its processing.

The experimental method is intended to substantiate and practically test the economic efficiency of individual steps. To this end, economies are being created to introduce and study the effectiveness of new organization and pay structures, to deepen the specialization of manufacturing, to use proven technology, and to learn the lessons of.

Eco-mathematical methods with the use of computers guarantee the highest quality of studies of economic phenomena, in particular, to determine the optimal paths for the development of the industry. The correlation analysis allows us to identify quantitative relationships between many factors and outputs. The method of linear programming determines, for example, the optimal level and structure of animal husbandry, the rational structure of the herd in certain minds, the efficiency of the placement of production of certain types of agriculture, the concentration of animals.

QUESTIONS FOR SELF-CONTROL

1. What is the importance of agriculture in the economy of Ukraine?
2. Why is agriculture less attractive to investors?
3. Justify the origin, development and economic importance of different types of management?
4. What are the consequences of farming in agriculture?
5. Identify new forms of management and prospects for their development?
6. What are the features of agriculture that distinguish it from other sectors of the national economy?
7. Why is agriculture characterized by the seasonal nature of production?
8. What is the subject of study of the science "Economics of Agriculture"?
9. Describe the basic methods of research of the science "Economics of Agriculture".
10. What are the main tasks of the agricultural economy?

TEST TASKS

1. What indicators characterize the importance of agriculture in the Ukrainian economy?

1) the number of tractors and cars in the industry;
2) acreage of crops;
3) livestock of productive livestock;
4) the mass of national income generated in agriculture.

2. Features of agricultural production:

1) the economic reproduction process is related to the reproduction of machines and implements;

2) agricultural products are processed for processing into the respective sectors of the national economy;
3) agricultural products are produced for consumption;
4) part of agricultural production is used in the next production process as a means of production.

3. Why is agriculture marked by the seasonal nature of production?

1) part of agricultural production is used in the next production process as a means of production;
2) the working period does not coincide with the period of production of agricultural products;
3) the natural conditions of agricultural production;
4) land is the main means of production.

4. The agricultural economy is:

1) the science of national wealth and ways of its multiplication;
2) science, which studies the attitude of people to the means of production in the process of using them to create material goods;
3) science that studies the effect of objective economic laws and the forms of their manifestation in agricultural production;
4) a science that studies the development of the productive forces of agriculture.

5. Research methods of agricultural economics:

1) statistical and economic;
2) intense;
3) extensive;
4) tariff qualification.

6. Identify forms of ownership of agricultural production in Ukraine:

1) rental;
2) group;
3) private;
4) Brigade.

7. The most common forms of farming in Ukraine's agriculture:

1) farming;
2) an association of tenants;
3) agricultural firm;

4) the state plant.

8. The level of agricultural production determines:

1) the main tasks of agriculture;
2) the pace of economic development;
3) the level of scientific and technological progress;
4) the value of gross output.

9. The economic process of reproduction in agriculture is closely linked to:

1) updating of the material and technical base;
2) the natural process;
3) production technology;
4) restoration of land resources.

10. The system of industrial relations in agriculture covers the relations between:

1) agriculture and industry;
2) agricultural enterprises and their subdivisions;
3) agricultural enterprises and their employees;
4) the state and the enterprises.

THEME 2. AGRICULTURAL INFRASTRUCTURE

2.1. The essence and importance of infrastructure in agriculture

2.2. Economic importance of industrial infrastructure

2.3. Social infrastructure and its importance in the development of agriculture

2.1. The essence and importance of infrastructure in agriculture

The functioning of any economic branch system in the production of a specific product (ware or service) which relies on certain resources ("raw material base") is impossible without a necessary infrastructure ("material and technical base", which helps to carry out the chosen type of activity). Therefore, in the conditions of further improvement of the technical base, the issues of enterprise infrastructure development (rational organization of supportive and servicing processes) are becoming increasingly important.

The concept of infrastructure in science dates back to the late 1950s – early 1960s. The term "infrastructure" (from the Latin "*infra*" – "below, under" + "structura" – "structure, location") was originally used in the military lexicon and meant a set of rear (supportive) structures that ensure the actions of the armed forces. In the economic literature, this term appeared in the writings of foreign scientists, characterizing the complex of industries serving industry and agriculture (construction of highways, canals, ports, bridges, airfields, warehouses, rail, communications, energy and water supply, sewerage, general and vocational education, science costs, health care, etc.).

With the development of the social division of labor and the increasing role of service units in the 1950s, works of R. Nurkse, P. Rosenstein-Rodan, A. Hirschman, A. Jangsson etc. were published, and the understanding of infrastructure as an supportive entity was maintained. Also, an attempt was made to substantiate its importance for the effective functioning of production.

Scientists who have investigated this issue, understand the term "infrastructure" as the general conditions for the functioning of material production and the effective solution of social problems, that is, the most general conditions for the process of social reproduction. The emergence of separate infrastructure elements is associated with the development of productive forces and the deepening of the social division of labor, when the natural conditions of production activities were supplied by artificially created due to the need for preparatory and final processes and the organization of manufactured product circulation. At the same time, the maintenance of the society members was an objective necessity to support its life. It was the increasing importance of the general conditions of the reproduction process that led to the emergence of the concept of infrastructure. The basis of highlighting the infrastructure in an economic complex is its functional purpose, which is to create the conditions to meet a wide range of needs of society, population, production.

Therefore, infrastructure is a set of components of an object that have a subordinative and supportive nature and provide the conditions for the normal operation of the object in total.

In the narrow sense, infrastructure is a complex of structures and lines of transport, communication, engineering equipment, as well as objects of social and cultural and public services for the population, which ensures the sustainable development and functioning of a territory.

In a broad sense, infrastructure is an inter-structural (systemic) unit whose activity is aimed at creating conditions for the functioning of a higher system, as well as supporting its sustainable and efficient development.

Thus, infrastructure is a collection of branches and types of activity that serve the economy and production (transport, communications, utilities, general and vocational education, health care, etc.). It includes the main structures and services, in particular, sewerage, water supply, electricity supply, which ensure the development of separate settlements and the economy as a whole, as well as the construction of roads, canals, ports, bridges, warehouses, energy facilities, communication systems, etc.

Attributes, by which infrastructure is classified:

- by function (productive and non-productive)
- by the scale of action (international, national, regional or branch, separate enterprise)
- by the type of services provided (transport, accommodation, information, innovation)
- by economic activity type (industry, bank, business, etc.)
- by branch (industry, agriculture, construction, etc.).

In general, the infrastructure is divided into certain types, as shown in Fig. 2.1.

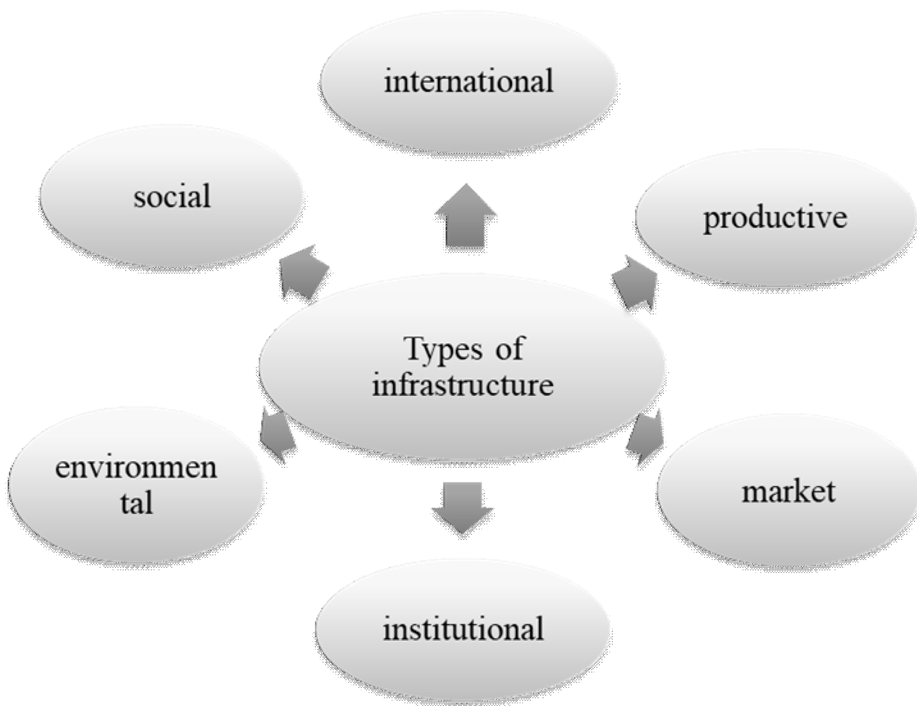

Fig. 2.1. Types of infrastructure

In particular, international infrastructure includes the Internet, elements of the country's transportation system, and facilities and facilities serving foreign economic activity and international connections.

Environmental infrastructure includes environmental protection facilities, protective plantings, wastewater treatment plants, ecotechnological interchanges (e.g. passageways for animals under overpasses, bridges), land reclamation systems, and so on.

The institutional structure includes different types of institutions: households, public administration bodies (committees and commissions of the Verkhovna Rada, Cabinet of Ministers of Ukraine, state apparatus of economic regulation, treasury).

The components of market infrastructure are commercial banks, commodity, labor and stock markets, business centers, audit firms, trading houses, business associations.

Scientists mainly identify two main types of infrastructure of a community life: social, used by society (population, to meet their own needs of consumers) and productive, used in industrial processes. We will cover more about them in the following sections.

The development of infrastructure in agriculture, its dynamics, trends, patterns are determined by a set of factors that significantly affect a specific branch as a system. The end results of agro-industrial production depend not only on the level of agricultural development, but also on its supportive industries. With the increase in agricultural production, the use of different types of resources and raw materials is increasing; the need for farms for electricity, transport, communication facilities is increasing; the dependence of agricultural production on the development of repair and technical services, organizations of logistical supply, etc. is increasing. Equally important is the development of branches and industries that help to obtain the required volumes of agricultural products and organizations that ensure the efficient use of products and bring it to the consumer.

Agriculture infrastructure is a complex of supportive and additional branches, facilities and activities that create the conditions for the functioning of agriculture by providing both services of productive nature by specialized units, and to meet the needs of the population in social services.

According to M. J. Horunji, infrastructure should be understood as an aggregate of elements of productive forces in the form of branches, facilities and activities that provide integrity both to the entire national economy and to its separate spheres and complexes, whose functional purpose is, firstly, in the creation of general conditions for the effective functioning of basic production, and, secondly, for the reproduction of labor.

From the definition stated above, it follows that knowledge of an infrastructure nature, peculiarities of formation and functioning becomes particularly important, since any positive changes in the organization, technology and production management are possible only if they will simultaneously be given an appropriate system of service.

Functionally, the infrastructure of agriculture is divided into social and productive.

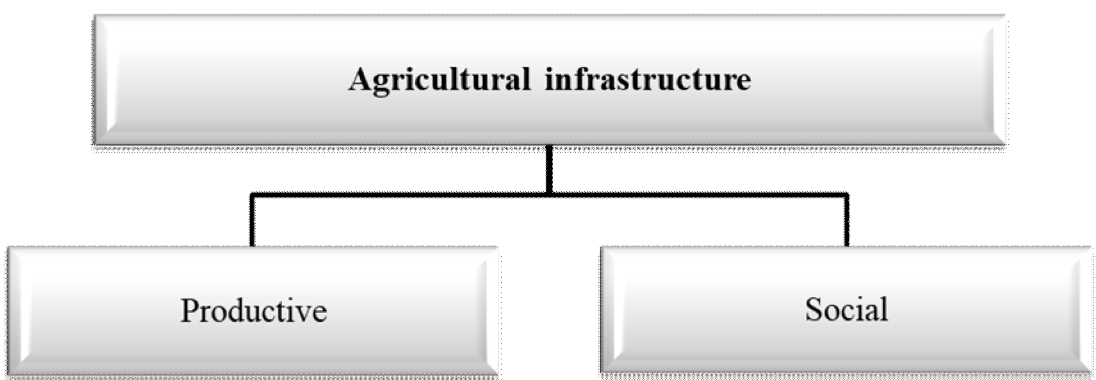

Fig. 2.2 Classification of Agriculture Infrastructure by function

Currently, the level of provision of agriculture with social and industrial infrastructure remains extremely low, namely:

1) the educational, cultural and social opportunities of the rural population are decreasing, which contributes to the boosting of negative demographic processes, especially the outflow of rural youth into large industrial centers, the asocial behavior of rural folk;

2) the network of medical establishments in the countryside is decreasing, the provision of medical care is complicated due to the lack of roads and telephone communications (the crisis state of health care is reflected on the life expectancy);

3) the life quality of the majority of the rural population decreases, increasing the imbalance in the development of the city and the village;

4) rural unemployment is rising.

This situation with the use of objects of social and productive infrastructure of agriculture:

1) leads to the degradation of the Ukrainian village, which contributes to the following effects: recession of agricultural production; violation of reproductive processes in the agroindustrial complex; formation of unfavorable economic conditions for agricultural activity; increase of social tensions in rural areas; reducing of the welfare level of the rural population;

2) substantiates the necessity of state participation in investment support of the social and productive development of the village, which in modern conditions should be directed not so much at increasing individual quantitative indicators of agricultural production, but at the ability of the agricultural sector to expanded reproduction, to achieve more complete satisfaction of social needs and quality of life rural population, conservation and multiplication of infrastructure.

State regulation, which is characterized by the balance of all agricultural systems and subsystems, remains the most important process of agricultural infrastructure development. This is a prerequisite for economic security in addressing the food program, the saturation and supply of domestic, environmentally friendly food products for the population of the country in the context of globalization of the world market system

2.2. Economic importance of industrial infrastructure

The agro-industrial complex of Ukraine is a leading cross-sectoral territorial production unit. The needs of the population for food production, its well-being strongly depend on the development level and balance the of its constituent spheres. One of the main factors on which the stable and rhythmic work of individual units and the entire economy of the complex depends is the production infrastructure.

Production infrastructure of the enterprise is a set of sub-units that do not directly participate in the creation of the main products of the enterprise, but their activities contribute to the operation of the main facilities, creating the necessary conditions (Fig.2. 3).

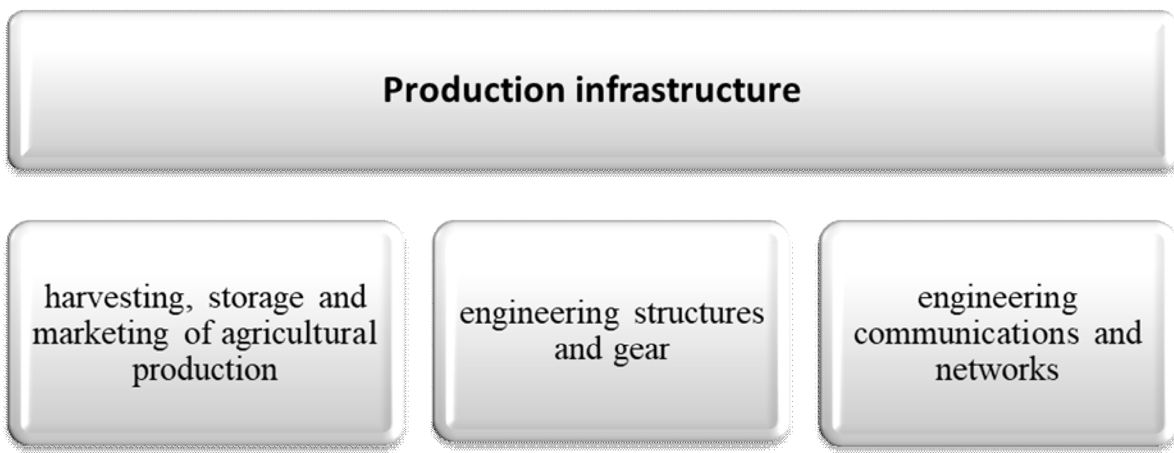

Fig. 2.3 Components of agricultural production infrastructure

Thus, the production infrastructure of the enterprise consists of:

✓ supportive and servicing workshops and facilities of the enterprise (repair, gear, energy, transport, warehouse facilities, etc.);

✓ supportive stations and services located in the main workshops;

✓ backbone facilities, communication networks, data collection and processing facilities, etc.

The composition and size of the objects of production infrastructure of enterprises depend on the branch, type and scale of production, features of structures and technology of production, the level of specialization of the enterprise.

In the sectoral structure of the agro-industrial complex, the infrastructure sector concentrates 8.7% of the number of industrial-production personnel, 11.0% of the value of fixed capital and concentrates 5.8% of the total volume of production of the complex, incl. production infrastructure – 2.9%.

The main components of the production infrastructure are: harvesting, transport and packaging, logistical and repair services, as well as agricultural-specific units – agrotechnical and veterinary services, plant protection services, etc.

The functional purpose of the production infrastructure regarding requirements of agriculture is to create normal logistical conditions for the successful development of basic production in all spheres of the agro-industrial complex.

The main task of the production infrastructure is to ensure the complete and rhythmic development of the main areas of the complex while creating the conditions for the effective use of its resource potential. Serving the basic production, the infrastructure must provide both the receipt of the required volumes of agricultural raw materials and their efficient processing and use.

2.3. Social infrastructure and its importance in the development of agriculture

A special place in ensuring the efficient functioning of agro-industrial production belongs to social infrastructure. It expresses the relationship between society and its members regarding the consumption of services (tangible and intangible) necessary to reproduce the aggregate workforce and guarantee the development of each human personality. As a component of the national economy, it is a set of branches whose functional purpose is to meet the needs of the population in services.

According to the peculiarities and functional role of the agro-industrial complex, its social infrastructure is a set of enterprises, institutions and authorities that provide socio-cultural and housing conditions of rural population in order to guarantee the restoration of skilled labor and stabilization of labor collectives [5].

Social infrastructure, as a rule, consists of divisions of catering, health care, kindergartens, educational institutions, housing and communal services, recreation, physical education and sports (Fig. 2.4).

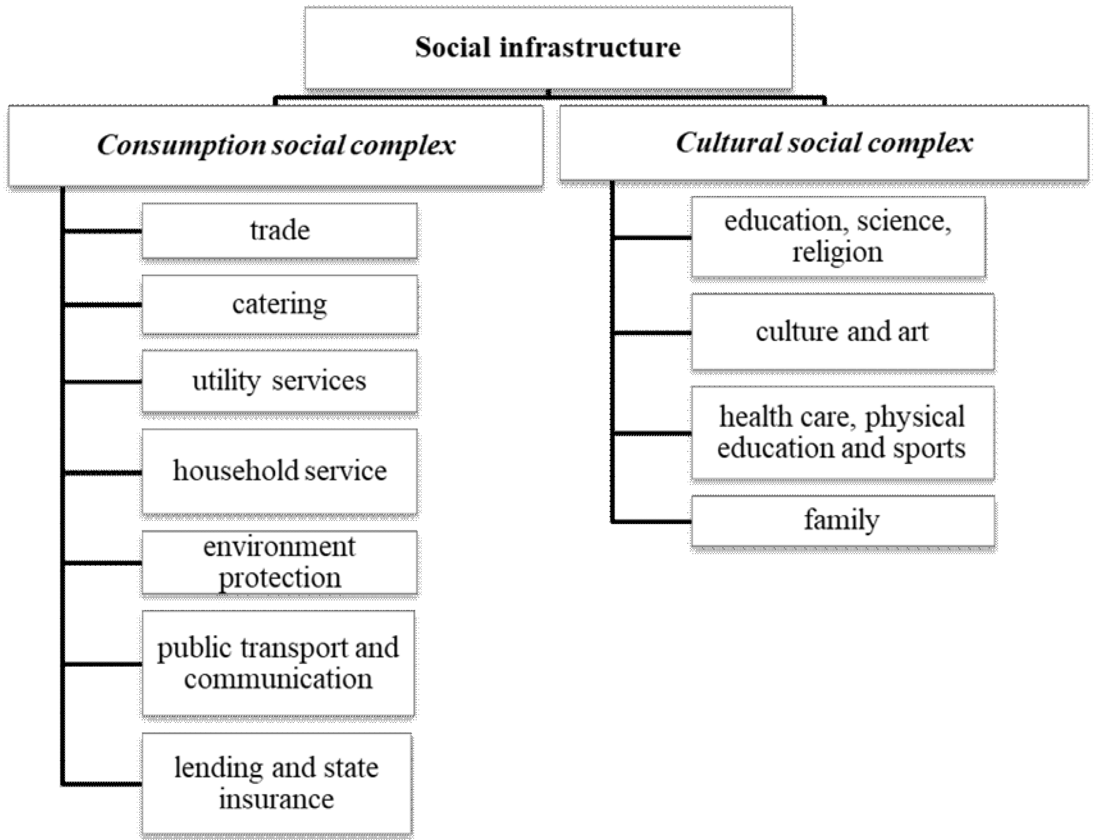

Fig. 2.4. Main elements of social infrastructure

Each branch of social infrastructure has its own organizational structure, forms of public service, mechanism of functioning, etc. All this causes the extreme diversity and complexity of the problems of social infrastructure development.

The activity of enterprises, organizations and institutions of social infrastructure is connected with the life activity of a person since he was born, whether he is educated in a preschool institution, studies in secondary schools, special secondary and higher educational institutions or works. At the same time, the results of activities of certain branches of social infrastructure are determined by the level of general and professional education of the population, its culture, health status, life expectancy, leisure time and its use.

The main functions of the sectoral composition of the elements of social infrastructure include:

- distribution and exchange (network of wholesale and retail enterprises, catering establishments, credit and insurance institutions);
- provision of consumer services (housing and communal services, household services, passenger transport, communication);
- health care (medical and recreational facilities, physical education and sports departments, social welfare facilities);
- formation of public consciousness and scientific outlook (network of cultural and educational institutions and facilities);
- management and protection of public order (public organizations and authorities, state authorities).

The state of the social infrastructure of agriculture depends largely on the level of agricultural production, but at the same time there is a reverse impact: the level of development of social infrastructure components depends on the level of production in the countryside.

The social infrastructure faces the following tasks:

✓ create conditions for productive employment and increase of incomes of rural population;

✓ radically improve the financial situation and increase the prestige of the rural intellectuals;

✓ strengthen the social protection of the most vulnerable sections of the rural population;

✓ ensure the stable functioning, development and improvement of the quality of social infrastructure.

The social importance of household services is determined by the fact that it provides a significant reduction in the time and labor of the population to maintain the household, personal hygiene, as well as organized satisfaction of individual needs of citizens, which can not be achieved through commercially produced goods. Household servicing of the population is carried out by those links of social infrastructure which increase production volumes mainly due to the increase in the number of employees. It is often impossible to use the advantages of concentration, mechanization, production automation.

Retailing and catering serve the direct satisfaction of the needs of the population in consumer goods. They not only bring the products of material production to consumers, but also shape the culture, forms of consumption, actively influence production.

Culture and art, as links of social infrastructure, are intended to satisfy the spiritual demands of the population, to develop abilities and high aesthetic tastes, to provide conditions for the spread and development of amateur folk art.

Functional purpose of the health care system is to increase the life expectancy and intense activity of people, to strengthen their health. The main goals of the educational branch are to accumulate knowledge and to create conditions for their assimilation by every member of society. The needs of both the individual in the knowledge of the world and society in a skilled workforce are met.

Increasing attention is being paid to the development of rural or so-called “green” tourism. Tourism promotes employment of rural population, development of market relations, international cooperation, involvement of Ukrainians and foreign citizens in learning about the rich natural and historical and cultural heritage of the region, and maintaining ecological balance.

The transition to market relations involves the development of new forms of ownership, changes in the organizational and legal forms of management in the areas of social infrastructure of rural areas.

There is an expansion of potential owners of social objects during the process of reforming of the social infrastructure of agriculture. These may include:

- municipal owner as a kind of state owner (ownership by territorial communities);
- state owner (state property transferred on a delegated basis to local councils);
- private owner (property transferred to municipal owners free of charge or sold into permanent private property to entities or persons, etc.);
- collective owner (property of a newly-established agricultural enterprise (successor) or property of a corporate owner (cooperative) of social objects in several settlements, villages, agricultural cooperatives, etc.);
- public owner (property of public organizations, political parties, etc.).

The objects of national ownership should include, first of all, recreational objects - sanatoriums, recreation centers, various sports facilities of national importance, cultural establishments, museums, reservations, campsites, transmission lines, communications, gas pipelines that may be delegated to local authorities only by delegated jurisdiction.

Communal property are usually kindergartens, comprehensive schools, hospitals, midwifery centers, cultural centers, clubs, libraries, physical education or sports institutions, which are on the balance of the village councils.

Agricultural enterprise property includes objects of social nature, which are on the balance sheet enterprise (kindergarten, cultural house, etc.).

Cooperative property is all objects of consumer co-operation, that is, establishments of trade, catering, household services, which are on the balance sheet of cooperative enterprises.

Public property includes union clubs, children camps, health and wellness facilities, etc., which are on the balance sheet of public organizations.

Private property include objects owned by a individual person, such as a store, tray, bath, etc.

Finding owners in social infrastructure is based on the following general principles:

- economic and socio-territorial practicability;
- socio-economic balance, their proportionality and interaction, conformity with social and economic structure or market territorially forming processes;
- the totality of socio-economic values of territorial communities, their constant improvement;
- ensuring transparency, providing opportunities for every resident of the village regarding the formation and functioning of the social environment.

There is a sharp decline in the potential of agricultural social infrastructure. This situation leads to a decrease in the commissioning of objects of housing, communal and socio-cultural purpose, reducing the educational and cultural and household opportunities of the rural population, causing complications with the provision of medical assistance.

The system of relations in the branches of social infrastructure is largely restraining and contradicts the laws of a market economy. When implementing social infrastructure reforms, the principles of social and economic efficiency must be balanced.

Local governments have a decisive role in the functioning and development of the objects of social infrastructure of agriculture. The mechanism of its development involves the use of state regulation, first of all, ensuring the priority of rural areas as a territorial sector of society and creating socially equal opportunities for the inhabitants of different settlements to meet their needs. In order to finance the development of the social infrastructure of agriculture, it is necessary to ensure a comprehensive approach by combining joint efforts of the state, local authorities and economic entities. With the existing distribution of revenues between state and local budgets, there is a problem of territorial differentiation of accessibility and quality of social goods and services. Addressing this requires accelerating the decentralization of power in order to give more initiative and autonomy to local self-government bodies, leaving at their disposal the vast majority of the money they earn, which will undoubtedly help improve the development of the social infrastructure of agriculture.

Considering the functional purpose of the main links of social infrastructure, we can conclude: as effectively they will be able to meet these needs, as will be the well-being of the population of Ukraine. While it is reasonable that the existing infrastructure (roads and highways, water supply, sewage, schools and hospitals) deserves priority, the formation of new areas of infrastructure development (broadband Internet access and wireless telephony) cannot be ignored. Improved infrastructure will deliver results in the distant future. Not only will it directly improve the quality of life, it will also help achieve all other set goals: modernization of agriculture and creation of non-farm jobs, in particular by reducing the cost of production and attracting and retaining skilled workers. The creation of an appropriate infrastructure is a prerequisite for the development of competitive rural agricultural enterprises.

QUESTIONS FOR SELF-CONTROL

1. Infrastructure classification characteristics
2. What is the importance of infrastructure in agriculture?
3. What is the production infrastructure?
4. The place and role of production infrastructure in the system of social production.
5. What are the main industries and units that are part of the production infrastructure?
6. What determines the composition and size of the production infrastructure?
7. Expand the concept of social infrastructure.
8. What are the components of social infrastructure?
9. What is affected by the organization and condition of the infrastructure?
10. What is the role of social infrastructure?

TEST TASKS

1. Infrastructure is classified by function:
1) information, innovative;
2) banking, commercial;
3) production, social;
4) international, national.

2.Types of infrastructure
1) environmental;
2) market;
3) institutional;
4) production;
5) economic

3. The production infrastructure includes:
1) public administration bodies;
2) treatment facilities;
3) commodity exchanges;
4) repair shop;
5) warehousing.

4. Tasks of production infrastructure:
1) ensuring the complete and rhythmic development of the main areas of agriculture;
2) obtaining the main agricultural output;
3) efficient processing of agricultural products;
4) definition of specialization and location of production.

5. Social infrastructure:
1) relations between society and its members regarding the consumption of services;
2) a set of industries whose functional purpose is to meet the needs of the population in services;
3) a set of divisions that, through their activities, contribute to the work of the main divisions, creating the necessary conditions for this;
4) ensure socio-cultural and housing conditions of rural population.

6. Social infrastructure consists of units:
1) catering;
2) housing and communal services;
3) engineering communications and networks;
4) instrumental.

7. Social infrastructure is divided into:
1) social and consumer complex;
2) social and industrial complex;
3) socio-cultural complex;
4) social and transport complex.

8. The basic functions of the sectoral composition of the elements of social infrastructure include:
1) distribution and exchange;
2) production services;
3) health care;
4) formation of public consciousness and scientific outlook.

9. The state of social infrastructure depends on:
1) the level of economic development;
2) the level of development of agricultural production;
3) the level of technology development;
4) employee motivation.

10. Tasks of social infrastructure:
1) increase of incomes of rural population;
2) creation of conditions for productive employment;
3) strengthening social protection;
4) improving the health of the rural population.

THEME 3. LAND RESOURCES AND THEIR USE

3.1. Features of land use in agriculture

3.2. Land Fund of Ukraine and its use

3.3. The Land Code of Ukraine is the basis for regulating land relations

3.4. State Land Cadastre

3.5. Land market and trends of its development

3.6. Economic efficiency of land use in agricultural enterprises and the main directions of its increase

3.1. Features of land use in agriculture

Land is the main condition for the existence of society and a more important source of national wealth, the first prerequisite and natural basis of social production, the universal factor of any human activity. Describing the value of land in social production, it should be noted that labor is not the only source of manufactured products and material wealth. According to William Petty, labor is the father of wealth, the earth his mother.

In terms of sectors of the economy, land has a different meaning and plays a different role. In industry (except mining), it has no organic connection with the production process and is the spatial basis for the location of various production facilities.

In agriculture, land with its soil cover, water and vegetation occupies a special place. Land is a sphere of application of labor, when a person influences it and the means of production, when due to its physical and chemical properties (fertility), the land provides for the growth and development of plants, crop yields.

Earth is the foundation of the rural economy, in which the interlocking economic processes of production and reproduction of natural.

In agriculture, land is the main means of production, without which the very process of production of crop and livestock production is not possible. At the same time, land is the object and the means of labor, and therefore the main means of production. Land largely determines the pace of development and the level of efficiency of agricultural production.

Land as a means of production in agriculture has specific features:

- *first* , unlike other means of production, land is not the result of human labor; as the gift of nature and the product of its centuries-old development, the earth precedes labor, it is a natural and inalienable condition;

- *secondly* , land is an indispensable means of production; if all other means of production can be replaced by newer and more productive ones, the production process cannot be carried out without land;

- *thirdly* , the land is spatially restricted and in the process of development of productive forces of agriculture it cannot be re-created or increased in size; however, in an environment of rational land use, its productive forces are constantly evolving and growing;

- *fourthly* , in the production process the land does not wear out, and when properly used it is constantly improving. So, unlike all other means of production, which undergo physical and moral deterioration and become unusable, land is an eternal means of production. This feature of the land is due to its important property, such as fertility, which is the basis of the theory of rational agriculture.

Land fertility is the ability of the soil to produce a crop whose level is characterized by its productive forces. The fertility of the land in its various parts is not uniform. Land productivity depends on the objective properties of the soil and the level of crop culture.

The increase in land productivity is achieved by the systematic increase of soil fertility on the basis of natural and economic processes according to the specific conditions and systems of agriculture. Distinguish between natural, potential, artificial and economic soil fertility.

The natural fertility of the soil is characterized by the supply of nutrients created as a result of the natural process of soil formation. It is caused by the action of the natural and biological properties of the soil, as well as the climatic conditions. The natural fertility of the soil depends on its chemical composition, ie the content of nutrients needed for the plants. Natural fertility is a property of soil formed under natural vegetation during the natural flow of the soil-forming process. It varies relatively little over time and is stable in size for a certain type of soil.

Potential fertility is determined by the gross (total) supply of soil nutrients in both accessible and inaccessible forms.

Artificial soil fertility is created in the process of human production through labor and means of production by enhancing the culture of agriculture. It is the result of additional investment of labor, means and means of production by enhancing the crop culture. Natural and artificial fertility are interconnected, practically existing in indissoluble unity.

Natural, potential and artificial fertility are inextricably linked (Fig. 3.1), since providing plants with moisture and nutrients depends on the properties of the natural soil, as well as on the change of soil properties under the influence of cultivation. Effective fertility, measured by the magnitude of the crop, is a true expression of natural and artificial fertility and largely depends on the level of development of science and technology.

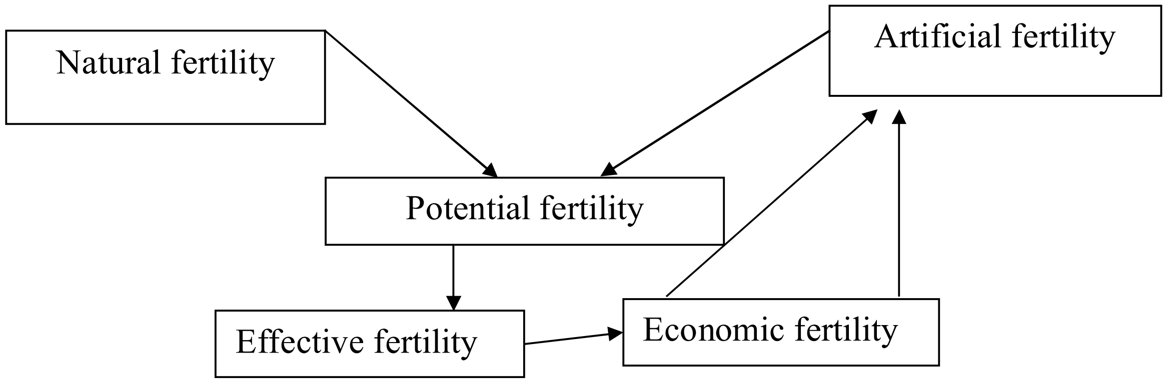

Fig. 3.1. The relationship between different types of fertility

The economic fertility of the soil is the totality of its natural and artificial fertility under conditions of certain development of productive forces. It characterizes the potential of the soil that is realized in the process of agricultural production, and reflects the true and effective level of its fertility. Thus, the economic fertility of the soil is a cumulative expression of its natural and artificial fertility, which is determined by the productivity of land achieved in a given period.

The economic fertility of the soil is the result of its use in agriculture, and its level is characterized by crop yields. Distinguish the absolute and relative economic fertility of the soil. The absolute fertility of the soil is characterized by the amount of production per unit of land area, and relative - per unit of production costs.

The level of economic fertility of the land is constantly changing under the influence of the development of the productive forces of agriculture. Land productivity can be steadily increased as a result of the application of means of production, labor and scientific achievements.

Soil plays an important role in the environment, it is the most important link of all terrestrial biocenoses and the biosphere of the earth as a whole. Rational land use is a necessary part of a comprehensive system of exploitation and protection of natural resources.

The level of land use and conservation as a means of production for future generations depends on many factors, especially socio-economic factors. In today's context, radical transformations of agrarian economic relations are needed to restore the peasant's position as a landowner interested in increasing production and improving its quality. Of great importance is the development of ownership and types of management. At the same time, it is important to create equal economic conditions and appropriate organizational preconditions for improving economic efficiency, development of independence and initiative.

3.2. Land Fund of Ukraine and its use

All lands that are within the territory of Ukraine of glass give a single land fund. Depending on the purpose, a single land fund of the country is divided into seven categories of land. The classification of lands according to their purpose determines the approach to the legal regulation of land relations. Land Purpose means the legal regime, conditions and limits of land use for specific purposes.

In the Land Code of Ukraine according to the purpose, the land fund is divided into the following categories:

1) Agricultural land - a land allocated for agricultural purposes or when values for these purposes. These are arable land, pastures, meadows, land allotted for gardens, gardens as well as urban land used for agricultural purposes, plots of land, gardens, etc .;

2) Residential and community development lands are those located within the urban, settlement and rural areas, as well as land granted to settlements outside their area. This category of land is a territorial base for building residential, municipal, industrial, transport and other buildings and con ores in order to meet utility and cultures but household and other needs of people living in the area. ;

3) Lands of nature reserve and environmental protection, land, health, recreational, historical and cultural - Doctor of these categories include agricultural

land (special) designation, which are withdrawn from business and are used for special purposes;

4) Forest lands are divided into:

a) Forest - covered with forest (tree and shrub) vegetation; not covered with forest vegetation to be forested nude (log, conflagration, woodlands, wasteland, etc.) involved in forest Wash routes, rides, fire breaks;

b) non-forested - occupied by structures related to forestry, lines of transmission lines, product lines and underground communications, etc.; agricultural land (arable land, bug last-year plantations, grasslands, pastures, provided for the needs offorestry) occupied by swamps and reservoirs within the forest plots provided for forestry purposes.

5) land of the water fund - the land occupied by seas, rivers, lakes, reservoirs, otherwater bodies, swamps, and islands; coastal protective stripes along the seas, rivers around reservoirs; hydraulic and other water management dispute ladies and channels, as well as land allocated for the band led agenda for them; coastal waterways ;

6) industrial, transport, communications, energy, defense and other purpose lands are those lands used for the use of enterprises, organizations and institutions to carry out the specific tasks of industrial production, transport, communications, etc.;

7) from the enamel of the reserve - this is all land, not transferred to the property or not given for permanent use. They also include land whose ownership or use has been terminated in accordance with law.

The nature of land use in the production process distinguishes two groups of land categories. The first is agricultural land and forestry, where land is the main means of production. The second group is the land of all other categories, where land is the spatial basis for the location of industry and other sectors of the economy.

Ukraine has considerable land and resource potential. The Land Fund of Ukraine is 60.3 million hectares, or about 6 percent of the territory of

Europe. Agricultural land makes up about 19 percent of all-European land, including arable land - about 27 percent. Area of black soil in Ukraine is from 15.6 mln. To 17.4 mln. Ha, or about 8 percent of world reserves.

There are 24 hectares of agricultural land per worker employed in agriculture in Ukraine (Fig. 3.2). And the area of agricultural land per capita (person) is the highest among European countries and is 0.9 hectares, including 0.7 hectares of arable land (the average of European countries - 0.44 and 0.25 hectares respectively).

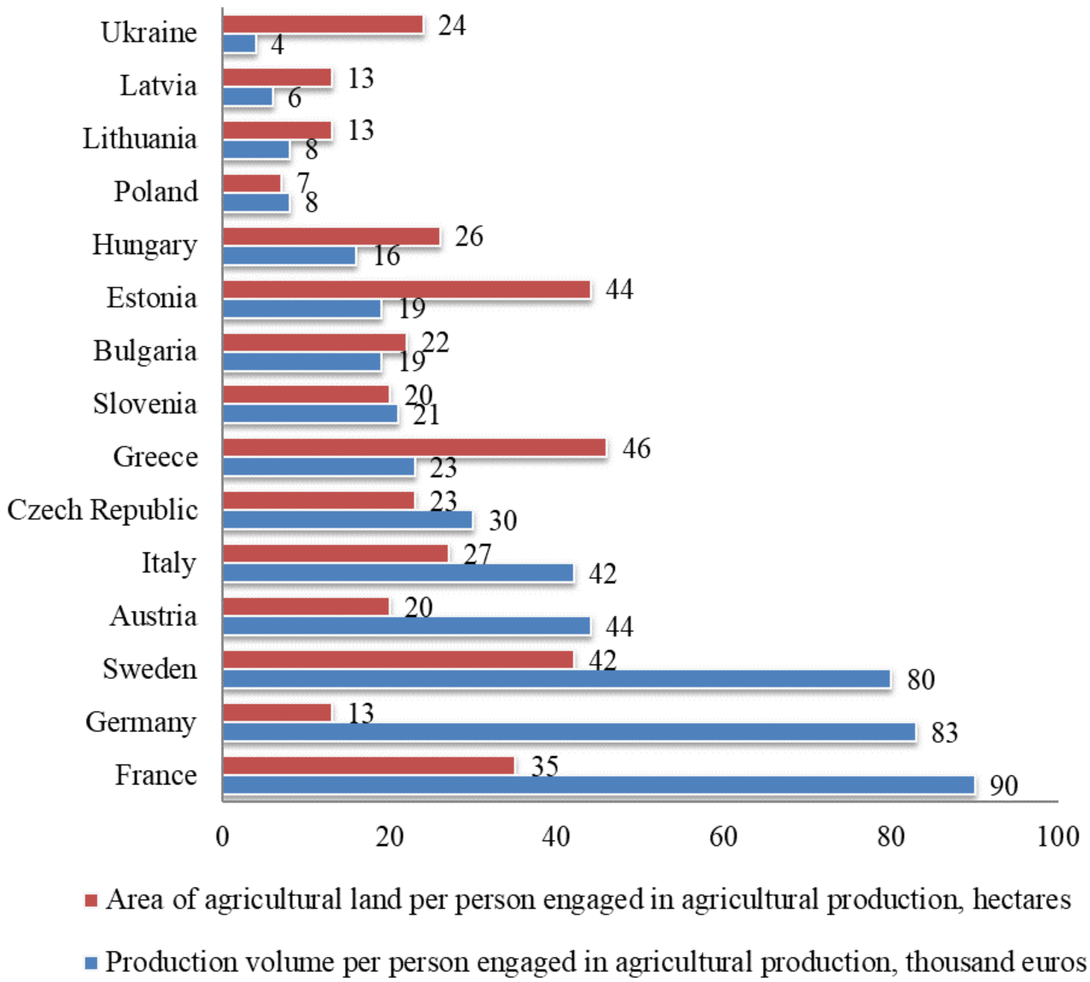

Fig. 3.2. Area of agricultural land per person engaged in agricultural production

Ukraine's agricultural land covers 42.7 million hectares, or 70 percent of the country's total area, and arable land - 32.5 million hectares, or 78.4 percent of all agricultural land. The land fund is characterized by a large share of agricultural land, which is the basis for the development of highly efficient agricultural production.

Agricultural lands include different productivity lands. As a part of agricultural land, arable land and perennial crops are of the highest value - the quality of land resources and the efficiency of their use increase with their share. In Ukrainian farms, the share of arable land in agricultural lands is increasing from north to south, and the areas of natural hayfields and pastures are decreasing accordingly.

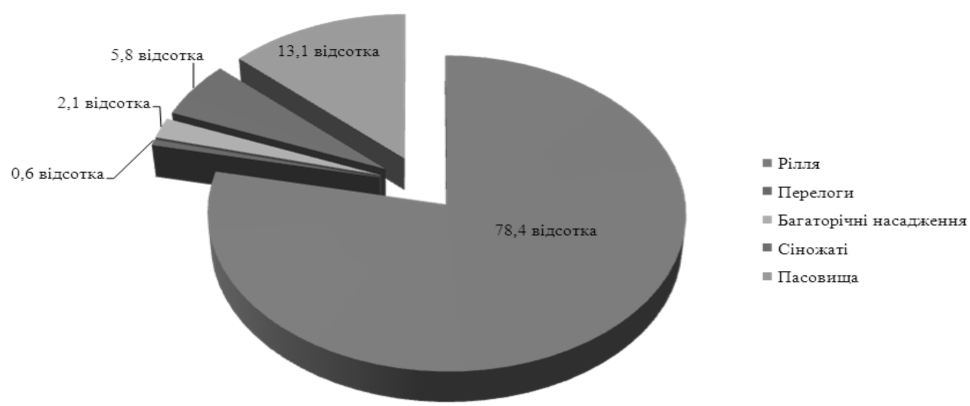

Fig. 3.3. Structure of agricultural lands of Ukraine

In the total area of agricultural land (Fig. 3.3), arable land is 32.5 million hectares (78.4%), hayfields - 2.5 million hectares (5.8%), pastures - 5.6 million hectares (13.1%), perennial plantings - 0.9 million hectares (2.1%) and the area of fallow lands - 0.26 million hectares (0.6%). The structure of agricultural land indicates a high level of plowing, which, on the one hand, characterizes the intensive use of land in agriculture, and on the other, the need for appropriate measures to protect land from wind and water erosion.

The structure of agricultural land depends on the zonal features and characterizes the quality of land as a means of production in agriculture. In the structure of land resources of the country and land use there are significant disparities, which deepening can be a threat to the environment and the environment, as well as the efficiency of economic activity, sustainable development of the national economy as a whole.

In Ukraine, over 92 % of the territory is attracted for business use . The level of land plowing is extremely high and amounts to more than 54%, while in developed countries of Europe it does not exceed 35% (Fig. 3.4).

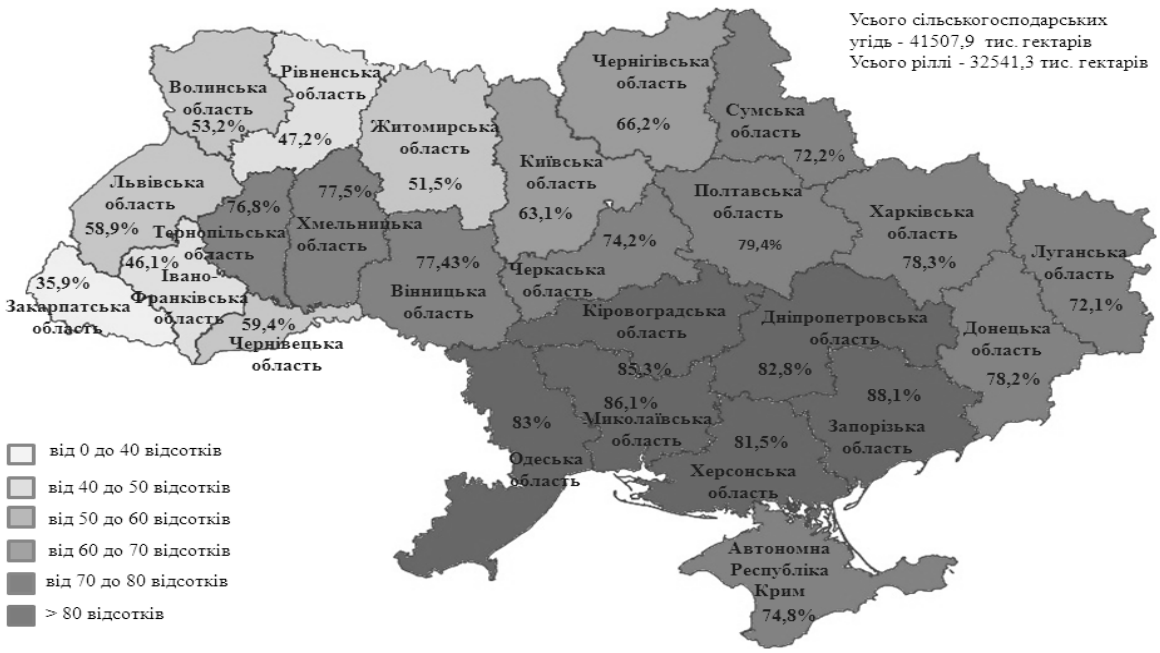

Figure 3.4. Plowed agricultural land in the regions of Ukraine

The actual afforestation of the territory of Ukraine is only 16%, which is not enough to ensure ecological balance (the average of European countries is 25-30%).

Excessive plowing of land has led to disruption of the ecologically balanced ratio of agricultural land, forests and reservoirs, which negatively affected the sustainability of agricultural landscapes and led to a significant man-made burden on the environmental sphere.

In Ukraine, there are over 1.1 million hectares of degraded, low-productive and technogenically contaminated land subject to conservation, 143.4 thousand hectares of disturbed land in need of reclamation, and 315.6 thousand hectares of low-yielding land in need of improvement.

The most significant factor in the decline of land productivity and increased degradation of agricultural landscapes is water erosion of soils.

The total area of agricultural land affected by water erosion is 13.3 million hectares (32 percent), including 10.6 million hectares of arable land. The eroded land contains 4.5 million hectares with medium and heavily washed away soils, including 68 thousand hectares completely lost the humus horizon. Other negative factors, such as salinity, salinity, waterlogging, acidity, and rockiness, also affect the quality of land resources.

Intensive agricultural land use leads to a decrease in soil fertility due to their densification, in particular black soil, loss of bumpy-grained structure, water permeability and aeration capacity with all environmental consequences.

The degradation of the soil cover, due to man-made pollution, has intensified. The greatest danger to the environment is contamination of soil with radionuclides, heavy metals, pathogens.

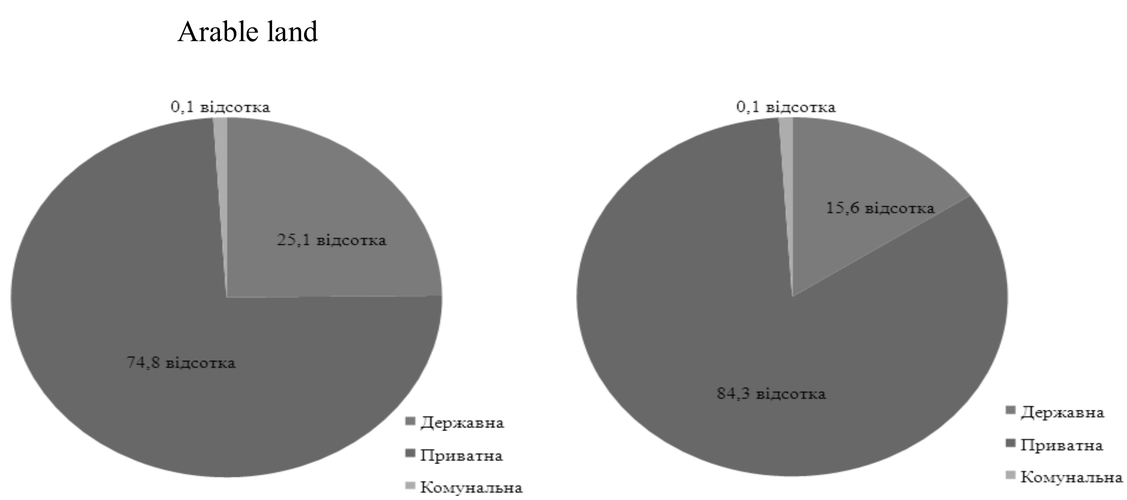

Fig. 3.5. Distribution of agricultural land by form of ownership

The qualitative status of land resources and a number of objects of economic sectors is significantly influenced by hydrometeorological and dangerous exogenous geological processes and phenomena (villages, landslides, landslides, subsidence, abrasion, destruction of banks of reservoirs, etc.), which are more than 50 percent of the territory.

Relations with the use and protection of land resources are governed by the Land Code of Ukraine, which defines their legal, economic and organizational principles. The regulation of land relations also provides for the protection of the rights of citizens, businesses and organizations to land.

The land in the country can be privately owned, communal and state owned. According to state acts, the share of private agricultural land in Ukraine is now almost 75% (Fig. 3.5).

The current ban on agricultural land in Ukraine promotes the rental market. Businesses have virtually no land in ownership and lease land, and lately, land use has become increasingly popular on the right of emphitheism - a long-term, alienated and inherited right to someone else's property, which is to grant a person use another's land for agricultural needs for the purpose of obtaining fruit and income from the obligation to use it effectively for the intended purpose . In Ukraine, there is a special law "On Land Lease", which regulates the rules of leasing agricultural land. The law does not set any restrictions on entities that may be tenants of agricultural land.

The calculation of the rent for the land is carried out taking into account the inflation indices, unless otherwise provided by the lease. With the consent of the parties, payments for land rent can be made in kind. The calculation in kind must correspond to the monetary equivalent of the value of the goods at market prices at the date of payment of the rent. Calculations on rent for land plots owned by the state and municipal property, carried out exclusively in cash. The total lease term for agricultural land may not be less than 7 years, and for land on which hydroelectric land reclamation is carried out - 10 years. The maximum lease term may not exceed 50 years.

The order of rent of state and communal property is different from that of private land. First of all, the right to lease agricultural land of state and communal ownership is acquired exclusively at land auctions held in the form of auctions, the winner of which is the person who offered the highest rent per year.

The land plots are leased to the citizens of Ukraine for farming and privately owned and leased for use. In accordance with the Land Code of Ukraine, land plots are transferred free of charge into private ownership to citizens for the purpose of holding a farm in the amount of land share (share) designated for members of agricultural enterprises located in the territory.

Farmers may additionally purchase or lease land for production purposes, the size of which is limited only by the contract of sale or lease. Acquisition of land by citizens for ownership of a farm over a free area is carried out for a fee.

At the end of 2017, 34.1 thousand farms were operating in Ukraine, accounting for 75% of the total number of agricultural enterprises. They used almost 4.6 million hectares of agricultural land. The average size of a farm is 82 hectares of agricultural land. Each of these farms uses mainly the personal labor of the farmer's family members. These sections are not separable.

For the purpose of collective gardening, citizens' plots are transferred to the ownership of land plots at the rate of not more than 0.12 ha per one member of the cooperative. These parcels consist of the collectively owned jointly owned lands of the cooperative and of the private property of its members.

All owners and land users must ensure the use of land according to their intended purpose, rational and efficient use of land resources, increase soil fertility, protect land from erosion, prevent environmental degradation due to their economic activity.

Table 3.1

Crops and their structure
(all farm categories)

Groups of cultures	2000		2016		2017	
	million hectares	%	million hectares	%	million hectares	%
The entire acreage	27.2	100	27.0	100,0	27.6	100,0
Cereals	13.6	50.2	14,4	53,3	14.6	53,0
Technical cultures	4.2	15.4	8.9	32,8	9.6	33.6

Potatoes, vegetable and melon crops	2.3	8.4	1.8	6,8	1.8	6,7
Fodder crops	7.1	26,0	1.9	7.1	1.9	6,7

The total acreage of Ukraine is characterized by a tendency to increase. In 2017, compared to 2000, it increased from 27.2 million hectares to 27.6 million hectares, or 1.5% (Table 3.1). At the same time, the acreage of cereals increased by 1 million hectares or by 7.4%, industrial crops - by 5.4 million hectares, or 2.3 times. At the same time, the acreage under potatoes, vegetables and melons decreased by 21.7% and the area of fodder crops decreased by 3.7 times. Such a significant decrease in the area of forage crops is caused by the crisis of the livestock industries and the rapid decline in the productive livestock of livestock and poultry.

Describing the composition and structure of the acreage, it should be noted that in 2017. The largest share was occupied by cereals - 53.0% and industrial crops - 33.6% (Table 3.1).

The structure of the acreage of the enterprise is formed taking into account the domestic needs for crop production and the plan of sales of individual products in accordance with the market situation. It is necessary to take into account the peculiarities of natural conditions and the requirements of the system of agriculture, which provides for the increase of soil fertility and preservation of the natural environment.

3.3. The Land Code of Ukraine is the basis for regulating land relations

The Land Code is the basic law that regulates land relations in Ukraine in order to secure the right to land of citizens, legal entities, territorial communities and the state, rational use and protection of land. The Land Code is the main document governing land relations in our country.

Land relations are social relations concerning the possession, use and disposal of land.

The subjects of land relations are citizens, legal entities, local authorities and state authorities.

The objects of land relations are land within the territory of Ukraine, land plots and rights thereto, including land shares (shares).

The Land Code defines the composition and purpose of the lands of Ukraine. The lands of Ukraine include all lands within its territory, including islands and lands occupied by water bodies. As you already know, the land of Ukraine by main destination is divided into 9 categories. Land plots of each category of land that are not leased out to the property or use of citizens or legal entities may be in stock.

Agricultural lands are lands allocated for the production of agricultural products, the implementation of agricultural research and training activities, the placement of appropriate production infrastructure for these purposes.

Agricultural lands are transferred *to the property and made available for use:*

1) to citizens - for the conduct of personal peasant farming, horticulture, horticulture, mowing and grazing, conducting commodity agricultural production;

2) agricultural enterprises - for conducting commodity agricultural production;

3) agricultural research institutions and educational establishments, rural vocational and technical schools and general schools - for research and educational purposes, promotion of advanced experience in agricultural management;

4) non-agricultural enterprises, institutions and organizations, religious organizations and associations of citizens - for maintenance of ancillary agriculture.

Agricultural lands *cannot be* transferred to foreign nationals, stateless persons, foreign legal entities and foreign countries.

Important for the development of land relations is the provision of the Land Code that local governments in the process of privatization in their territory create a reserve fund of land in the amount of 15% of the area of all agricultural land, which were in constant use of the respective enterprises. The Land Reserve Fund is state-owned or communal-owned and is intended for further redistribution and use for its intended purpose.

The Land Code defines the content *of land ownership* and land *use rights* , as well as the *ownership* of land.

Land ownership is the right to own, use and dispose of land. The land in Ukraine may be *privately owned, communal or state owned.*

The subjects of land ownership are:

1) citizens and legal entities - on private property;

2) territorial communities that exercise this right directly or through local governments - on communal property land;

3) the state, which exercises this right through the relevant state authorities - on the state property.

Foreign nationals and stateless persons may acquire ownership rights to *non-agricultural* land on which there are real estate owned by them under private ownership.

The right of permanent use of a land plot is the right to own and use a land plot that is in state or communal ownership, without a fixed term. Only enterprises, institutions and organizations belonging to state or communal property acquire the rights of permanent use of land from state and communal property lands.

Land in Ukraine may be leased. *The right to lease a land plot* is a contract based on the term of paid ownership and use of the land plot required by the tenant for conducting business and other activities.

Land plots can be leased to citizens and legal entities of Ukraine, foreign nationals and stateless persons, foreign legal entities, international associations and organizations, as well as foreign states. Land lease can be short-term - no more than 5 years and long-term - no more than 50 years.

The Land Code defines the rights of land owners and land users. *Land owners have the right to:*

1) sell or otherwise alienate the land, lease it, pledge, inheritance;

2) independently manage on the land;

3) ownership of crops and plantings of agricultural and other crops, produced agricultural products;

4) to use in the established order for their own needs the common benefits of fossils, peat, forest plantations, water bodies and other properties of land available on the land;

5) for damages in cases provided by law;

6) construct residential buildings, industrial and other buildings and structures.

Land users have similar rights except that they have no right to sell or otherwise feel the land.

The possibility of buying and selling land by its owners, which is provided for by the Land Code, means that land has become a commodity in Ukraine. However, land law provides for a number of restrictions on the sale and purchase of land. Thus, the Land Code states that citizens and legal entities that own land for farming, as well as citizens of Ukraine - owners of land shares (shares) are not entitled to January 1, 2008. sell or otherwise dispose of their land and shares (shares) other than land, their inheritance and land for public use.

In addition, during this period it is forbidden to enter the right to land share (share) in the authorized funds of companies.

The Land Code establishes the following *responsibilities of land owners and land users:*

1) ensure the use of land for its intended purpose;

2) comply with the requirements of the legislation on environmental protection;

3) timely payment of land tax or rent;

4) not to violate the rights of owners of adjacent land plots and land users;

5) increase soil fertility and retain other beneficial properties of the earth;

6) provide timely information to the respective executive and local self-government bodies on the status and use of land and other natural resources in the manner prescribed by law;

7) comply with the rules of the neighborhood and restrictions related to the establishment of land easements and protection zones;

8) preserve geodetic signs, anti-erosion structures, networks of irrigated and drained systems.

The right of a land easement is the right of the owner or land user of a land plot for limited paid or free use of another's land plot (s). The owner or land user of the land plot has the right to require the establishment of a land easement for the maintenance of his land plot (right of passage and passage on the available path, right of passage and run of cattle to the natural reservoir located on the adjacent land plot and other land easements). Land servitude is established by agreement between the owners of neighboring land plots on the basis of a contract or by court decision.

Citizens and legal entities acquire property rights and rights to use land plots from state or communal property lands at the discretion of executive or local self-government bodies within their powers.

Free transfer of land parcels to the property of citizens is carried out in the case of: privatization of land parcels used by citizens; land acquisition as a result of privatization of state and communal agricultural enterprises and organizations; obtaining land from state and communal property within the limits of the free privatization norms defined by the Land Code.

Norms of free transfer of land to Ukrainian citizens.

Citizens of Ukraine are entitled to the free transfer of land from state or communal property in the following sizes:

1) for farming - in the amount of the land share (share) determined for members of agricultural enterprises located in the territory of the village council where the farm is located;

2) for keeping a personal peasant farm - no more than 2 hectares;

3) for gardening - no more than 0.12 hectares;

4) for the construction and maintenance of a dwelling house, farm buildings and structures (private plot) in villages - no more than 0.25 hectares , in settlements no more than 0.15 hectares , in cities - no more than 0.10 hectares ;

5) for individual cottages no more than 0.10 ha ;

6) for the construction of individual garages no more than 0.01 ha .

The Land Code provides for the possibility of *termination of ownership of a land* plot in the event of voluntary waiver of it, a request to recover the land plot at the request of the creditor, alienation of the land plot for public and public needs, confiscation by court order and other grounds.

Landowners and land users are *compensated for damage* caused by the removal (redemption) or temporary alienation of agricultural land, the establishment of restrictions on the use of land, due to the deterioration of the quality of agricultural land and their improper use of the land, as well as the lack of temporary use of land.

The Land Code provides for *state control* over land use and protection. It is carried out by the authorized bodies of the executive power on land resources (the State Committee on Land Resources), and by observance of the requirements of the legislation on land protection - by the specially authorized bodies on ecology and natural resources.

In addition, *land monitoring will* be carried out , which is a system for monitoring the state of land in order to detect changes in time, evaluate them, prevent them and eliminate the consequences of negative processes.

The Land Code provides for the maintenance of the state land cadastre, covering its content, tasks and components. It is determined that the state land cadastre is maintained by the authorized body of executive power on land resources, ie the State Committee of Land Resources.

3.4. State Land Cadastre

In certain regions and farms of Ukraine, agricultural lands differ significantly in terms of fertility, which affects the efficiency of their use and the results of economic activity. In this regard, in agriculture, the same costs of production objectively give different results. Land quality assessment characterizes the potential for their effective use in the context of a certain development of productive forces. In order to provide a scientific justification for the level of land use and regulation of land relations, a state land cadastre is being developed, which is the basis for efficient use and conservation of land.

According to Article 139 of the Land Code of Ukraine, the *State Land Cadastre* is the only state system of land cadastral works, which establishes a procedure for recognition of the fact of origin or termination of the right of ownership and right to use land plots and contains a set of information and documents on the location and legal regime of these plots, their assessment, land classification, quantitative and qualitative characteristics, distribution among landowners and land users.

The main tasks of maintaining the state land cadastre are:

a) ensuring that all land plots are complete;

b) application of a unified system of spatial coordinates and system of identification of land plots;

c) introduction of a unified system of land cadastral information and its accuracy.

The State Land Cadastre includes:

1) state registration of land plots;

2) accounting for the quantity and quality of land;

3) cadastral zoning;

4) cadastral surveys;

5) soil boning;

6) economic valuation of land;

7) monetary valuation of land.

State registration of land plots is carried out within the state register of land, which consists of two parts:

a) books of records of registration of state acts on the ownership of land and the right of permanent use of land, leases of land, indicating cadastral numbers of land plots;

b) a land book containing information about the land plot.

Accounting for the quantity and quality of land . Land counts reflect the information that characterizes each land by area and composition of land. Quantitative and qualitative accounting of land provides for systematic keeping and updating of data on separate categories of land owners and land users about the presence of land fund in them and its distribution by separate types of agricultural lands.

Inventory zoning includes the installation of:

a) the location of land use restrictions;

b) boundaries of cadastral zones and quarters;

c) boundaries of assessment areas and zones;

d) cadastral numbers (territories of the administrative-territorial unit).

Cadastral surveys are a set of works performed to identify and restore land boundaries. Cadastral survey includes:

a) geodetic establishment of boundaries of land;

b) agreeing the boundaries of the land plot with adjacent owners and land users;

c) restoration of land boundaries on the ground;
d) establishing boundaries of parts of the land that contain encumbrances and restrictions on land use;
e) preparation of cadastral plan.

Land boning is a comparative assessment of soils by their basic natural properties, which are sustainable in nature and have a significant effect on the yield of crops grown under specific climatic conditions.

The soil is scored on a 100-point scale. Higher scores are rated soils with better properties that have the highest natural productivity. According to the results of the qualitative assessment of the soil , soil cancellations are determined , the soils are divided into agricultural production groups.

Land boning makes it possible to organize the soils according to their fertility and economic value, to set distribution limits and to determine their area on the territory of each farm. Detected soil cancellations and agricultural groups of land are the subject of economic assessment of land.

The economic assessment of land is to determine its relative value as a means of production in agriculture. It is an important part of the land cadastre and is inextricably linked to the economic conditions of agricultural production. The essence of economic assessment is to determine the relative yield of land, depending on their quality and location.

Monetary valuation of land plots is conducted according to the methodology approved by the Cabinet of Ministers of Ukraine. The monetary valuation of land plots is determined on a rent basis.

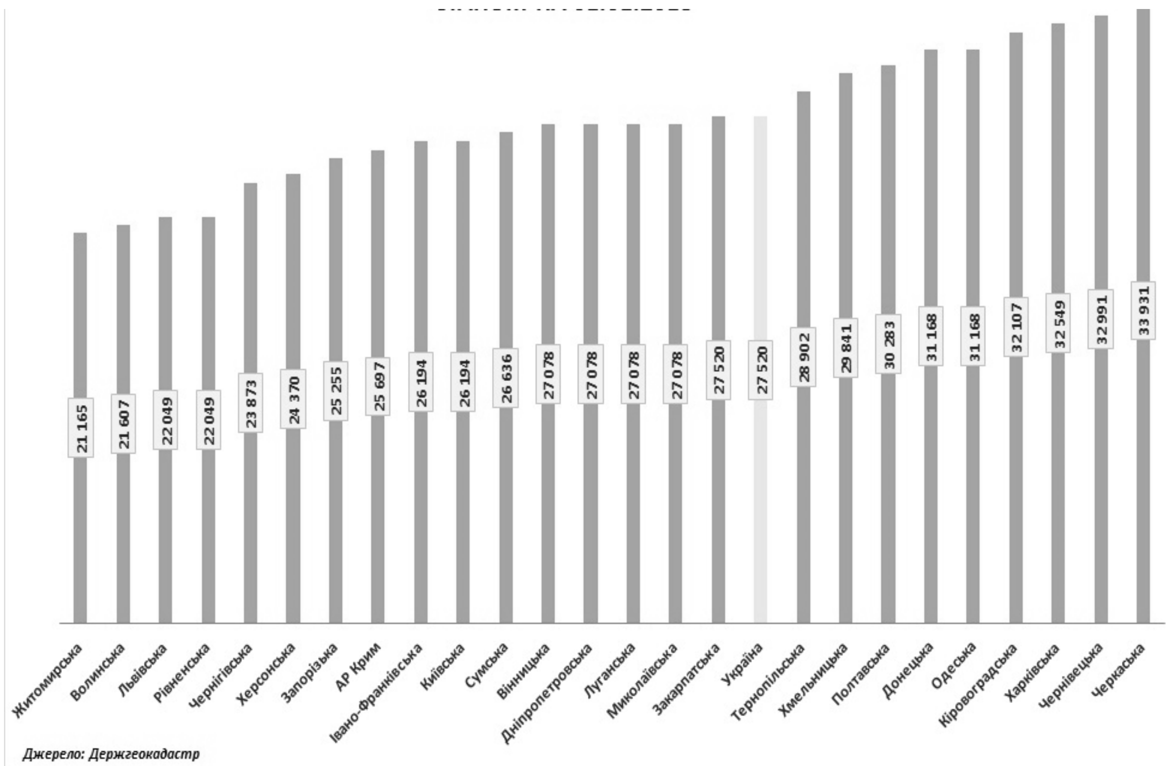

Figure 3.6. Regulatory monetary valuation of 1 hectare as of January 1, 2018, UAH

Depending on the purpose and procedure of conducting the monetary valuation of land plots can be normative and expert.

Regulatory monetary valuation of land used to determine the amount of land tax losses of agricultural production, economic incentives and rational use of Preserve lands.

According to the data of the State Geocadastre (Fig. 3.6), as of January 1, 2018, the regulatory monetary value of one hectare of arable land in the country average was 27.5 thousand UAH, ie about 840 euros.

The most expensive arable land is estimated in the Cherkasy region - almost 34 thousand UAH / ha, which is about 1050 euros, the cheapest - in Zhytomyr region - 21.2 thousand UAH / ha, which is about 650 euros.

Normative monetary assessment of a separate agricultural land plot is carried out by the formula:

$$Dzg = \Sigma\ (Pogre \times Gagr) + PNG \times GGg,$$

where Gzd - regulatory monetary valuation of agricultural land, UAH;

Gagr - regulatory monetary assessment of the agricultural production group of soils of the respective agricultural land of the natural and agricultural area, UAH per hectare;

Graz - area of agricultural production group of agricultural land, hectares;

PNGS - the area of non-agricultural land (land under economic paths and runs, field forest strips and other protective plantations, except those attributed to forest land, land under farm buildings and yards, land under the infrastructure of agricultural markets and temporary agricultural markets.), hectares;

Gnsg - normative of the capitalized rental income of non-agricultural land on agricultural lands, UAH per hectare.

Expert monetary valuation is used in the implementation of civil agreements on land.

Monetary valuation of agricultural land is carried out separately on arable land, land under perennial crops, natural hayfields and pastures. The basis for calculating the monetary valuation of land is the rental income generated by the production of cereals and determined by the data of the economic valuation of land.

The state land cadastre is intended to provide landowners, land users and tenants with information on the status of land in order to organize their rational use, improve the management of land resources, justify the amount of payment for land.

Land cadastre provides a differentiated approach to individual farms and regions, according to its data, organize efficient use and protection of land, improve placement and specialization of agricultural production, set more reasonable prices for products, determine the price of land in terms of transition to market relations.

3.5. Land market and trends of its development

The land market is a set of economic mechanisms that provide for the establishment, modification and termination of land rights that occur on the basis of a legally executed contract and are mediated by cash or in kind payments.

The most important condition of land market is the establishment of private land ownership, which gives the right to possess, use and dispose of it. At the same time, certain conditions must be created for the practical realization of this right - the land owner must be able to freely use the right to dispose of land through its sale, gift, exchange, pledge, inheritance and lease within the current legislation. There must also be economic motivation for land sellers and buyers to enter the land market. At the same time, the purchasers must have the appropriate solvency and opportunity to receive acceptable income for them from the agricultural business. This in turn requires a positive second economic environment and land market infrastructure.

The basic principles of the European Union's land ownership policy, including agricultural land, are the right to free movement of capital, the opening and running of private businesses and the absence of discrimination. In most EU Member States, there are no legal restrictions on agricultural land ownership (any natural or legal person can legally purchase and own agricultural land). Legal restrictions on agricultural land ownership limit the number of potential buyers and competition from the agricultural land sales market.

In countries that later become members of the European Union, restrictions are usually imposed on the ownership of agricultural land by foreigners (including nationals of EU Member States). For example, in the Czech Republic and Slovakia there are restrictions on foreign natural and legal persons who cannot buy agricultural land, which is aimed at preventing speculation of agricultural land in the Member States of the European Union.

In Bulgaria, land reform began in the early 1990s, during which land ownership was granted to all who could prove that it was the owner until 1946. Former landowners returned all the land. Thus, today, 98 percent of farmland is privately owned. A new three-year moratorium was imposed on new owners. A citizen of Bulgaria, a legal or natural person who has been in the territory of the country for more than five years, a company from the country with which Bulgaria has concluded an international agreement, and also from a member state of the European Union may purchase the land. Land prices are not regulated, there are no restrictions on the area that can be sold to one person. The average value of agricultural land is $ 4,5 thousand per hectare.

In Estonia, the reform started in the early 90's XX century. The most difficult task was to find a balance between restitution - the return of land to its former owners and the distribution of state land between peasants who worked on it during the Soviet Union. The foreigners were almost immediately allowed to participate in the purchase of the land only if it was used for farming purposes, and the right to change the target status of the land after five years of its direct use was legalized. About 60 percent of the land fund is leased from agricultural producers. The state does not regulate land prices. The average land value is $ 5,000 per hectare.

In Poland, the reform began at the same time as in Bulgaria and Estonia. Collectivization in the country after its accession to the socialist camp has largely failed. About 75 percent of arable land continued to remain privately owned even under Communist rule. The state does not regulate land prices. The maximum area of the property owned by an individual is 500 hectares. Land sales tax ranges from 2 to 5 percent and is charged to the buyer. Partial restrictions on the participation of foreign capital in the purchase of agricultural land exist, but as of May 1, 2016, they have been abolished for EU citizens. The average land value is $ 10,000 per hectare.

In Romania, the process of transferring land from state ownership to private ownership through distribution and partial restitution took place. Restrictions on the acquisition of agricultural assets are insignificant: the buyer must have professional experience or qualifications in managing the agricultural sector, the maximum area for individuals is 100 hectares. In Romania, 94 percent of the land fund is privately owned. Following the country's accession to the EU in 2007, a seven-year moratorium on the sale of land to non-residents was introduced. In 2014 , its term expired and the market became open to foreign capital. The state does not regulate land prices. The land sale tax is 2-3 percent of the transaction value. EU citizens have access to the purchase of agricultural land provided it is used for its intended purpose. The average land value is $ 6,000 per hectare.

In Croatia, the restitution process began after the breakup of the former Yugoslavia in 1996. It finally came to an end only in 2010, when the right to return land ownership was acquired by foreign nationals who could prove their heredity. Land prices are not regulated in Croatia, and there are no restrictions on the area that can be sold. The land sale and tenure tax is 5 percent. Foreigners do not have access to purchase agricultural land. Its average cost is $ 7 thousand per hectare.

In Serbia, land reform began with the adoption of a restitution law, according to which 74 percent of agricultural land was returned to private owners who had been deprived of their land ownership in 1953. The restitution process for the vineyards was in a different order. Tenants of public lands have been granted the right to continue the lease for 30 years. Today, 92 percent of agricultural land is privately owned. The state does not regulate land prices, there is a limit on the minimum land plot - 0.5 hectares. Foreigners are not allowed to purchase land. Its average cost is $ 13,000 per hectare.

In all these countries, the land market or the market with partial restrictions was gradually created or fully opened. The transformation of the socialist system into a capitalist one led to a decrease in the share of agricultural production in the structure of gross domestic product, but it led to an increase in the profitability and productivity of the agricultural sector. The choice of the model of development of the agricultural land market in these countries gave impetus to rapid socio-economic development.

The situation is different with the development of the market in some of the most developed EU Member States.

Austria does not belong to EU agricultural countries. Only 1.4 percent of the national gross domestic product is in the agro-industrial complex. Private ownership is 53 percent of agricultural land. Each federal land has a separate law governing the ownership of land, and the order of sale and purchase is determined by local executive bodies. In some provinces, price and minimum allotment limits are set.

Partial restriction on the purchase of agricultural land also applies to mountain areas - only registered farmers have the right to purchase. The minimum lease term is three years. There is a ban on agricultural land crushing - only one child can inherit land ownership. Some provinces have exceptions. The land purchase tax is 3.5 percent of the transaction value and is paid by the buyer. The cadastral map registration fee (1.1 percent of the transaction value) is also charged to the buyer. The income tax on the allotment is 20 percent of the transaction value. Almost 2 percent of landowners own 18.4 percent of agricultural land. Austria has created a maximum balanced model of the market with high production efficiency and compatibility with the principles of environmental protection and soil management. The average value of agricultural land is $ 42,000 per hectare.

The UK is not an agrarian state. The share of the agro-industrial complex in the national gross domestic product is only 0.7 percent, 90 percent of the agricultural land is privately owned. The market is as liberalized as possible - there are no restrictions on property rights for foreign companies or individuals. There is no restriction on the area of privately owned land other than Scotland, where the minimum area should be 0.3 hectares. In some administrative and territorial units, a progressive zero-rate tax scale depends on the value of the agreement. Land leases are not regulated, except Scotland - no more than 175 years.

The UK is one of the countries with the highest levels of agricultural mechanization and production productivity. Although farming is unpopular with young people (the average age of a British farmer is 59), agriculture is considered one of the most attractive investment assets. The average value of agricultural land is $ 31,000 per hectare.

Ireland has one of the most liberalized land markets in the EU. The process of land redistribution took place under the control of the state and subject to subsidization, traditionally long-term loans were given to peasants for 66 years. Debentures are passed on to the next generations, with the result that about 91 percent of the agricultural land is privately owned, about 20 percent is rented. A feature of the Irish market is short-term, seasonal leases, which traditionally are informal and do not require registration, unlike long-term leases. There are no restrictions on the purchase of land in Ireland by foreigners. Only legal entities - non-EU residents are required to obtain permission from the Land Commission. There are no restrictions on the minimum or maximum area that can be owned by one person. The registration fee can range from 1 percent to 8 percent of the cost of the deal, but a zero tax applies to young farmers. The land lease fee is only 1 percent of the transaction value. If farmers implement environmental programs or infrastructural development, a flexible system of tax benefits is applied. The average value of agricultural land is $ 39,000 per hectare.

In Spain, as a result of land reform, the priority category was introduced, which gave innovative agricultural companies the right to long-term lease of land, annual state aid for eight years and other benefits. The government has also set a bar for compulsory insurance. Land tax exceeds 0.3 percent of land value. The property transfer tax is 6-7 percent of the transaction value.

There are no restrictions on the purchase and sale of land for foreigners. There is no regulation of the price corridor, no minimum or maximum volumes of land for agribusiness are defined. In Spain, one of the highest in the EU is the level of value added in the agro-industrial complex per worker. The average value of agricultural land is $ 16,000 per hectare.

Germany is a country with a traditionally high level of mechanization and the introduction of environmentally friendly technologies in agricultural production. But in the 90 years of XX century in the agricultural sector of the country there was a political crisis caused by the reason of which was the incorporation of the former GDR farms in liberalized and highly developed market of Germany. The land privatization process had three stages.

In the first stage, the land was not sold but only leased for 12 years; on the second, the state land was sold at a preferential cost, above all, to those who lost their holdings in 1945 or were already involved in agricultural production; on the third, land that continued to be held by the state fund was marketed through auctions. Former landowners may purchase agricultural land at a preferential value, provided that it is used for its intended purpose within the next 20 years. Tax is no more than 3.5 percent of the transaction value and is charged to the buyer.

In Germany, medium-sized farms and large corporate farms predominate. The market of the eastern federal lands is almost four times more vibrant than the western ones. The average size of land purchased and sold is higher in the eastern regions than in the western regions. The average value of agricultural land is $ 32,000 per hectare.

In the Netherlands, technologies that contribute to high-efficiency production are widely used, with productivity five times higher than the European average. The high liquidity of the agro-industrial complex in the Netherlands motivates financial corporations to buy agricultural assets from owners and lease them to such owners. In this case, the previous owner can buy his land at the end of the lease term, having additional working capital without involvement of credit resources. In the Netherlands, 89 percent of agricultural land is privately owned. There are no regulatory restrictions on the price, area or country of origin of capital for investment in agro-industrial complex in the Netherlands. Land acquisition tax is 6 percent of the transaction value.

The buyer may be exempt from tax if he or she is not obliged to change the purpose of his / her asset for ten years. The minimum lease term is six years, the farm - 12 years. The tenant has the priority right to purchase his land in the event of its auction. It is one of the most successful examples of liberalization and deregulation in the world. The average value of agricultural land in the Netherlands is $ 64,000 per hectare.

Switzerland is an example of an open and high-tech market for agricultural assets worldwide. Although the agro-industrial complex employs only 3.2 percent of the population, more than 50 percent of the food consumed by the population is produced in Switzerland. 100 percent of the land in the state is privately owned. There is no state regulation or influence on the market balance, restrictions on the right to buy and sell land under EU citizenship, one of the countries of the European Free Trade Association or having a residence permit in Switzerland. The only condition for the acquisition of agricultural land is that the buyer must operate the farm on his own, with appropriate experience or qualifications. The maximum area is regulated by local authorities in each canton (self-governing province). The cost of the agreement should not exceed the average cost of similar sites over the last five years by 15 percent. Land ownership tax is minimal - no more than 0.3 percent of the market value of land. The lease term should be at least nine years. Changing the purpose of the land after the sale is prohibited. Land use is strictly regulated by legislation on environmental standards and animal welfare. Priority is given to family forms of production. The landowner in the case of sale must obtain the notary permission from relatives who have the primary right of inheritance or purchase of this land. The average land value in Switzerland is $ 70,000 per hectare.

The turnover of agricultural land in Ukraine is quite static, owing to the current ban on the alienation of agricultural land (the so-called "moratorium"), which was established in 2002.

Due to the moratorium in Ukraine, it is forbidden to sell, donate, pledge or otherwise alienate 96% of all privately owned agricultural land, as well as all state and communal lands. The exception to the moratorium is only land granted for personal peasant farming, obtained through privatization of state-owned agricultural enterprises, individual gardening, etc. Such land accounts for about 1.7 million hectares, ie 4% of all agricultural land.

The moratorium had previously been in place until 2005 with the aim of adopting the relevant legislation and establishing the infrastructure of the land market, but since then the Verkhovna Rada of Ukraine extended the moratorium 8 times and last extended the moratorium until January 1, 2018.

In the event of a lifting of the agricultural land moratorium, the World Bank estimates that land prices will rise to $ 3-3.5 thousand per hectare compared to the current $ 1-1.5 thousand.

In the absence of the agricultural land market in Ukraine, leasing relations are actively developing, the cost of rent is deducted from the normative monetary valuation, so the average cost of the normative monetary valuation of land in Ukraine was used when comparing prices with European countries.

In the EU Member States, as in Ukraine, significant amounts of agricultural land are rented in the short or long term. In terms of EU countries, the most expensive agricultural land lease is in the Netherlands - 791 euros / ha, the cheapest - in Latvia - 46 euros per hectare. In Ukraine, in 2017, the average lease payment for one hectare of agricultural land was UAH 1369 or EUR 41 (Fig.3.7).

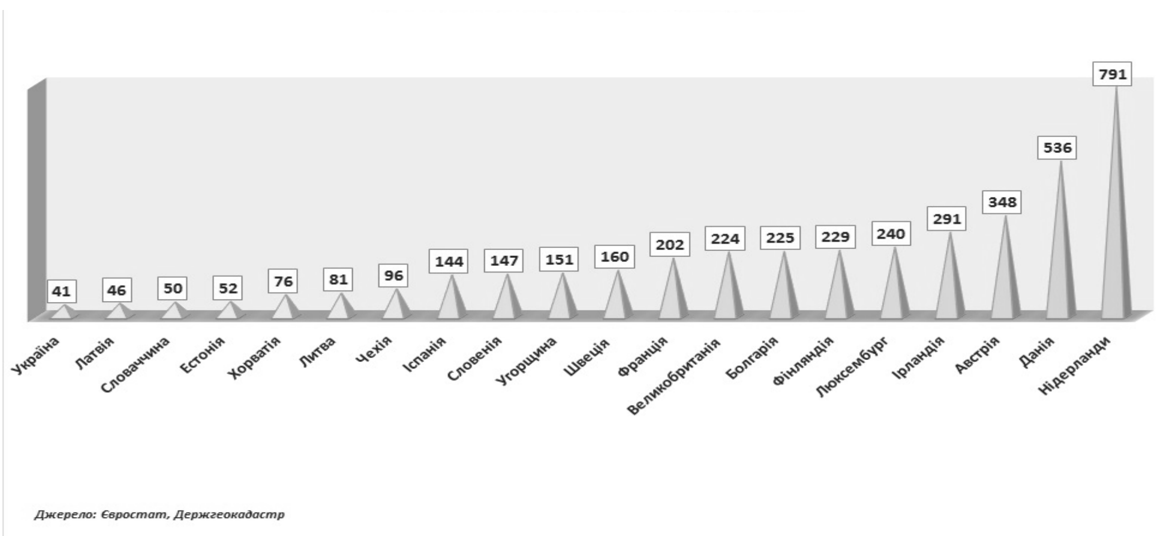

Figure 3.7. Average lease payment for agricultural land in individual EU countries and Ukraine, euro / hectare

Given the world experience, as well as the fact that in developed countries both the lease relations and the agricultural land market are developing uniformly, Ukraine needs to develop such directions.

3.6. Economic efficiency of land use in agricultural enterprises and the main directions of its increase

The full satisfaction of the population's needs for food, light industries in agricultural raw materials requires an increase in agricultural production on the basis of rational and efficient land use. The level of agricultural production is largely determined by the qualitative composition of the land. However, land use efficiency is influenced by many factors, including the level of development of productive forces, the degree of land plowing, the structure of acreage, the share of land reclaimed in the total area of agricultural land.

The economic efficiency of land use in agriculture is characterized by a system of natural and value indicators.

By *natural indicators* include:

- crop yields;
- production of certain types of agricultural products per 100 hectares of land (milk, meat of all kinds, beef, wool - 100 hectares of agricultural land; grain, sugar beets and other crop products, as well as pork - per 100 hectares of poultry production; - per 100 hectares of crop area).

To *cost indicators* include: cost of gross and marketable products, gross and net income and earnings per 1ha of agricultural land.

Since natural indicators characterize the level of use of a certain part of agricultural land in the production of certain types of crop and livestock products, they are applied to farms with the same sectoral structure of production.

The cost indicators most fully characterize the economic efficiency of land use and enable the comparison and objective assessment of land use levels in farms that specialize in the production of different types of products.

Table 3.2

Indicators of agricultural land use efficiency in Ukraine (all farm categories)

Indicators	Years			
	2010	2015	2016	2017
Yield, kg / ha: cereals and legumes	26,9	41,1	46,1	42.5
Sugar beet	279,5	435,8	481,5	474,9
Sunflower	15.0	21.6	22,4	20,2
Potato	132.5	161,4	165,8	167,8
Produced on 100 ha of agricultural land. please, q: Milk	271	256	250	248
Meat of all kinds (in slaughter weight)	50	56	56	56
Beef and veal	10	9	9	9
Wool	101	55	50	47
Pork was produced per 100 ha of arable land, c	19,4	23.3	23,0	22,6
Produced per 100 ha of grain sowing: eggs, ths.	113	114	105	106
Poultry meat, c	63,2	77.6	81,0	81,0
Gross production cost per 1 ha of agricultural production land (at constant 2010 prices), UAH.	4687,5	5769,2	6136,2	6005,3

According to Table 3.2 it is possible to estimate the level of economic efficiency of land use in agricultural enterprises of Ukraine of all categories. Analyzing it in dynamics, it should be noted that for the period 2010-2017. there was a gradual increase in the utilization of agricultural land. Yes, in 2017 compared to 2010. the value of gross output (at constant 2010 prices) per agricultural hectare increased from UAH 4687.5. up to 6005,3 UAH or 1,3 times. This was due to higher yields of basic crops and an increase in the production of meat of all kinds, especially pork and poultry.

Improving the efficiency of land use is one of the most important national economic problems, the successful solution of which will contribute to the effective functioning of agricultural enterprises. It should be noted that the advanced farms in Ukraine have achieved a sufficiently high level of agricultural land use efficiency.

The rational and effective use of land in agricultural enterprises can be achieved by taking measures to increase soil fertility and protect it from erosion and other destructive processes. Based on national interests, society should use the land to pass it on to improved generations. The implementation of the achievements of scientific and technological progress and intensive technologies in agriculture objectively requires not only their positive impact on land but also the possible negative consequences caused by the specific manifestation of certain means of production.

In this connection, we can distinguish the following main directions of increasing the economic efficiency of land use in agriculture: 1) a system of measures to increase the fertility of land;
2) protection of soils from erosion and other destructive processes;
3) reduction of land areas falling out of agricultural turnover.

The diversity of natural conditions necessitates the introduction of a scientifically sound system of agriculture, which provides for the increase of soil fertility, improvement of the quality of agricultural land. Therefore, the main component of the farming system is the farming system.

The system of agriculture is a complex of interrelated agro-technical, reclamation and organizational-economic measures aimed at efficient use of land, preservation and increase of soil fertility, obtaining high yields of crops. The system of agriculture includes the structure of acreage, crop rotation systems, tillage, fertilizers, seeds, weed control, pests and diseases of crops, system of reclamation measures, protection of soils from water and wind erosion, environmental protection.

Increasing the efficiency of land use in agriculture is facilitated by the intensification of crop production through the introduction of progressive farming systems, advanced machinery and technology for growing crops.

Strengthening the material and technical base of enterprises, the achievement of agrarian and economic science create objective prerequisites for the conversion of agriculture on an industrial basis, the introduction of advanced technologies of crop production. The most important requirements for industrial technology are the preservation and increase of fertility of the land, high quality of work, their execution in the optimum agrotechnical terms, improvement of working conditions and increase of its productivity, improvement of product quality and rational use of nature.

Land reclamation is aimed at increasing the economic fertility of the soil and growing sustainable crop yields . It covers irrigation, forest plantation (land reclamation), radical improvement of natural forage, anti-erosion and other measures.

The economic efficiency of the use of crop production resources depends to a large extent on the soil fertility level . The dynamics of humus content in soils of different zones of Ukraine indicates that growing high crop yields under conditions of deficient humus balance requires an increase in the use of organic fertilizers. An average of 10.5 tonnes of organic fertilizer should be applied per 1 hectare of arable land, incl. in Polissya - 14 tons, in Forest Steppe - 11 tons and in the Steppe - 9 tons.

An important way to increase the economic efficiency of land use is to protect the soil from erosion and other destructive processes .

It is necessary to expand the use of soil protection systems and methods of soil cultivation and anti-erosion measures in farms. Landowners and land users are obliged to take measures to protect the soil from wind and water erosion, to prevent salinisation, waterlogging and overgrown with weeds, as well as other processes that worsen the soil.

The agricultural land resources of Ukraine are relatively large but not infinite. Therefore, the protection of agricultural land, and especially the most productive part of them - arable land that falls out of agricultural turnover , is an important state problem .

With the development of industry, transport and construction of cities there is a constant withdrawal of land from agricultural production. There is also an unjustified allotment of agricultural land for other purposes. It is therefore necessary to apply economic measures to protect agricultural land resources . According to the land cadastre, such monetary valuation of a hectare of agricultural land should be established so that it is not always disadvantageous for industrial enterprises and organizations to use them for non-agricultural purposes.

Of great importance for the rational use of land is the improvement of the economic mechanism of management aimed at the protection of natural resources. Industrial and construction enterprises are obliged to recultivate the land and transfer it for agricultural or forestry use after the development of minerals or other works.

These and many other measures to improve the efficiency of land use can be effectively implemented, taking into account the regional characteristics of agricultural production, economic and legal conditions of management. The implementation of these measures is the basis for the successful development of agricultural enterprises, improving the welfare of the people and strengthening the economy of the country.

QUESTIONS FOR SELF-CONTROL

1. What are the features of the land as a means of production in agriculture?
2. Types of soil fertility?
3. Purposeful land categories?
4. The composition and structure of agricultural land in Ukraine?
5. Main landowners and land users of agricultural land, their rights and responsibilities?
6. Land ownership, land use, rent and rent?
7. What is the right of land servitude?
8. What is the essence of the land cadastre and what is it used for?

9 . Indicators of economic evaluation of land use?

10 . Basic directions of rational use of land and increase of its efficiency?

TEST TASKS

1. Fill in the missing word :

……… - a set of necessary and substantiated information about the natural properties of lands, their economic and legal status.

2. Agricultural land shall include:

1)ponds and reservoirs;

2)arable land;

3)land of nature conservation purpose;

4)sowing area of agricultural land enterprises.

3. In the structure of agricultural land. the area of arable land is:

1)almost 80%;

2)more than 50%;

3)almost 60%;

4)more than 70%.

4. Land cadastre is:

1)a set of necessary information about the natural properties of land and the efficiency of their use;
2)a set of necessary information about the economic and legal status of the lands and the level of their use;
3)a set of necessary and substantiated information about the natural properties of land, their economic and legal status;
4)a set of necessary information about the efficiency of land use and their legal status in terms of transition to market relations.

5. Land cadastre is used for:

1)to determine the specialization of the enterprise;

2)to determine the location of agricultural land. production;

3)organization of efficient use and protection of land;

4)to determine land use efficiency.

6. Monetary valuation of land is used for:
1)determination of recoupment of production costs;

2)obtaining a loan secured by land;

3)determining the level of land use;

4)definition of specialization of the enterprise.

7. Indicators of economic efficiency of land use:
1)egg production per 100 ha of arable land;

2)milk production per 100 ha of agricultural land. land;

3)pork production per 100 ha of arable land;

4)production of beef per 100 ha of arable land.

5) profit for 1 UAH. Basic th capital

8 . Indicators of economic efficiency of land use:
1)the cost of gross output per average annual employee ;

2)the cost of gross production at 1 UAH. costs;

3)profit for the 1st hectare of the year land;

4)the value of gross production per 1 ha of agricultural land. land ;

9 . The main directions of increasing the efficiency of land use:
1)improving productivity in the economy;

2)system of measures for increasing the fertility of land;

3)lease of land in agricultural enterprises;

4)expansion of acreage of industrial crops.

10. The ability of the soil to produce a crop, the level of which characterizes its productive forces - is:
1) yield;
2) the level of profitability;
3) fertility;
4) rate of return.

THEME 4. MATERIAL AND TECHNICAL BASE OF AGRICULTURE

4.1. The concept and features of the agriculture’s material and technical base

The creation of a developed high-performance agricultural production requires an appropriate level of development of the material and technical base of agricultural enterprises. The material and technical base is one of the most important components of the productive forces and has a multifaceted importance in the development of agricultural production.

The material and technical base of an agricultural enterprise is a set of means and objects of labor that are used in agricultural production. It includes the material elements of the productive forces of the industry and creates the appropriate material conditions for the production of agricultural products. It is important to make effective use of the production potential created over many years in agricultural enterprises.

The primary role is played by the means of production as a part of the material and technical base of agricultural enterprises. They include:

- land as the main means of agricultural production;
- tractors, combine motors, automobiles, stationary engines, electric power plants and working cattle. These elements of the material and technical base constitute the energy resources of the enterprise. Power machines do not directly affect the objects of labor, but their role in the development of the productive forces of agriculture is extremely large;

- agricultural machinery and implements, livestock farm equipment and feed preparation machines, other working machines that are used in agricultural production, power grids, water pipelines. Working machines are the basis for all work in crop and livestock production, as well as in the primary processing of agricultural products;виробничі приміщення та споруди, транспортні засоби і дороги;
- productive livestock and poultry;
- feed, seeds, organic and mineral fertilizers, chemicals of crop production and animal husbandry, as well as other means of production in agricultural enterprises.

All these components of the material and technical base are means and objects of labor, which are used in agricultural production. The main of them are mechanical means of labor, which constitute the material basis of agricultural production. However, in the formation and development of the material and technical base in agricultural enterprises, a special role belongs to the land - it is the main and indispensable means of production, without land, the process of agricultural production itself is impossible.

The material and technical base of agriculture has material and structural features due to differences in the technology of agricultural production, a different combination of natural and technical factors:

1. The most important part of the material and technical base of the agricultural enterprise is land-the main means of agricultural production. Land used in agricultural production is called agricultural land. They include arable land, hayfields, pastures, perennial plantations and deposits. Agricultural lands of agricultural enterprises are characterized by different quality and productivity, which primarily depends on the zonal characteristics of their location. Agricultural lands of our country are determined by a large share of arable land, which is the basis for the development of intensive agricultural production.
2. At the present stage, the main problem, the solution of which depends on the further development of agricultural production, increasing the fertility of

land. Only under these conditions can the efficient use of all other means of production be ensured, in particular machinery and equipment, production facilities and facilities, productive livestock and feed, seeds and fertilizers.

3. The material and technical base of agriculture significantly depends on natural conditions and is characterized by zonal features of agricultural production. In different zones with different soil and climatic conditions, different systems of machines are used, which most fully take into account regional differences and meet specific production conditions.

4. The material and technical base of agricultural enterprises is formed and developed taking into account the seasonal nature of production. In this regard, a significant number of agricultural machines and tools are used for a short period, appropriate stocks of seeds, feed and other means are created. This requires additional costs and affects the efficiency of the use of material and technical means.

5. An integral part of the material and technical base of agriculture are living organisms-productive and working cattle, young animals, poultry, perennial plantations and the like. Economic and biological processes are closely intertwined in agricultural production. The latter are determined by the growth and development of living organisms and significantly affect the efficiency of the use of all other means of production.

6. An integral part of the material and technical base are the means of production, which are created directly in agriculture (productive livestock, feed, seeds, organic fertilizers).

Today, in the agricultural sector of Ukraine, the problem of updating and development of material and technical means is quite acute, in the solution of which an important place is occupied by the formation of the equipment market and the provision of services to agricultural producers. The solution of these issues is constrained by the difficult financial condition of agricultural producers, their low solvency, the lack of long-term systemic credit support for agricultural production.

In recent years, the material and technical base of the agro-industrial complex has undergone significant destruction. Due to the fact that the majority of agricultural machinery has fulfilled its amortization period, the funds provided for the purchase of new, producers actually spend on its repair and maintenance.

Technical support of agriculture has now reached a critical limit.

Table 4.1

Dynamics of agricultural enterprise's technical equipment in Ukraine

Type of technology	Year				
	2000	2010	2015	2016	2017
Tractors, ths pcs	318,9	151,3	127,9	132,7	129,3
Combine harvester, ths pcs	65,2	32,8	26,7	27,4	26,8
Corn harvesters, ths pcs	7,9	2,5	1,6	1,5	1,5
Beet harvester, ths pcs	13	1,2	2,4	2,3	2,0
Flax harvesters, ths pcs	1,7	0,5	0,2	0,2	0,1
Trucks, ths pcs	227	104	83,6	87,3	81,2
Milking machines and devices, ths pcs	33,5	10,9	10,2	10,3	9,5

In 2000-2017, the level of provision of agricultural enterprises with all means of production decreased rapidly (table 4.1). Having analyzed the availability of equipment of agricultural enterprises, it can be noted that the number of tractors decreased from 319 thousand pieces in 2000 to 129.3 thousand pieces in 2017, or by 59.5%, corn harvesters – by 81%, corn harvesters – by 69%, beet harvesters – by 69.4%, flax harvesters – by 94%, trucks - by 64.2%, milking 71.6%. These data show that in 2000-2017 the material and technical base of agricultural enterprises did not develop.

Technical support of agriculture is one of the decisive factors of food security of the state. Equipment of agricultural enterprises with various types of equipment – about 50% of the technological needs. Of the existing technical means almost 80% depreciated. Due to physical wear and tear and technical malfunctions, almost a third of the available equipment is not used every year, which increases the load on it.

The low solvency of agricultural producers has led to a significant slowdown in the rate of reproduction of technical means, as a result of which domestic plants of tractor and agricultural machinery have almost completely lost markets for their products and are on the verge of bankruptcy and termination of production of technical means for agriculture. For the same reasons, almost lost repair and maintenance industry. The existing fleet of machines is maintained in working order mainly by the efforts of the users themselves on their own service base, which is not sufficiently provided with repair and technical equipment and qualified personnel.

The distribution of the main types of equipment between agricultural enterprises and households is presented in table 4.2. It is noteworthy that 62.8% of tractors and only a third of combines are concentrated in the farms of the population.

Table 4.2

Ratio of availability of main types of agricultural machinery by categories of farms, %

	2010	2015	2016	2017
Tractors: in agricultural enterprises	44,4	41,3	39,0	37,2
in households	55,6	58,7	61,0	62,8
Harvesters: in agricultural enterprises	61,2	66,6	72,0	70,9
in households	38,8	33,4	28,0	29,1

This is due to the fact that it is in agricultural enterprises concentrated production of cereals (including corn), sugar beets and flax. Although 98% of potatoes are grown in households, they do not use specialized potato harvesters.

Table 4.3

Number of agricultural machinery's main types per 1 agricultural enterprise by the size of agricultural land in 2017, pieces

Enterprises that had agricultural land	Tractors-total	Cargo and cargo-passenger automobiles	Combine harvester
including area, ha			
до 50,0	2	2	1
50,1–100,0	2	2	1
100,1–500,0	4	3	1
500,1–1000,0	7	4	2
1000,1–2000,0	11	8	3
2000,1–3000,0	16	13	4
3000,1–4000,0	20	16	4
4000,1–5000,0	25	20	5
5000,1–7000,0	27	21	6
7000,1–10000,0	32	25	7
More than 10000,1	73	63	14
Enterprises that did not have agricultural land	5	6	3

According to the level of agriculture's provision with material and technical resources, Ukraine lags behind the developed countries of the world. The quantity and quality of fixed assets does not meet the technological needs. On average, in Ukraine, 1 hectare of agricultural land accounts for 5-7 times less fixed assets than in agricultural enterprises with the existing material and technical base (table 4.3).

Small and medium-sized farms have especially low level of equipment, with an area of crops up to 250 hectares, which make up more than 2/3 of their total number.

At the same time, it should be noted that the level of provision of enterprises with appropriate technical means depends on the introduction of intensive and industrial technologies of agricultural production.

Table 4.4

Provision of agricultural enterprises of Ukraine with agricultural machinery

	Year				
	2000	2010	2015	2016	2017
Tractor, ths pcs	318,9	151,3	127,9	132,7	129,3
per 10,000 ha of arable land, pcs	124	78	68	71	69
Combine harvester, ths pcs	65,2	32,8	26,7	27,4	26,8
per 10,000 ha of sown area of grain crops (without corn), pcs	59	36	35	38	38
Corn harvester, ths pcs	7,9	2,5	1,6	1,5	1,5
per 10,000 ha of corn acreage, pcs	81	12	5	5	4
Potato harvester, ths pcs	3,6	1,7	1,2	1,2	1,1
per 10,000 ha of potato acreage, PCs	1338	590	531	553	612
Beet harvesters, ths pcs	13	4,2	2,4	2,3	2
per 10,000 ha of sown area of sugar beet factory, pcs	165	92	114	84	68
Flax harvesters, ths pcs	1,7	0,5	0,2	0,2	0,1
per 10,000 ha of flax acreage, pcs	729	84	31	28	32

There is a significant reduction in the number of all types of equipment per unit area (table 4.4), which is primarily due to the growth of its productivity, changes in technologies for growing individual crops and changes in the area of crops. Attention is drawn to the fact that in quantitative terms for the period 2010-2017. combine harvesters became less than 6 thousand pieces. At the rate of 10 thousand hectares of grain crops, their number increased by 2 harvesters.

Calculations carried out in the NSC "Institute of economics in agriculture" show that all the needs of agricultural enterprises will be provided if the 10,000 hectares of arable land account for 160-180 tractors in reference calculation and 80-85 combine harvesters per 10,000 hectares of crops without corn. In 2017, these indicators were: tractors-69 pieces, combine harvesters-38 pieces.

With the strengthening and development of the material and technical base of agricultural enterprises increases the production of agricultural products. Quantitative and qualitative indicators of agricultural production, the level of satisfaction of the population's demand for food quite depend on the achieved level of development of the productive forces of agricultural enterprises. However, the strengthening of their material and technical base largely depends on the development of industries that supply the village with industrial means of production.

The determining factor of improving the material and technical base of agricultural enterprises is scientific and technical progress, which is carried out continuously and is a necessary condition for economic and social development. In the conditions of scientific and technological progress, first of all, the means of labor are improved, which are crucial for the development of material production. The means of labor is not only a measure of the development of the labor force, but also an indicator of the level of social relations in which labor is performed.

Features of agricultural production are reflected in the development of productive forces of this sphere of production activity. In particular, the progress of agricultural science and the introduction of its achievements into production play an important role in strengthening and developing the material and technical base of agricultural enterprises. It is a question of improvement of plants and animals of biological and economic objects on the basis of deduction and use of new grades of agricultural crops, breeds of cattle and a bird of high productivity. The use of agricultural crops and animal breeds with great potential for increasing productivity is the basis for the introduction of intensive technologies that ensure high efficiency of agricultural enterprises.

4.2. Energy resources of agricultural enterprises

The most active part of the material and technical base in agricultural enterprises are energy resources, which include the power of mechanical engines (tractors, combines, cars, etc.), electric motors, electrical installations and livestock. In this case, the power of electric motors and electrical installations can be converted into mechanical horsepower by a factor of 1 kW-1.36, working horses-0.75, working oxen-0.5 mechanical horsepower. Increasing the level of enterprise's provision with energy resources characterizes the strengthening and development of their material and technical base.

The mechanical engines make up the vast majority in the energy resources of agricultural enterprises in Ukraine (table 4.4), and the share of working cattle is only 0.02%. In the composition of energy resources, the main place is occupied by tractor and automobile engines, the share of which is about 2/3 of all capacities.

The total number of agricultural enterprise's energy resources of Ukraine in 2017 compared to 2010 decreased by 5,034 thousand kW, or 13.7%.

Table 4.4

Availability of power capacities in agricultural enterprises of Ukraine, thousand kW

Types of power capacity	Year			
	2010	2015	2016	2017
Total power capacity, incl.:	36739	31020	32835	31705
tractor engine	12557	12033	12615	12582
engines of combines and self-propelled machines	6101	5797	6096	6229
car engine	12339	10044	10353	9811
other mechanical motors	348	312	351	376
electric motors and electrical installations	5371	2806	3397	2683
equipment for the production of renewable energy	2	21	15	19
working cattle in terms of mechanical force	21	7	8	5

The level of provision of agricultural enterprises with energy resources is determined by the following indicators:

power supply of the enterprise – is a quantity of power capacities (K. s.) at the rate of 100 hectares of the sown area;

energy efficiency of labor – is an amount of energy capacity (K. s.) per average annual worker employed in agricultural production.

У 2000-2017 рр. енергетичні потужності в розрахунку на одне сільськогосподарське підприємство зменшились на 3,9% (таблиця 4.5).

Energy capacity (per agricultural enterprise) decreased by 3.9% in 2000-2017 (table 4.5).

The level of provision of agricultural enterprises with energy resources for 2000-2017 decreased. If in 2000 per 100 hectares of acreage accounted for 312 kW, in 2017-165 kW, or 47.1% less. The level of energy intensity of labor for the studied years in connection with a sharp decrease in the number of workers in agricultural enterprises, increased from 28.2 es to 63.9 KS per average annual employee, or 2.3 times.

Table 4.5

Dynamics of provision with agricultural enterprise's energy resources in Ukraine

Indicator	Year				
	2000	2010	2015	2016	2017
Energy capacity of agricultural enterprises, mln kW	69,8	36,7	31,0	32,8	31,7
Power capacity per 1 enterprise, kW	1660	1713	724	761	759
Power capacity, kW:	28,2	51,8	61,9	64,0	63,9
per employee	312	193	166	175	165
per 100 hectares of acreage	3811	2928	v.d.	2256	2184
The total consumption of electricity, mln kWh	1824	4130	v.d.	4396	4402

Indicators of agricultural enterprise's energy efficiency differ significantly in some regions of Ukraine, due to differences in their sectoral structure, specialization and concentration of production and other factors.

The use of electricity becomes important in the energy resources of farms, which indicates the further development and improvement of the material and technical base of agricultural production. Electrification of production processes is an important factor in the introduction of complex mechanization and automation of agricultural production.

The use of electricity in agricultural enterprises of Ukraine for 2000-2017 decreased by 42.7%.

The labor efficiency is used to estimate the level of electricity using in enterprises, which is determined by the amount of electricity used for production needs, per average annual worker of agricultural production.

Labor efficiency in agricultural enterprises of Ukraine amounted to 1824 kWh in 2000, then in 2017 - 4402 kWh., or 2.4 times more.

The introduction of the achievements of the scientific and technological revolution, the transfer of agricultural production to an industrial basis require a significant increase in the use of electricity. The growth of labor productivity in enterprises provides a significant increase in its productivity. Electrification of agriculture has great economic and social importance, contributing to the improvement of working and living conditions of rural workers.

Increasing the level of provision of agricultural enterprises with energy resources determines the rational and efficient use of them. In the process of development of material and technical base of enterprises, the introduction of energy-saving technologies becomes important. They should become one of the main sources of meeting the growing needs of households in energy resources, contribute to improving production efficiency.

4.4. Machine and tractor fleet and efficiency of its use

Provision of agricultural enterprises with machinery and high-performance use of it are of particular importance. After all, the quantity and quality of agricultural products largely depend on compliance with certain deadlines for individual production processes and works.

As part of the equipment used in farms, dominated by machine and tractor fleet. With its help, mechanized work is carried out in crop production, animal husbandry, transport and other industries.

The volume of mechanized works of the machine and tractor fleet is calculated in conventional reference hectares. *A reference hectare* is a conventional unit that corresponds to plowing 1 hectare of arable land under certain (reference) conditions. Accordingly, the coefficients of the transfer of various types of mechanized works in conventional reference hectares.

Conditional reference hectares are determined by multiplying the number of performed normozmin tractor of the corresponding brand on its replacement reference output. It is calculated for each brand of tractors by multiplying the coefficient (to translate this brand of tractors in the conditional reference) on the duration of the shift in hours. The number normon determined by dividing the actually performed scope of work for change on a change of rate of development. In those cases when the tractor works hourly, quantity normozmin define by division of the fulfilled time on 7 hours.

Normative output determined for each brand of tractor in reference hectares per unit of working time. Production in 1 hour. for tractor DT-75 is 1 conventional hectare, so it is taken as a reference. Tractors of all other brands are translated into conditional reference tractors by the corresponding coefficients.

Physical tractors are assigned into conditional references by the coefficients, which are determined on the basis of the normative output per shift. Tractors of class 3 t (DT–75, T–74, T–75) with standard development of 7 hectares are accepted for unit. Then, for example, the tractor T-150 with standard development of 11,6 hectares will have coefficient for transfer to conditionally-reference 1,65 (11,6:7).

The similar system of indicators is used to determine the efficiency of harvesters and other complex machines. However, the volume of work performed by harvesters is calculated in physical hectares of harvested area of the respective crops (cereals, potatoes, sugar beets, corn for silage, etc.).

Ensuring the effective use of equipment and the need to perform a complex of mechanized works in the optimal time conditions justify the quantitative and structural composition of the machine and tractor fleet of the enterprise.

Table 4.6 shows a decrease in the number of tractors in the period 2010-2017 from 151287 units to 129272 units, or 14.6%. This decrease was due to a decrease in the availability of tractors with low power: less than 40 kW-by 34.1% and from 40 to 60 kW-by 34.7%.

Table 4.6

Availability of tractors in agricultural enterprises, units

	Year			
	2010	2015	2016	2017
Tractors-total	151287	127852	127852	129 272
including tractors capacity: less than 40 kW	9798	6678	6678	6 461
from 40 to 60 kW	57584	41489	41489	37 628
from 60 to 100 kW	43929	41615	41615	44 394
100 kW or more	39976	38070	38070	40 789

The number of tractors with a capacity of 60 to 100 kW and 100 kW or more, on the contrary, increases by 1.1% and 2% respectively. This led to a change in the structure of the machine-tractor fleet of agricultural enterprises of Ukraine (table 4.7).

If in 2010 the largest share was occupied by tractors with a capacity of 40 to 60 kW – 38.1%, in 2017-with a capacity of 60 to 100 kW-34.3%.

Table 4.7

Distribution of tractors by capacity in agricultural enterprises of Ukraine, %

Capacity	Year			
	2010	2015	2016	2017
Less than 40 kW	6,5	5,2	5,2	5,0
from 40 to 60 kW	38,1	32,5	32,5	29,1
from 60 to 100 kW	29,0	32,5	32,5	34,3
100 kW or more	26,4	29,8	29,8	31,6

The availability of tractors of different capacities and in the context of enterprises of different organizational and legal forms of management has also changed significantly (table 4.8).

Table 4.8

Availability of tractors in agricultural enterprises by organizational and legal forms of management, units

	Agricultural enterprises, total	including					
		Business entities	Private enterprises	Cooperatives	Farms	State enterprises	Enterprises of other organizational forms
2010 year							
Tractors-total	151287	67724	23567	10355	29254	4875	15512
including tractors less than 40 kW	9798	4289	1234	830	1293	488	1664
from 40 to 60 kW	57584	24548	8767	4459	11632	2172	6006
from 60 to 100 kW	43929	19657	7071	2692	9484	1158	3867
100 kW or more	39976	19230	6495	2374	6845	1057	3975
2017 year							
Tractors-total	129272	58713	21585	4956	37248	2578	4192
including tractors less than 40 kW	6461	3039	940	294	1509	230	449
from 40 to 60 kW	37628	16842	6119	1923	10294	1085	1365
from 60 to 100 kW	44394	18 588	7460	1402	15096	646	1202
100 kW or more	40789	20244	7066	1337	1049	617	1176

The total demand for a certain group of tractors can be determined by the formula:

$$Пт = \frac{Он}{Д \cdot Кк \cdot Кз \cdot Кн \cdot Кт},$$

where Пт - need for a specific group of tractors;

Он - the amount of work in the shift production rates to be performed in the calendar peak period;

Д - number of days in the calendar peak period;

Кк - the utilization ratio of a period in weather conditions;

Кз - modification coefficient;

Кн - coefficient of replaceable norms of output;

Кт - the coefficient of technical readiness, which depends on the duration of the calendar (working) period.

Equipment of agricultural enterprises with high-performance technologies necessitates a combination of technical capabilities of machines and the requirements of their effective use. After all, the use of machinery and tractor fleet of the enterprise largely determines the amount of costs for the production of agricultural products and its economic efficiency.

The level of parks' efficiency is determined by three groups of indicators:

I. *Indicators of use intensity for machine-tractor park:*

– *the utilization rate* is determined by dividing the machine-days in work to the machine - days of stay in the enterprise;

– - *working off by one tractor of machine-days and machine-shifts for a year and a season* define by dividing of all volume of the fulfilled machine-days on average quantity of tractors and combines (separately) for a year and a season;

– *modification coefficient* is calculated as the ratio of the number of worked shifts to the number of worked days.

II. *Indicators of efficiency of use of machine-tractor park:*

– *annual (seasonal) production of conditional reference hectares by one tractor* is determined by dividing the total amount of work performed (physical and conditional hectares) by the average number of tractors per year (season);

– *the daily and shift output of one tractor* is determined by dividing the volume of work performed (physical hectares) by the number of machine-days and machine-shifts worked.

III. Indicators of efficiency of machine-tractor park use:

– the cost of one conventional reference hectare is determined by dividing the amount of operating costs for the ICC on the total amount of work in conventional reference hectares; for harvesters-the cost of a hectare of harvested area;

– *fuel consumption per standard hectare;*

- *production of gross output per unit cost of equipment* is determined by dividing the cost of gross output (in comparable prices in 2010) by 100 hryvnia cost of equipment in the ICC.

To determine the efficiency of harvesters and other complex machines use a similar system of indicators. However, the volume of work performed by harvesters is calculated in physical hectares of harvested area of the respective crops (cereals, potatoes, sugar beets, corn).

The main reason for the inefficient use of tractors in agricultural enterprises are simple. The causes of downtime (failure of tractors and agricultural machines, untimely delivery of technological materials, lack of work, etc.) are established on the basis of operational analysis of the use of working time for brands of tractors and in the Park as a whole. Thus the account of the reasons of idle times of tractors has to be well organized.

The measures to reduce downtime of tractors include improving the organization of maintenance of tractor units, labor organization, pre-acquisition of working machines, increasing the number of tractor drivers, improving the accounting system of the tractor fleet. Unfortunately, not always and not everywhere all the downtime of tractors are taken into account and reflected in the operational reporting. At the same time, as practice of work of many farms shows, their size very essential. Therefore, an objective analysis of downtime and their causes, the search for reserves to reduce them will contribute to a significant increase in the level of use of the tractor fleet at the enterprises of the industry.

The development of the material and technical base of agricultural enterprises involves the constant replacement of old equipment with new, imperfect systems of machines more productive and automated. The use of new equipment or a new system of machines in farms significantly affects the efficiency of agricultural production. Therefore, recommending a particular system of machines before introduction into production, it is necessary to determine its economic efficiency and justify the feasibility of using a fundamentally new system of machines.

4.5. Vehicles and their use

An important component of the material and technical base of agricultural enterprises are vehicles. They constitute an independent industry for each enterprise, which provides transportation of goods. Consistency of production processes with transport operations is a necessary condition for uninterrupted and productive work of each agricultural enterprise.

Agricultural production has wide connections and its further development is impossible without a developed system of inter-farm and intra-farm vehicles. Due to the large territorial remoteness of fields and farms, cargo transportation is an important part of the production process.

Transport works are divided into:

- internal-brigade-transportation of workers of production divisions; delivery of container, fertilizers, seeds on fields; transportation of production to places of sorting, packing, etc.;
- inside-farm - transportation of products from fields and farms to places of completion, processing, storage;
- extra-farm - transportation of goods to procurement and processing enterprises, elevators or delivery of means of production used in economic

activities.

In agrarian formations the volume of cargoes in tons is determined by technological maps of cultivation of agricultural crops and production of animal products with simultaneous consideration of transportation of various materials, mineral fertilizers, oil products, fuel, etc.

Organizational and economic requirements for any types of vehicles are their compliance with the type of cargo, the possibility of rational organization of labor and minimum operating costs.

Rational organization of transport works in agricultural formations requires consistency in the work of loading and unloading machines, mechanisms and vehicles, their full load during the year, rational acquisition of units taking into account the transport speed and load capacity of cars and trailers, high-quality road network and organizational forms of agricultural production.

The volume of transport works in ton-kilometers, or cargo turnover, is calculated by multiplying the volume of cargo transportation in tons by the weighted average distance of transportation. The volume of cargo transportation in tons and cargo turnover in ton-kilometers in a particular agricultural enterprise depends on the area of land use, the level of crop yields, animal productivity, the specialization of the economy, its distance from processing enterprises and procurement organizations, the railway station and other works.

The need for vehicles is significantly influenced by the class of goods. There are five such classes. The first class includes loads that provide 100% of the use of load capacity (grain, except oats and corn on the cob, fresh potatoes, flour, fresh fruit in boxes, stone, cement, mineral fertilizers, etc.), the second – using a load capacity of 99-71% (wool pressed, garden greens in boxes, fresh cabbage, feed, corn on the cob, hay and straw pressed, sunflower seeds, etc.), to the third – 70-51% (wool fresh milk in cans and tankers, oil products, silage, tobacco, livestock (and the like), up to the fourth – by 50-41% (vegetable greens in bulk, silkworm cocoons, vegetable seedlings without packaging, small domestic cattle, etc.), by the fifth class – loads that ensure the use of load capacity of less than 41% (cotton).

Agricultural enterprises mainly use three types of transport - road, tractor and horse-drawn. The total volume of annual transported cargo per 1 hectare of arable land is 70-90 tons, of which up to 75% of all cargo is transported by road, 23% of transportation is carried out by tractors and 2% by horse-drawn transport. The ratio between the individual modes of transport and the distribution of traffic by type of vehicle are established in each agricultural formation, taking into account such factors as the class of cargo, road conditions, distance of transportation, urgency, weather conditions, method of loading and unloading, technology of agricultural production. Other things being equal, the criterion for choosing a vehicle is to minimize costs per ton of cargo transported.

Freight transport requires high costs for its maintenance and this largely affects the cost of agricultural products.

The economic efficiency of the use of vehicles is characterized by a system of indicators. To determine the economic efficiency of the use of road transport, the following indicators are used:

1) car utilization rate (the ratio of the number of car-days in work to the number of car-days in the economy);
2) average daily mileage of one car, km;
3) mileage utilization ratio (ratio of mileage with load to total mileage);
4) load capacity utilization factor (the ratio of actual work performed to the possible volume, t-km);
5) the number of transported goods in tons and the number of ton-kilometers per vehicle;
6) average technical speed is calculated by dividing the total mileage of cars on the time spent in motion;
7) cost per ton-kilometer;
8) operating costs per 100 km of mileage and per ton of cargo.

The efficiency of the use of vehicles depends not only on the technical and operational capabilities of modern cars, but also on the availability and condition of the road network. The construction of paved roads requires considerable funds, but is cost-effective. Significantly increase the speed of transportation and load capacity of vehicles, reduce fuel costs and repair costs of vehicles. The condition of the roads is also an important factor in the socio-economic development of the village.

QUESTIONS FOR SELF-CONTROL

1. What is a part of the material and technical base of agriculture?
2. What are the material and structural features of the material and technical base of agriculture.
3. The level of technical equipment of agricultural enterprises in recent years.
4. What are the indicators of energy resources of agricultural enterprises.
5. How is the energy supply of an agricultural enterprise determined?
6. What do the energy resources of an agricultural enterprise include?
7. What characterizes the increase in the level of provision of enterprises with energy resources?
8. Reveal the essence of mechanization of agricultural production.
9. What is the system of machines and what is its significance for the mechanization of agricultural production?
10. What is leasing? Its types and meanings for agriculture.

TEST TASKS

1. The totality of means and objects of labor that are used in agriculture is:
1) material and technical complex;
2) material and technical base;
3) logistics;
4) material and technical production.

2. Indicators of development of material and technical base of the agricultural enterprise:

1) labor intensity of production;
2) energy efficiency of labor;
3) labor productivity;
4) energy intensity of production.

3. The number of power capacities per one average annual employee, which is employed in the current year is............... .

4. The level of mechanization of individual production processes in agriculture is determined by:
1) in horsepower;
2) percentage;
3) in human-hours;
4) in UAH;

5. The indicators of economic efficiency of the use of road transport include:
1) mileage utilization rate;
2) the coefficient of technical readiness;
3) the shift factor;
4) load capacity utilization ratio.

6. The indicators of economic efficiency of the use of machinery and tractor fleet include:
1) number of machine days worked per year;
2) the number of worked shifts per year;
3) the shift factor;
4) cost of reference hectare;
5) load capacity utilization factor.

7. **Energy resources include:**
1) engine power of tractors, combines, cars;
2) power of mechanical and electric motors;
3) power of electric motors, electrical installations, working equipment, car engines;
4) power of mechanical, electric motors, electrical installations and working equipment.

8. The level of mechanization of production processes in agriculture is:
1) the amount of energy resources per average annual employee;
2) the percentage of mechanized work to the total amount of work in the field;
3) the percentage ratio of the volume of mechanized works to the area of agricultural land of the enterprise;
4) the percentage of the total volume of work in the industry to the volume of mechanized work.

9. Indicators of provision of the enterprise with energy resources:
1) the number of power capacity per 1 head of cattle;
2) the amount of energy capacity per 1 kg of agricultural products;
3) the amount of generating capacity per 100 hectares of agricultural land;
4) the amount of energy capacity per 100 hectares of grain crops.

10. Indicators of use of machinery and tractor fleet
1) daily output in physical hectares of the performed works on 1 conditional tractor;
2) annual output of mechanized works for 1 conventional tractor;
3) annual output in physical hectares of the performed works on 1 conditional tractor;
4) replacement development in physical hectares of the performed works on 1 conditional tractor.

THEME 5. RESOURCE POTENTIAL OF AGRICULTURE

5.1. The concept of resource potential of agriculture

5.2. Methodical bases of an estimation of resource potential

5.3. Economic efficiency of use of resource potential of agriculture and ways of its increase

5.1. The concept of resource potential of agriculture

For successful functioning of agricultural enterprises it is necessary to provide them with appropriate resources and to create conditions for rational use of these resources on the basis of introduction of innovations. Agricultural enterprises today do not fully use their opportunities to increase agricultural production and improve its quality. At the same time, the available production facilities in many farms are not used effectively enough.

From the point of view of constancy of features of structure of resource potential division of resources on steels, conditionally-steels and variables is offered. Permanent are those resources, the volume and qualitative composition of which for a sufficiently long period remain virtually unchanged. Such properties are inherent in the energy of the sun, the availability of water resources, the average monthly temperature of different periods of the year and the like.

The category of conditionally constant includes such types of resources, the volume or qualitative composition of which may gradually change under the influence of economic, environmental, social or other factors. Such resources include land, which may gradually lose fertility or be transformed into non-agricultural land due to a number of reasons. Conditionally permanent are also the labor resources, because the workers of agricultural enterprises are mainly local population, which has a permanent residence in the region and, as a rule, does not have alternative employment offers.

Variables resources are considered resources that the agricultural enterprise buys on the market (fuels and lubricants, fertilizers, plant protection products, etc.). When calculating the value of the resource potential, the volume and qualitative composition of variable resources in it in most cases depends on the economic situation of the enterprise.

Since the resource potential is considered to be a determining factor in the ability of an enterprise to carry out certain types of economic activities in the current and future periods, the higher the proportion of permanent and conditionally permanent resources in its composition, the more powerful the potential itself will be.

An important issue is to determine the components of production resources and the structure of the resource potential of agriculture. The most important resource for the agricultural industry has always been and remains land. The size of the farm land, their quality and location largely determine the production specialization of economic entities, production volumes, the quality of the products.

It should be noted that the resource potential of agriculture depends not only on the area and structure of agricultural land, but also on the level of their economic fertility. The quality of land resources determines the level and conditions of management, as well as the efficiency of the use of material and labor resources. Therefore, agricultural land includes the resource potential of agriculture, taking into account the indicators of their qualitative assessment.

In addition to land, in the process of agricultural production (especially in crop production), other natural resources actively participate: solar energy; water in the form of groundwater, rain and surface water as a source for irrigation; wind as a regulator of temperature and humidity, and the like. In the conditions of industrialization of the agricultural sector, special attention should be paid to the provision of the agricultural enterprise with material and technical resources, among which the key elements are specialized equipment and technologies. Unlike natural resources, the availability of material and technical resources is relatively equal for all economic entities.

The process of agricultural production is carried out only in the presence and organic unity of such elements of productive forces as means and objects of labor and labor resources. In this regard, the irreplaceable components of the resource potential of agriculture are material and labor resources.

Different groups of labor (human) resources are called upon to combine all types of resources mentioned earlier and involve them in the production process. The need for a certain amount of labor is determined by the scale of production, the level of mechanization of labor, industrial specialization of the enterprise. Requirements to the quality of labor resources, first of all, depend on the level of applied technologies, the complexity of existing equipment and equipment, the degree of diversification of production. In the process of agricultural production, only labor resources combine material and land resources, as well as ensure their rational use. Consequently, the resource potential of agriculture consists of agricultural land, material and labor resources. The totality of these resources is the basis of agricultural production and determines its resource potential.

The resource potential of agriculture is a set of interrelated resources used in agricultural production. The possibilities of individual farms in obtaining the relevant results differ significantly, due to the quantity and quality of available production resources, or their resource potential.

Certain types of production resources should correspond only to their inherent functions. Therefore, the development of agricultural production, as well as improving its efficiency depends on the composition and rational ratio of production resources.

As part of the resource potential of agricultural enterprises, there are three groups of resources that are directly involved in the production of agricultural products.

The first group includes natural and biological resources, which include land, water, climatic and mineral resources, plants, animals, environmental factors and the like.

The second group includes labor potential as the most important part, on the one hand, biological and other social resources, by means of which the connection between nature and logistical resources and the process of production.

The third group includes production capital, including fixed and circulating assets of production and material and technical resources.

The composition of the resource potential, as well as the ratio of individual types of production resources depends on the nature and characteristics of the relevant branches of agriculture. Thus, in crop production, the main production resources are land, machinery and tractor fleet, seeds, fertilizers, labor resources, etc.

The resource potential of animal husbandry includes very important material resources, such as productive and working livestock, specialized production facilities of farms and their equipment, feed, medicines, labor resources, etc.at the same time, the share of productive livestock should be such that its rational use ensures the effective functioning of all other production resources.

The resource potential of agriculture is the material basis of the production potential, which characterizes the ability of the enterprise to produce a certain amount of agricultural products. As an economic category, production potential does not reflect the actual results of production of an agricultural enterprise, but its potential to achieve these results. Therefore, the production potential is characterized by the forecast level of agricultural products with the rational use of total resources.

Therefore, the production potential of agricultural production is an objectively determined level of economic results, which is ensured by the rational use of production resources. At the same time, the production potential of the economy is determined by the possible volume of production per 1 hectare of agricultural land.

Characterizing the essence of the potential of an agricultural enterprise, it is necessary to distinguish its following types: resource, production and economic.

The economic potential of agriculture is a set of economic opportunities of the industry, which can be used to solve specific socio-economic problems of rural areas. It is determined by the size of the net output that can be created in agriculture and used to meet the needs of society. It is necessary to understand that the economic potential of agriculture is subject to the development of its productive forces and the nature of agricultural production relations.

5.2. Methodical bases of an estimation of resource potential

The structure of the resource potential of agriculture includes different functional purpose and quality of production resources. To calculate the total resource potential it is necessary to reduce all production resources of agricultural enterprises to a comparative level and Express a single indicator. Methodological recommendations for determining the resource potential of agriculture provide a monetary assessment of each type of production resources and the calculation of their total value in the economy.

The value of the resource potential of the agricultural enterprise will be:

$$РП = З_р + Вб.ак + К_{ос} + К_{об} + Т_р ,$$

where $РП$ – total resource potential of the economy, UAH;

$З_р$ – monetary valuation of land resources, UAH;

$Вб.ак$ – the cost of biological assets of the economy, UAH;

$К_{ос}$ and $К_{об}$ – fixed and current assets (capital) of the enterprise, UAH;

$Т_р$ – monetary assessment of labor resources, UAH.

Monetary valuation of land plots is carried out according to the methodology approved by the Cabinet of Ministers of Ukraine. Normative monetary assessment of the land plot is necessary in the following cases:

- when it is necessary to establish the size of the tax for the land plot;
- determination of the amount of rent for land plots in state and municipal ownership;
- calculation of losses of agricultural and forestry production;
- determination of the size of the state fee for the exchange, inheritance and donation of land.

Monetary valuation of a separate land plot for agricultural purposes is carried out according to the formula:

$$Гзд = \Sigma (Пагр \times Гагр) + Пнсг \times Гнсг,$$

where Гзд - monetary valuation of agricultural land, UAH;

Гагр - normative monetary assessment of agricultural production group of soils of the corresponding agricultural land of the agricultural district, UAH per hectare;

Пагр - area of agricultural group of soils of agricultural land, hectares;

Пнсг - the area of non-agricultural land (land under farm roads and girders, field-protective forest strips and other protective plantings except those which are classified as land for forestry purposes, land under farm buildings and yards, land under infrastructure of wholesale markets of agricultural products, land temporary preservation, etc), hectares;

Гнсг - norm of capitalized rental income of non-agricultural land on agricultural land, UAH per hectare.

The value of biological assets of the farm is the current and long-term biological assets of crop production and animal husbandry, taken at fair average annual (residual) value from form 1 "Balance". It is also necessary to take into account the average annual cost of work in progress, which may be the cost of next year's harvest, egg incubation, beekeeping-the cost of honey in hives, etc., as well as the cost of semi-finished products of its own production, which can also be considered biological assets.

Monetary assessment of labor resources can be carried out by various methods. There are two main approaches to its cost measurement-cost and effective. The use of an effective approach to the monetary assessment of labor resources before the transfer of the size of the production capital, which replace one agricultural worker. When calculating such an analogue of one employee, as a rule, correlation and regression analysis is used.

Monetary assessment of labor resources on the cost approach can be carried out, first, on the basis of the costs required for the reproduction of one average annual agricultural worker. If the average cost of living per able-bodied person per month from July 1, 2018 amounted to 1841 UAH., the cost per year will be 22092 UAH., and for the 20-year period - 441,84 thousand UAH. This figure can be considered a monetary estimate of one average annual employee.

In recent years, when using the cost method, the costs of reproduction of labor take either the annual wage Fund of one employee, or the average monthly nominal wage of employees of agricultural enterprises. According to most scientists, to calculate the cost of labor resources, it is necessary to use the average wage for the industry, since the subsistence minimum reflects only the minimum set of food, non-food goods and services sufficient to ensure the normal functioning of the human body and meet its basic social and cultural needs. It is clear that such a minimum set of benefits is generally insufficient and does not fully satisfy the needs of the individual. Therefore, if we consider the cost of labor resources from the point of view of the costs of their formation and restoration, ensuring adequate social life and meeting basic needs, it is the average wage that will more accurately meet the specified criterion. Therefore, the value of labor potential (ТП) can be determined by the formula:

$$ТП = ЗП \times 12 \cdot ЧП \cdot СПП,$$

Where ТП – labor potential of agricultural enterprise, UAH;

ЗП – average monthly nominal salary of employees of agricultural enterprises, UAH;

12 – number of months per year;

ЧП – average number of employees engaged in agricultural production, persons;

СПП – average projected period of work, years.

Fixed and current assets of agricultural enterprises do not require monetary valuation as such, since they have a cost estimate, which is based on the actual costs of production, creation, construction, purchase of such funds and is presented in the financial statements of the enterprise.

Having determined the monetary value of each type of production resources, the absolute resource potential of the agricultural enterprise is calculated. The size of the resource potential is the material basis for the development of agricultural production and increase its efficiency.

When determining the resource potential it is necessary to proceed from the fact that the level of provision of enterprises with production resources has a significant impact on the results and efficiency of agricultural production. Therefore, the resource potential characterizes the ability of individual farms to produce a certain amount of agricultural products, schozumovlyuyutsya their resursoobespechennostyu.

For comparison of farms on the level of resource supply also determine the relative resource potential per 1 ha of agricultural land.

Agricultural enterprises differ not only in resource availability, but also in the structure of resource potential, which is determined by the percentage of individual types of resources in their total value. At the same time, the structure of production resources of farms largely determines the final results of their economic activity. With the same size of the resource potential and its different structure, the results of agricultural production in farms will be different, and accordingly their production potential will be different.

The definition of the total resource potential of agriculture has a corresponding economic significance. In particular, the indicator of resource potential should be used for the integrated assessment of the efficiency of agricultural production.

5.3. Economic efficiency of use of resource potential of agriculture and ways of its increase

The effectiveness of the use of resource potential depends on a set of interrelated factors that shape its level and structure, as well as determine the development trends.

When assessing the economic efficiency of the use of the resource potential of agriculture, it is necessary to correctly determine the system of indicators that should objectively reflect its level. In the conditions of market relations, the role of cost indicators increases, which contribute to the strengthening of the commodity form of economic relations.

To obtain comparable values of resource costs and results, the volume of products produced is calculated in value terms. The most important indicators characterizing the results of agricultural production are the cost of gross and marketable products, gross and net income and profit of the economy.

In the process of agricultural production as resources function: agricultural land, material production workers, fixed and working capital. Therefore, indicators of the efficiency of the use of the resource potential of agriculture in the first place should characterize the efficiency of the use of certain types of production resources.

Indicators of economic efficiency of use of certain types of production resources:

1) land resources: the cost of gross production, gross income and profit per 1 hectare of agricultural land;

2) labor resources: the cost of gross output and gross income per average annual employee and per 1 person-hour;

3) fixed capital: capital productivity, capital intensity of production, profit rate;

4) working capital: turnover ratio and duration of one turnover.

Indicators characterizing the economic productivity (efficiency) of certain types of resources are characterized by a certain inconsistency and can not give an unambiguous assessment of the level of use of the resource potential of an agricultural enterprise. Thus, labor productivity and production per 1 hectare of agricultural land grew in different types, and the level of capital output was constantly decreasing.

To determine the economic efficiency of the total resource potential of agriculture, the following indicators are used: the cost of gross output, gross and net income and profit per 1000 UAH. total resource potential. These indicators are generalizing and generally characterize the efficiency of the resource potential of the economy. The use of a single criterion of efficiency instead of a set of indicators makes it possible to determine the conditions for the effective use of resource potential.

The economic efficiency of using the resource potential of agricultural enterprises depends on many factors, especially on the level of their resource supply. The development of agriculture on the basis of the concept of production resources determines the increase in production and increase its efficiency. With the increase in the resource supply of agricultural enterprises, the production of gross output is growing at a relatively high rate.

The efficiency of agricultural production depends to a large extent on the structure of resource potential. In farms with a high level of production efficiency, the structure of resource potential is marked by a relatively greater share of fixed and circulating production assets and less-land resources. With the same quality of land in farms above the share of production assets as part of the resource potential determines the increase in gross production per 1 ha of agricultural land and 1000 UAH. total potential. Consequently, the increase in agricultural production can be achieved by increasing the level of resource supply and improving the structure of resource potential.

An important factor in improving the efficiency of resource potential is the specialization of the enterprise in the production of certain types of agricultural products. This creates favorable conditions for the formation of the resource potential of the economy and ensures its optimal structure.

Assessment of resource potential and efficiency of its use is carried out in agricultural industries and enterprises. A high level of efficiency of agricultural production is achieved on the basis of an appropriate ratio between individual types of production resources. Therefore, the actual deviation of this ratio from its optimal level indicates a certain disproportion in the development of the agricultural economy. This necessitates the implementation of appropriate organizational and economic measures to improve and develop the material and technical base of agricultural production.

QUESTIONS FOR SELF-CONTROL

1. What is the essence of the resource potential of agriculture?
2. What is the material basis of the productive potential of agriculture?
3. What determines the production potential of agriculture?
4. What determines the economic potential of agriculture?
5. How to assess the resource potential of agriculture and its industries?
6. How is the absolute resource potential of an agricultural enterprise determined?
7. How is the relative resource potential of an agricultural enterprise determined?
8. What indicators characterize the economic efficiency of the use of certain types of agricultural production resources?

9. What indicators characterize the economic efficiency of the use of the total resource potential?

10. What factors affect the economic efficiency of the use of resource potential?

TEST TASKS

1. The resource potential of agriculture is:

1)the set of production resources;

2)the totality of material resources;

3)level of agricultural production;

4)level of development of material and technical base.

2. The production potential of agriculture is determined by:

1)the volume of agricultural production;

2)the level of gross production per 1ha of agricultural land;

3)possible volume of production of gross output per 1 ha of agricultural land;

4)the volume of production of certain types of products per 100 hectares of relevant land.

3. The economic potential of agriculture is determined by:

1)the volume of gross output;

2)volume of net production;

3)volume of production capital;

4)net profit;

5)rate of return.

4. The economic efficiency of the use of the total resource potential is characterized by:

1) the cost of gross production per 1 hectare of agricultural land;

2) the cost of gross production per 100 UAH. fixed capital;

3) the cost of gross production per 1000 UAH. total resource potential;

4) profit per 1 ha of agricultural land;

5) rate of return.

5. The economic efficiency of the use of the total resource potential is characterized by:

1)rate of return;

2)profit per 1 ha of agricultural land;

3)profit per 1000 UAH. total resource potential;

4)the cost of gross production per 100 UAH. fixed capital;

5) the cost of gross production per 1 hectare of agricultural land.

6. What factors influence the efficiency of resource potential use?

1) the profitability of production;

2)2resource availability of the economy;

3)the capital intensity of production;

4)material intensity of production.

7. What factors influence the efficiency of resource potential use?

1)capital intensity of production;

2)production profitability;

3)the structure of the resource potential;

4)structure of agricultural production.

8. The composition and structure of the resource potential depends:

1) features of the relevant branches of agriculture;
2) placement of relevant branches of agriculture;
3) development of the country's economy;
4) activities of the agricultural enterprise.

9. Objectively determined level of economic results, which is provided by rational use of production resources:

1) the economic potential;

2) environmental potential;
3) production capacity;
4) aggregate potential.

10. While increasing the resource supply of agricultural enterprises is growing at a relatively high rate:
1) profit per 1 ha of agricultural land;
2) gross production;
3) the level of profitability of agricultural production;
4) the rate of profit.

THEME 6. RESOURCE POTENTIAL OF AGRICULTURE

6.1. The concept of resource potential of agriculture

6.2. Methodical bases of an estimation of resource potential

6.3. Economic efficiency of use of resource potential of agriculture and ways of its increase

6.1. The concept of resource potential of agriculture

For successful functioning of agricultural enterprises it is necessary to provide them with appropriate resources and to create conditions for rational use of these resources on the basis of introduction of innovations. Agricultural enterprises today do not fully use their opportunities to increase agricultural production and improve its quality. At the same time, the available production facilities in many farms are not used effectively enough.

From the point of view of constancy of features of structure of resource potential division of resources on steels, conditionally-steels and variables is offered. Permanent are those resources, the volume and qualitative composition of which for a sufficiently long period remain virtually unchanged. Such properties are inherent in the energy of the sun, the availability of water resources, the average monthly temperature of different periods of the year and the like.

The category of conditionally constant includes such types of resources, the volume or qualitative composition of which may gradually change under the influence of economic, environmental, social or other factors. Such resources include land, which may gradually lose fertility or be transformed into non-agricultural land due to a number of reasons. Conditionally permanent are also the labor resources, because the workers of agricultural enterprises are mainly local population, which has a permanent residence in the region and, as a rule, does not have alternative employment offers.

Variables resources are considered resources that the agricultural enterprise buys on the market (fuels and lubricants, fertilizers, plant protection products, etc.). When calculating the value of the resource potential, the volume and qualitative composition of variable resources in it in most cases depends on the economic situation of the enterprise.

Since the resource potential is considered to be a determining factor in the ability of an enterprise to carry out certain types of economic activities in the current and future periods, the higher the proportion of permanent and conditionally permanent resources in its composition, the more powerful the potential itself will be.

An important issue is to determine the components of production resources and the structure of the resource potential of agriculture. The most important resource for the agricultural industry has always been and remains land. The size of the farm land, their quality and location largely determine the production specialization of economic entities, production volumes, the quality of the products.

It should be noted that the resource potential of agriculture depends not only on the area and structure of agricultural land, but also on the level of their economic fertility. The quality of land resources determines the level and conditions of management, as well as the efficiency of the use of material and labor resources. Therefore, agricultural land includes the resource potential of agriculture, taking into account the indicators of their qualitative assessment.

In addition to land, in the process of agricultural production (especially in crop production), other natural resources actively participate: solar energy; water in the form of groundwater, rain and surface water as a source for irrigation; wind as a regulator of temperature and humidity, and the like. In the conditions of industrialization of the agricultural sector, special attention should be paid to the provision of the agricultural enterprise with material and technical resources, among which the key elements are specialized equipment and technologies. Unlike natural resources, the availability of material and technical resources is relatively equal for all economic entities.

The process of agricultural production is carried out only in the presence and organic unity of such elements of productive forces as means and objects of labor and labor resources. In this regard, the irreplaceable components of the resource potential of agriculture are material and labor resources.

Different groups of labor (human) resources are called upon to combine all types of resources mentioned earlier and involve them in the production process. The need for a certain amount of labor is determined by the scale of production, the level of mechanization of labor, industrial specialization of the enterprise. Requirements to the quality of labor resources, first of all, depend on the level of applied technologies, the complexity of existing equipment and equipment, the degree of diversification of production. In the process of agricultural production, only labor resources combine material and land resources, as well as ensure their rational use. Consequently, the resource potential of agriculture consists of agricultural land, material and labor resources. The totality of these resources is the basis of agricultural production and determines its resource potential.

The resource potential of agriculture is a set of interrelated resources used in agricultural production. The possibilities of individual farms in obtaining the relevant results differ significantly, due to the quantity and quality of available production resources, or their resource potential.

Certain types of production resources should correspond only to their inherent functions. Therefore, the development of agricultural production, as well as improving its efficiency depends on the composition and rational ratio of production resources.

As part of the resource potential of agricultural enterprises, there are three groups of resources that are directly involved in the production of agricultural products.

The first group includes natural and biological resources, which include land, water, climatic and mineral resources, plants, animals, environmental factors and the like.

The second group includes labor potential as the most important part, on the one hand, biological and other social resources, by means of which the connection between nature and logistical resources and the process of production.

The third group includes production capital, including fixed and circulating assets of production and material and technical resources.

The composition of the resource potential, as well as the ratio of individual types of production resources depends on the nature and characteristics of the relevant branches of agriculture. Thus, in crop production, the main production resources are land, machinery and tractor fleet, seeds, fertilizers, labor resources, etc.

The resource potential of animal husbandry includes very important material resources, such as productive and working livestock, specialized production facilities of farms and their equipment, feed, medicines, labor resources, etc.at the same time, the share of productive livestock should be such that its rational use ensures the effective functioning of all other production resources.

The resource potential of agriculture is the material basis of the production potential, which characterizes the ability of the enterprise to produce a certain amount of agricultural products. As an economic category, production potential does not reflect the actual results of production of an agricultural enterprise, but its potential to achieve these results. Therefore, the production potential is characterized by the forecast level of agricultural products with the rational use of total resources.

Therefore, the production potential of agricultural production is an objectively determined level of economic results, which is ensured by the rational use of production resources. At the same time, the production potential of the economy is determined by the possible volume of production per 1 hectare of agricultural land.

Characterizing the essence of the potential of an agricultural enterprise, it is necessary to distinguish its following types: resource, production and economic.

The economic potential of agriculture is a set of economic opportunities of the industry, which can be used to solve specific socio-economic problems of rural areas. It is determined by the size of the net output that can be created in agriculture and used to meet the needs of society. It is necessary to understand that the economic potential of agriculture is subject to the development of its productive forces and the nature of agricultural production relations.

6.2. Methodical bases of an estimation of resource potential

The structure of the resource potential of agriculture includes different functional purpose and quality of production resources. To calculate the total resource potential it is necessary to reduce all production resources of agricultural enterprises to a comparative level and Express a single indicator. Methodological recommendations for determining the resource potential of agriculture provide a monetary assessment of each type of production resources and the calculation of their total value in the economy.

The value of the resource potential of the agricultural enterprise will be:

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where *РП* – total resource potential of the economy, UAH;

$З_р$ – monetary valuation of land resources, UAH;

Вб.ак – the cost of biological assets of the economy, UAH;

$К_{ос}$ and $К_{об}$ – fixed and current assets (capital) of the enterprise, UAH;

$Т_р$ – monetary assessment of labor resources, UAH.

Monetary valuation of land plots is carried out according to the methodology approved by the Cabinet of Ministers of Ukraine. Normative monetary assessment of the land plot is necessary in the following cases:

- when it is necessary to establish the size of the tax for the land plot;
- determination of the amount of rent for land plots in state and municipal ownership;
- calculation of losses of agricultural and forestry production;
- determination of the size of the state fee for the exchange, inheritance and donation of land.

Monetary valuation of a separate land plot for agricultural purposes is carried out according to the formula:

$$Гзд = \Sigma\ (Пагр \times Гагр) + Пнсг \times Гнсг,$$

where Гзд - monetary valuation of agricultural land, UAH;

Гагр - normative monetary assessment of agricultural production group of soils of the corresponding agricultural land of the agricultural district, UAH per hectare;

Пагр - area of agricultural group of soils of agricultural land, hectares;

Пнсг - the area of non-agricultural land (land under farm roads and girders, field-protective forest strips and other protective plantings except those which are classified as land for forestry purposes, land under farm buildings and yards, land under infrastructure of wholesale markets of agricultural products, land temporary preservation, etc), hectares;

Гнсг - norm of capitalized rental income of non-agricultural land on agricultural land, UAH per hectare.

The value of biological assets of the farm is the current and long-term biological assets of crop production and animal husbandry, taken at fair average annual (residual) value from form 1 "Balance". It is also necessary to take into account the average annual cost of work in progress, which may be the cost of next year's harvest, egg incubation, beekeeping-the cost of honey in hives, etc., as well as the cost of semi-finished products of its own production, which can also be considered biological assets.

Monetary assessment of labor resources can be carried out by various methods. There are two main approaches to its cost measurement-cost and effective. The use of an effective approach to the monetary assessment of labor resources before the transfer of the size of the production capital, which replace one agricultural worker. When calculating such an analogue of one employee, as a rule, correlation and regression analysis is used.

Monetary assessment of labor resources on the cost approach can be carried out, first, on the basis of the costs required for the reproduction of one average annual agricultural worker. If the average cost of living per able-bodied person per month from July 1, 2018 amounted to 1841 UAH., the cost per year will be 22092 UAH., and for the 20-year period - 441,84 thousand UAH. This figure can be considered a monetary estimate of one average annual employee.

In recent years, when using the cost method, the costs of reproduction of labor take either the annual wage Fund of one employee, or the average monthly nominal wage of employees of agricultural enterprises. According to most scientists, to calculate the cost of labor resources, it is necessary to use the average wage for the industry, since the subsistence minimum reflects only the minimum set of food, non-food goods and services sufficient to ensure the normal functioning of the human body and meet its basic social and cultural needs. It is clear that such a minimum set of benefits is generally insufficient and does not fully satisfy the needs of the individual. Therefore, if we consider the cost of labor resources from the point of view of the costs of their formation and restoration, ensuring adequate social life and meeting basic needs, it is the average wage that will more accurately meet the specified criterion. Therefore, the value of labor potential (ТП) can be determined by the formula:

$$ТП = ЗП \times 12 \cdot ЧП \cdot СПП,$$

Where ТП – labor potential of agricultural enterprise, UAH;

ЗП – average monthly nominal salary of employees of agricultural enterprises, UAH;

12 – number of months per year;

ЧП – average number of employees engaged in agricultural production, persons;

СПП – average projected period of work, years.

Fixed and current assets of agricultural enterprises do not require monetary valuation as such, since they have a cost estimate, which is based on the actual costs of production, creation, construction, purchase of such funds and is presented in the financial statements of the enterprise.

Having determined the monetary value of each type of production resources, the absolute resource potential of the agricultural enterprise is calculated. The size of the resource potential is the material basis for the development of agricultural production and increase its efficiency.

When determining the resource potential it is necessary to proceed from the fact that the level of provision of enterprises with production resources has a significant impact on the results and efficiency of agricultural production. Therefore, the resource potential characterizes the ability of individual farms to produce a certain amount of agricultural products, schozumovlyuyutsya their resursoobespechennostyu.

For comparison of farms on the level of resource supply also determine the relative resource potential per 1 ha of agricultural land.

Agricultural enterprises differ not only in resource availability, but also in the structure of resource potential, which is determined by the percentage of individual types of resources in their total value. At the same time, the structure of production resources of farms largely determines the final results of their economic activity. With the same size of the resource potential and its different structure, the results of agricultural production in farms will be different, and accordingly their production potential will be different.

The definition of the total resource potential of agriculture has a corresponding economic significance. In particular, the indicator of resource potential should be used for the integrated assessment of the efficiency of agricultural production.

6.3. Economic efficiency of use of resource potential of agriculture and ways of its increase

The effectiveness of the use of resource potential depends on a set of interrelated factors that shape its level and structure, as well as determine the development trends.

When assessing the economic efficiency of the use of the resource potential of agriculture, it is necessary to correctly determine the system of indicators that should objectively reflect its level. In the conditions of market relations, the role of cost indicators increases, which contribute to the strengthening of the commodity form of economic relations.

To obtain comparable values of resource costs and results, the volume of products produced is calculated in value terms. The most important indicators characterizing the results of agricultural production are the cost of gross and marketable products, gross and net income and profit of the economy.

In the process of agricultural production as resources function: agricultural land, material production workers, fixed and working capital. Therefore, indicators of the efficiency of the use of the resource potential of agriculture in the first place should characterize the efficiency of the use of certain types of production resources.

Indicators of economic efficiency of use of certain types of production resources:

1) land resources: the cost of gross production, gross income and profit per 1 hectare of agricultural land;

2) labor resources: the cost of gross output and gross income per average annual employee and per 1 person-hour;

3) fixed capital: capital productivity, capital intensity of production, profit rate;

4) working capital: turnover ratio and duration of one turnover.

Indicators characterizing the economic productivity (efficiency) of certain types of resources are characterized by a certain inconsistency and can not give an unambiguous assessment of the level of use of the resource potential of an agricultural enterprise. Thus, labor productivity and production per 1 hectare of agricultural land grew in different types, and the level of capital output was constantly decreasing.

To determine the economic efficiency of the total resource potential of agriculture, the following indicators are used: the cost of gross output, gross and net income and profit per 1000 UAH. total resource potential. These indicators are generalizing and generally characterize the efficiency of the resource potential of the economy. The use of a single criterion of efficiency instead of a set of indicators makes it possible to determine the conditions for the effective use of resource potential.

The economic efficiency of using the resource potential of agricultural enterprises depends on many factors, especially on the level of their resource supply. The development of agriculture on the basis of the concept of production resources determines the increase in production and increase its efficiency. With the increase in the resource supply of agricultural enterprises, the production of gross output is growing at a relatively high rate.

The efficiency of agricultural production depends to a large extent on the structure of resource potential. In farms with a high level of production efficiency, the structure of resource potential is marked by a relatively greater share of fixed and circulating production assets and less-land resources. With the same quality of land in farms above the share of production assets as part of the resource potential determines the increase in gross production per 1 ha of agricultural land and 1000 UAH. total potential. Consequently, the increase in agricultural production can be achieved by increasing the level of resource supply and improving the structure of resource potential.

An important factor in improving the efficiency of resource potential is the specialization of the enterprise in the production of certain types of agricultural products. This creates favorable conditions for the formation of the resource potential of the economy and ensures its optimal structure.

Assessment of resource potential and efficiency of its use is carried out in agricultural industries and enterprises. A high level of efficiency of agricultural production is achieved on the basis of an appropriate ratio between individual types of production resources. Therefore, the actual deviation of this ratio from its optimal level indicates a certain disproportion in the development of the agricultural economy. This necessitates the implementation of appropriate organizational and economic measures to improve and develop the material and technical base of agricultural production.

QUESTIONS FOR SELF-CONTROL

1. What is the essence of the resource potential of agriculture?
2. What is the material basis of the productive potential of agriculture?
3. What determines the production potential of agriculture?
4. What determines the economic potential of agriculture?
5. How to assess the resource potential of agriculture and its industries?
6. How is the absolute resource potential of an agricultural enterprise determined?

7. How is the relative resource potential of an agricultural enterprise determined?
8. What indicators characterize the economic efficiency of the use of certain types of agricultural production resources?
9. What indicators characterize the economic efficiency of the use of the total resource potential?
10. What factors affect the economic efficiency of the use of resource potential?

TEST TASKS

1. The resource potential of agriculture is:

1)the set of production resources;

2)the totality of material resources;

3)level of agricultural production;

4)level of development of material and technical base.

2. The production potential of agriculture is determined by:

1)the volume of agricultural production;

2)the level of gross production per 1ha of agricultural land;

3)possible volume of production of gross output per 1 ha of agricultural land;

4)the volume of production of certain types of products per 100 hectares of relevant land.

3. The economic potential of agriculture is determined by:

1)the volume of gross output;

2)volume of net production;

3)volume of production capital;

4)net profit;

5)rate of return.

4. The economic efficiency of the use of the total resource potential is characterized by:

1) the cost of gross production per 1 hectare of agricultural land;

2) the cost of gross production per 100 UAH. fixed capital;

3) the cost of gross production per 1000 UAH. total resource potential;

4) profit per 1 ha of agricultural land;

5) rate of return.

5. The economic efficiency of the use of the total resource potential is characterized by:

1)rate of return;

2)profit per 1 ha of agricultural land;

3)profit per 1000 UAH. total resource potential;

4)the cost of gross production per 100 UAH. fixed capital;

5) the cost of gross production per 1 hectare of agricultural land.

6. What factors influence the efficiency of resource potential use?

1) the profitability of production;

2)2resource availability of the economy;

3)the capital intensity of production;

4)material intensity of production.

7. What factors influence the efficiency of resource potential use?

1)capital intensity of production;

2)production profitability;

3)the structure of the resource potential;

4)structure of agricultural production.

8. The composition and structure of the resource potential depends:

1) features of the relevant branches of agriculture;
2) placement of relevant branches of agriculture;
3) development of the country's economy;
4) activities of the agricultural enterprise.

9. Objectively determined level of economic results, which is provided by rational use of production resources:
1) the economic potential;
2) environmental potential;
3) production capacity;
4) aggregate potential.

10. While increasing the resource supply of agricultural enterprises is growing at a relatively high rate:
1) profit per 1 ha of agricultural land;
2) gross production;
3) the level of profitability of agricultural production;
4) the rate of profit.

THEME 7. THE INTENSIFICATION OF AGRICULTURAL PRODUCTION

7.1. The essence of intensification of agricultural production

7.2. Indicators of intensification of agricultural production

7.3. The main directions of intensification and ways to increase its efficiency

7.1. The essence of intensification of agricultural production

Agriculture is one of the priority sectors of the national economy. The development of the agricultural sector contributes to improving the material well-being of the population, strengthening the economic and food security of the state, increasing its export potential. At the same time, the agricultural production sector is one of the most risky sectors of the economy, since its development is greatly influenced by environmental and biological factors.

There are two ways to increase agricultural production - extensive and intensive. The development of agriculture is based on *extensive* reproduction, when only the field of activity expands, and *intensive*, when more efficient means of production are used.

Extensive agricultural development implies an increase in production based on a constant level of technology and technology. In crop production, the increase in production is due to the expansion of acreage, and in animal husbandry - the increase in livestock and poultry.

For the intensive development of agricultural production, the increase in output is due to additional investments aimed at implementing the achievements of science, advanced technology and progressive technology, which lead to an increase in crop yields and livestock productivity.

In the historical development, an increase in agricultural production over a long period occurred with the use of extensive factors - the expansion of acreage due to the plowing of vacant land. Extensive development of agriculture is limited largely by the availability of land resources suitable for use in agricultural production.

As extensive factors of increase in agricultural production are limited, the intensification of agriculture in the conditions of scientific and technological progress is of exceptional importance and is the main direction of its development. The process of intensification is an objective and logical way for the development of agriculture, which is characteristic of all civilized countries. However, this does not mean that in the context of intensive farming, there is no need to increase the number of productive livestock.

The main prerequisites for the transition to intensive agriculture are, firstly, the need to further increase agricultural production, secondly, the limitation of arable land and, thirdly, the accumulation of material resources and funds in enterprises for intensive production development.

As a form of extended reproduction, agricultural intensification occurs based on additional investments per unit of land area, with the aim of qualitative improvement of all factors of production because of innovative activity. In this regard, in economic *terms of agricultural intensification* should be understood as the concentration of productive resources on the same land instead of dividing them between different land plots. At the same time, intensive development of agriculture implies qualitative improvement of the means of production and use of advanced technologies.

The peculiarity of the intensification of agricultural production is that the efficiency of technical improvements of means and objects of work is manifested not directly, but through the functioning of the earth. The intensification of agriculture is based on the peculiarity of the land as a means of production that its fertility, when used properly, increases the yield of crops.

Describing the process of intensification, it should be noted that agriculture is not developed by increasing the amount of cultivated land, but based on improving the quality of cultivation, by increasing the size of the means of production that put them in the same amount of land.

The intensification of agricultural production is based on additional investment, but its essence cannot be linked only to the absolute increase in additional costs. In the process of intensification, additional investments should reflect the quality improvement of production. Therefore, additional investments include the widespread use of scientific and technological progress, the use of more efficient means of production and advanced technologies to improve the productivity of land and livestock.

In the process of intensification, additional investments should be considered in organic unity with the production results. Thus, agricultural intensification is the concentration of labor per unit of land area in order to increase agricultural output and improve its quality.

Consistent intensification of agricultural production based on improvement and rational use of all its factors, as a rule, provides high-end results. In this case, the growth rate of production may exceed the rate of increase in additional costs. Intensification has a comprehensive impact on agricultural development, creating new opportunities for improving the economic efficiency of production. The intensification process involves the creation of highly productive agriculture based on an increase in its technical level, the widespread use of more sophisticated means of production and skilled labor.

The intensification of agriculture is the process of concentrating the aggregate cost of materialized and living labor on the same land area, and in animal husbandry - increasing output per head of cattle and economic efficiency of its production.

With the development of scientific and technological progress in agricultural production, the ratio between the cost of materialized and living labor changes - the share of the former increases and the latter decreases accordingly. Therefore, intensive agricultural development is primarily based on the widespread introduction in all its branches of integrated mechanization and automation of production, which is the basis for improving its economic efficiency.

The intensification of agriculture is studied not only as a single and holistic process, but also in relation to the sectors of crop and animal husbandry. The intensification of livestock breeding differs significantly from the intensification of agricultural production as a whole, as well as from the intensification of crop production. In the crop, the object of intensification is land, which in the process of expanded reproduction increases fertility, and therefore is an eternal means of agricultural production and an indispensable condition of it.

In livestock industries, the intensification of livestock and poultry is the subject of intensification. Animals have certain productive capabilities, mainly due to their biological characteristics. Animals as a means of production are only used intensively for a certain period, which ends after they have been eliminated due to poor performance and poor maintenance.

The specific features of the intensification of production in the crop and livestock sector cause differences in the organization of extended reproduction in these areas. The increase in the production of livestock products is due to both the increase in the livestock population and the increase in its productivity. With a rational combination of intensive and extensive pathways, high rates of livestock development and increase of its efficiency are ensured.

The intensification of animal husbandry involves, primarily, the intensive and efficient use of productive cattle, the improvement of methods of keeping and feeding them. The progress of animal husbandry is manifested not only in increasing livestock, but also in improving its quality, in replacing worse livestock, in improving its level of feeding. Additional investments are aimed at improving breeding work, removing new, more productive livestock breeds, increasing its productivity, introducing progressive ways of reproducing the herd and accelerating its turnover.

The intensification of agriculture is closely linked to the intensive development of other sectors of the agro-industrial complex, united by a common end goal. The process of intensification is carried out in the conditions of optimization of the basic proportions between the agrarian sector and the industry, which provides its means of production, as well as between the branches engaged in processing of agricultural products and production service of agriculture. This helps to increase the efficiency of agricultural intensification based on economy of production resources, as well as socio-economic development of the village.

The agriculture of our country for many years developed because of combination of extensive and intensive directions, which provided improvement of the structure of production, increase of labor productivity and increase of output. In modern conditions, the intensification of agriculture is the main direction of its development and the main source of improving the efficiency of agricultural production, which ensures the strengthening of the economy of agricultural enterprises.

7.2. Indicators of intensification of agricultural production

The intensification of agriculture includes all areas of development of the economy of agricultural enterprises based on widespread using of the achievements of scientific and technological progress and directly influences the final results of production.

The purpose of agricultural intensification is to increase the output of high quality products per unit of land or per head of livestock, as well as to increase the economic efficiency of agricultural production. A solution to this problem is the additional investment that causes the concentration of materialized and living labor on the same land area, and in livestock - on the head of livestock.

Based on this study, the intensification of agricultural production is carried out in three stages based on a system of indicators. Depending on the economic content, *these are indicators of the level of agricultural production intensity, output and economic efficiency of agricultural production intensification.*

When studying the intensification of agricultural production in the whole economy or its individual sectors, firstly, it is necessary to determine the object of intensification. In agricultural enterprises, the intensification of agricultural production as a whole is the total area of their agricultural land.

The subject of crop intensification is arable land, and animal husbandry as a whole is a contingent stock of productive livestock of agrarian enterprise.

When studying the intensification of production of certain types of products (grain, sugar beet, milk, pork, etc.) the object of intensification is the area of sowing of the respective crop or the average annual livestock of a particular type of productive livestock.

In the process of agricultural intensification, various means of production and live labor of rural workers are applied to the land. In this regard, a system of economic indicators is used to determine the level of agricultural production, including general and partial, cost and natural.

Aggregate indicator of the level of intensity of agricultural production, which reflects the total cost of materialized and living labor, *is the sum of the value of fixed assets and current production costs (excluding amortization) per hectare of agricultural land.*

This indicator directly expresses the essence of intensification and generally characterizes the level of intensity of agricultural production.

An important indicator of agricultural level intensity is the *annual production costs per hectare of agricultural land*. Annual agricultural costs include part of the cost of fixed assets in the amount of depreciation related to the cost of production, as well as the cost of working capital consumed, including wages. Depending on the subject of intensification, this indicator can characterize the level of agricultural production intensity of an enterprise or its individual industries.

To determine the level of intensity separately in the crop or livestock sector, this indicator is calculated by industry, respectively, per hectare of arable land and the head of productive livestock.

To determine the level of production intensity of certain types of products (grain, milk, pork, etc.), it is necessary to calculate the amount of annual production costs per 1ha of sowing of the corresponding crop or one average annual head of a separate type of productive cattle.

The indicator of annual production costs is used not only in determining the level of intensity, but also in studying the economic efficiency of intensification of agricultural production, comparing it with the value of gross production.

The level of agricultural production intensity is also determined *by the value of fixed assets per hectare of agricultural land*. This figure reflects only the work accomplished embodied in the main means of production. In the process of use, fixed assets transfer their value to products only partially, in the amount of annual depreciation, but they create the appropriate conditions for the rational use of tangible working capital. Therefore, increasing the availability of fixed assets for farms increases the level of using and productivity of land, and promotes more productive using of livestock.

The level of agricultural intensity is also characterized *by the cost of living labor per hectare of agricultural land*. The intensification of agricultural production is carried out based on using the achievements of scientific and technological progress, which promotes the introduction of complex mechanization and automation of production processes. Therefore, unlike other indicators, labor costs per unit of land area in the process of intensification are naturally reduced. This reflects the corresponding changes in the cost-effective and lively labor cost of increasing the technical equipment of agriculture.

In some cases, when the intensification is based on the improvement of production technology, and the level of mechanization of production processes does not change, the cost of labor per hectare of land area or head of livestock increases. However, this does not violate the general pattern of development of the productive forces of agriculture.

In the process of agricultural intensification, the use of means of production in the form of various material elements and energy resources is increasing. Therefore, to characterize the level of intensity of agricultural production use the following natural indicators: the amount of energy capacity, electricity consumed for production needs (kWh) per 1 ha of arable land or acreage, the amount of mineral and organic fertilizers, the amount of tractor work performed in conditional reference hectares per 1 hectare of arable land, livestock density per 100 hectares of agricultural land.

Natural indicators of the level of intensity of individual livestock industries include: feed costs per one head of livestock, the level of complex mechanization and automation of production processes, the cost of breeding, breed composition of the herd, etc.

Comparing the level of intensity of agricultural production in the analyzed and base years calculate the size of additional investments and the rate of their growth. The study of changes in the level of agricultural production makes it possible to establish the impact of additional costs on increasing output from a unit of land or from one head of animals.

The main *performance indicators of agricultural intensification* are the value of gross production, gross and net income and profit per 1 ha of agricultural land. In some branches of the agricultural enterprise, the result of intensification is expressed in the increase of crop yields or the productivity of certain types of livestock and poultry.

Increasing the level of agricultural production intensity should not only increase output per hectare of land, but also reduce labor costs and costs per unit. This expresses the essence of the intensification process, which involves not only additional investments in agriculture and increased production of products, but also increasing its efficiency.

The following indicators characterize the economic efficiency of intensification in agricultural production: labor productivity, capital efficiency, return on production costs, cost of production, rate of profit, level of profitability, and return on additional costs. The last indicator in the general form describes the economic feasibility of increasing production costs and determines the efficiency of their use. The recoupment of additional costs is the cost of additional gross agricultural production at the rate of one UAH additional costs in the process of production intensification.

In conditions of increasing economic efficiency of intensification, it is envisaged to reduce capital intensity, material and energy consumption of production. In animal husbandry, there is of particular importance of reducing the feed capacity of production, i.e. reducing the cost of feed for the production of a unit of production.

Increasing economic efficiency of agricultural intensification is characterized by higher growth rates of output per unit of land or per head of livestock compared to an increase in production costs.

In agricultural practice, there are three options for the efficiency of agricultural intensification: the recoupment of additional costs does not change, they give as much output per unit of land or head of livestock as previous equal costs; additional costs provide more output than previous costs; additional output is less than additional production costs. In the latter case, the intensification of agriculture is carried out on the basis of a constant technical level, without taking into account the achievements of scientific and technological progress.

The difference in the rate of increase of production costs per unit of land area and the increase in the value of gross production does not contradict the objective laws of intensification of agricultural production. Therefore, the case of reducing the productivity of additional investments is just as possible as the case of improving their performance.

Increasing the economic efficiency of agricultural intensification is achieved through the integrated use of land, logistical and labor resources, based on the implementation of scientific and technological progress.

7.3. The main directions of intensification and ways to increase its efficiency

The development of agriculture will continue on the basis of consistent intensification. In view of this, a major prerequisite for developing the productive forces of the agrarian sector of the economy is the widespread introduction into production of scientific and technological progress.

In certain periods of agricultural development, priority was given to different directions of intensive development of production. This is the improvement of agricultural machinery, land reclamation, increased use of mineral and organic fertilizers, the expansion of varietal crops, improving the breed composition of productive livestock and poultry. Today, some of these factors are not as important as before; others have become the basis for the intensification of agricultural production.

At the present stage, *the main directions of agricultural intensification are as follows*: mechanization and automation; melioration; chemicalization; electrification; innovative resource-saving technologies; biotechnology; specialization and concentration of production; effective management; progressive forms of organization and remuneration.

The introduction of *complex mechanization and automation of production* involves the creation of high-performance and advanced systems of machines, taking into account the specificities of the agricultural sectors. Of particular importance is the improvement of the quality and reliability of agricultural machinery, which is the basis of high efficiency of its use.

The process of intensification of agricultural production involves not only the saturation of its modern technology, but also increasing the efficiency of its use. Thus, the efficiency of the machine-tractor fleet largely depends on the level of labor productivity and the strengthening of the economy of agricultural enterprises. In an economy where the number of energy-intensive tractors is increasing, it is necessary to have a complete set of towed and towed machines and implements. The issue of improving the efficiency of agricultural machinery and equipment is inseparable from social factors, above all the problem of significantly improving the working conditions of mechanizers.

An important area of agricultural intensification is land melioration, which improves the productivity of agricultural land and the economic efficiency of production. Land melioration is an effective factor and in many cases the prerequisite for increasing the fertility of the land, which is the basis of high and sustainable crops.

In Ukraine, nearly 20 million hectares of agricultural land is located in a risky area, where droughts, dry winds and dust storms cause great damage to agriculture. In the dry years, which are repeated periodically, Ukraine does not pick up 10-15 million tons of grain, 12-18 million tons of feed in feed units. Drought causes very large losses, which are calculated by billions. There are about 10 million ha lands requiring irrigation in the area of risk agriculture. In recent decades, about 3 million hectares of arid lands have been irrigated and put into operation. It allows creating a zone of guaranteed and stable production of agricultural products. In connection with the regulation of the water-air regime of soils and the introduction of the required amount of fertilizers, it became possible to program high and sustainable crops.

However, it should be noted that hydrotechnical land melioration is a very time-consuming area of development of agricultural production intensification. Costs for hydrotechnical land melioration fluctuate within 12 -18 thousand UAH. per 1 ha. In addition, hydrotechnical land melioration also requires a large amount of current operating costs for the repair of hydraulic structures, maintenance of the drainage and irrigation systems; land melioration improvement.

Modern drainage melioration is carried out on a new basis with the saturation of hydraulic structures, the widespread use of closed drainage, the presence of systems of two-way control of the air-air regime. The introduction of better methods of drainage and quality improvement of reclamation works enable the farms of the Polissya and western regions of Ukraine to increase the intensity of land use, to increase the production of crop and livestock products.

One of the most important areas of agricultural intensification is the balanced chemization of agriculture. Agricultural chemistry means the use of mineral fertilizers, which directly increase the yield of crops. Increased soil fertility is associated with the widespread use of mineral fertilizers in combination with agrotechnical measures. Currently, about 60% of the nutrients introduced into the soil are mineral fertilizers.

Of particular importance is the use of mineral fertilizers to increase crop yields and accelerate the return on investment. Many years of research of scientific institutions show that the introduction of mineral fertilizers in the farms of Polissya provides 40-50% increase in crop yields, Forest-steppe zone - 35-40, Steppe - 30-35%.

Particularly highly effective application of complete mineral fertilizer (K45P60K70). The yield of winter wheat in the forest-steppe zone was 5-8 c / ha, depending on the precursor and method of tillage. The yield of winter wheat in Polissia with the application of complete mineral fertilizers (more than 40 kg of the active substance of nitrogen, phosphorus and potassium) is on average 8.4 hectares / ha. In the steppe conditions, high efficiency of mineral fertilizers on barley crops, especially in the dry years, when the yield increase was 8-9 c / ha.

The intensification of agricultural production is based on the increase of soil fertility, which largely depends on the rational combination and application of organic and mineral fertilizers in appropriate proportions. In order to increase the level and efficiency of the use of mineral fertilizers, to ensure the preservation of the environment, it is necessary in each case to have an agrochemical justification for their application.

The use of mineral and organic fertilizers, chemicals to control weeds, pests and diseases of plants is the basis for the introduction of intensive technologies for growing crops. The experience of intensive wheat-growing farms has shown that yields are increasing by 65-70% compared to traditional technology.

Highly effective use of chemicals (protein-vitamin supplements, vitamins, feed antibiotics, mineral feed additives, feed preservatives, animal protection products against diseases and insects, etc.) in feed production and animal husbandry. Thus, the advanced technology of grass silage with the addition of chemical preservatives makes it possible to reduce significantly nutrient losses compared to traditional silage and hay harvesting technology and to obtain high quality forage.

The introduction of *innovative resource-saving technologies* in agriculture, which would ensure the increase of efficiency of functioning of the agrarian sector in conditions of limited and depletion of natural resources, is of particular relevance. Now the constant introduction of the latest developments is the key to sustainable agriculture.

Despite the instability of innovation activity, the Ukrainian agriculture is trying to integrate advanced scientific and technical developments and adapt them to its own production. This is evidenced by the use of the latest technologies in agriculture, crop production and animal husbandry, which are used by leading enterprises in the country.

In domestic agriculture, progressive modern technologies of minimum tillage and precision agriculture are being increasingly used, namely: Mini-Till, No-Till or Zero-Till, Strip-Till.

At present, the most widespread use of plant breeding and genetic engineering is to activate crop production. About 120 scientific institutions are engaged in the selection of agricultural crops in Ukraine, which carry out breeding work with more than 300 species of plants. However, traditional breeding requires a considerable amount of time and extensive crossbreeding and the breeding material under study, so it is displaced by a marker, which, having certain genes, allows them to be controlled during breeding, which increases the reliability and efficiency of selection, while shortening the period creation of new varieties.

Gene engineering and the use of genetically modified organisms (GMOs) are becoming increasingly popular. Methods of genetic engineering, cell biology, DNA technology help transfer genetic material to plants from microorganisms, fungi and animals. Removal of genes and their inclusion in the genome of existing plant varieties gives them new features: resistance against pests, herbicides; to unfavorable soil and climatic conditions; ability to synthesize biopesticides; neutralize toxic substances in soil, water and the like. However, the final impact on living organisms consuming such products is not clearly defined and can manifest over the decades, adversely affecting their life.

Considerable interest is shown today in the production of agricultural "eco" products grown with minimal tillage, complete abandonment of the use of GMOs and plant protection products.

The use of space industry advances becomes the most appropriate condition for enhancing agricultural development. This is quite relevant in modern conditions, since the availability of large areas of the agrarian sector necessitates the receipt of information on the state of resources, efficient use of natural resource potential and material and technical resources, yield forecasting, implementation of modern systems of land use and information agro-technologies require the development of technological and technological technologies. Such systems include Global Positioning System (GPS), "Rapid Eye", CORINE Land Cover (Coordination of Information on the Environment).

Scientific and technological progress has stimulated the rapid development of nanotechnology, which is taking place in all areas of agriculture, including machinery and fertilizer systems. Nanotechnology defines a set of methods and techniques that guarantee the ability to create and modify objects in a controlled manner that have fundamentally new qualities and enable them to be integrated into fully functioning systems. The introduction and use of these technologies in the crop sector have a positive effect, affecting yields, cost savings, resource management and more.

The essence of innovative technologies related to animal husbandry is to implement:

– biotechnology (application of cellular and genetic engineering methods to enhance animal reproductive function). Research results are used to improve animal health, improve the quality of livestock products, protect the environment and conserve the gene pool. Biotechnology enables the identification of genetically resistant to various animal diseases and aims to use them in the breeding process;

– breeding (aimed at improving the breed qualities of animals due to the intensive use of highly productive breed breeding animals). The efficiency of breeding work is closely linked to the reproduction, the rate of renewal of the main flock, the provision of high-value genetic material, and in the future - the creation of a domestic market for breeding resources that would fully meet domestic needs and export-oriented;

– feeding systems. Modern standards of feeding should take into account the needs of animals for energy, dry matter, proteins, carbohydrates, fiber, fat, trace elements, carotene, vitamins and more. Accordingly, various feeding regimes are created for the respective breeds of animals, due to their precise dosage. This technology allows to increase the live weight gain of livestock, but the introduction of intensive feeding systems is hampered by the considerable need for the financial resources needed to modernize and automate production processes;

– technical and technological support, characterized by updating the farm technological base with the latest equipment for animal keeping. For example, fencing boxes and aft table with / without locking; combined boxes; general pillowcases; arrangement of chairs; feed and distribution systems; modern milking equipment, etc .; - resource-saving technologies based on the introduction of full process automation, the use of robotics, the creation of a forage base, breeding of high-productivity livestock

Compliance with this will affect the profitability of the livestock industry and will become the basis for innovative development of the agricultural sector. Although resource-saving technologies will contribute to the scientific and technological progress of domestic livestock, at this stage, this issue remains a problem due to the lack of organizational, economic, financial and logistical support.

One of the areas of intensification is the specialization of agricultural production. Specialization as a form of social division of labor is a condition for widespread use in agriculture of the achievements of scientific and technological progress and the basis for its consistent intensification.

The specialization of agricultural enterprises is inevitably accompanied by the *concentration* of production in all industries, which helps to increase its efficiency. Increasing output and increasing its efficiency in the intensification process is ensured by deepening specialization and achieving optimal sizes of agricultural production in enterprises of different forms of ownership and types of management.

Among the organizational and economic measures that ensure the rational use of production resources and increase the efficiency of production intensification, *the introduction of progressive forms of organization and remuneration* is of great importance. Currently, the intensification of agricultural production requires a radical restructuring of the methods of organization and remuneration based on progressive forms of material incentives.

The main strategic directions of intensification of agricultural production should be: attraction of investment resources; development of specialization and concentration of production to optimal sizes; new approaches to business development; development of production on an innovative basis through the use of new varieties and hybrids of crops and animal breeds; technical and technological re-equipment of production; diversification of production and development on this basis of domestic industrial relations and service and sales cooperation.

QUESTIONS FOR SELF-CONTROL

1. What is the essence of an extensive and intensive form of increasing agricultural production?
2. What are the additional investments for the same land area?

3. What are the country's transition factors to intensive agriculture?

4. What indicators characterize the level of intensity of agricultural production?

5. What indicators characterize the economic efficiency of agricultural intensification?

6. What are the main directions of intensification of plant and animal husbandry?

7. What are the main measures to improve the economic efficiency of agricultural intensification?

8. What is the intensification of production in the context of sustainable use of agriculture?

9. What indicators characterize the result of intensification of agricultural production?

10. What are the objects of intensification in plant growing, and which in animal husbandry?

TEST TASKS

1. What indicators characterize the intensive form of extended reproduction in plant growing?

1) expansion of acreage of agricultural land cultures;
2) increase agricultural crops yields;
3) increase in gross production of agricultural crops;
4) increasing the share of arable land in farmland.

2. Indicators of the level of agricultural production intensity:

1) production costs for 1 UAH of the value of gross output;
2) the cost of gross production per 1 ha of agricultural land;
3) the cost of gross production for 1 UAH costs;
4) annual production costs per 1 ha of agricultural land.

3. Indicators of the level of crop production intensity:

1) annual production costs per 1 ha of agricultural land;
2) annual production costs per 1 ha of arable land;
3) the value of gross output per 1 ha of agricultural land;
4) the value of gross output per 1 ha of arable land.

4. Indicators of the level of grain production intensity:

1) annual production costs per 1 ha of agricultural land;
2) annual production costs per 1 ha of arable land;
3) annual production costs per 1 ha of cereals sowing;
4) grain yields.

5. Indicators of the result of intensification in grain production:

1) the value of gross output per 1 ha of agricultural land;
2) the value of gross output per 1 ha of arable land;
3) grain yields;
4) grain production per 100 ha of arable land.

6. Indicators of the result of intensification in agriculture production:

1) the value of gross output per 1 ha of agricultural land;
2) the value of gross output per employee;
3) the value of gross output for 1 UAH production costs;
4) the value of gross output for 1 UAH fixed capital..

7. Indicators of economic efficiency of intensification in agricultural production:

1) the cost of fixed capital per 1 ha of agricultural land;
2) the value of gross output per average annual worker;
3) the value of gross output per 1 ha of agricultural land;
4) the cost of fixed capital per average annual worker.

8. Indicators of economic efficiency of intensification in agricultural production:

1) the cost of fixed capital per 1 ha of agricultural land;
2) the cost of fixed capital per average annual worker;
3) the value of gross output for 1 UAH production costs;
4) the value of gross output per 1 ha of agricultural land.

9. Indicators of economic efficiency of intensification in agricultural production:

1) the value of additional gross output per 1 ha of agricultural land;
2) the value of gross output per 1 ha of agricultural land;
3) the cost of fixed capital per 1 ha of agricultural land;
4) the cost of additional gross output for 1 UAH of additional costs.

10. Indicators of economic efficiency of intensification in agricultural production:

1) the value of gross output per 1 ha of agricultural land;
2) rate of return;
3) capital security of the enterprise;
4) power availability of the enterprise.

THEME 8. SPECIALIZATION, CONCENTRATION AND AGRICULTURAL INTEGRATION

8.1. The essence and objective conditions of development of specialization of agricultural enterprises
8.2. Concentration of agricultural production
8.3. Integration processes in agricultural production

8.1. The essence and objective conditions of development of specialization of agricultural enterprises

Specialization is the process of separating and starting enterprises or industries to produce similar products.

Specialization in agricultural production is the predominant development of one or more industries in the production of commodity products at individual enterprises and areas (districts, regions, natural and economic zones).

Depending on the object of specialization, it is distinguished by its three forms: territorial, specialization of agricultural enterprises and domestic specialization.

Territorial specialization means the predominant production of certain types of agricultural products in a particular territory. There are four types of territorial specialization - zonal, microzonal, regional and district. Zonal specialization characterizes the production direction of the zone, and in Ukraine the most established - Polissya, Forest-steppe, northern and central Steppe, southern Steppe, foothills and mountain regions of the Carpathians, foothills and mountain regions of Crimea. Microzonal specialization is inherent in relatively small areas within the respective zones where certain crops are not grown and are not widely distributed in Ukraine. Formed, for example, microzones of hop production and southern hemp. The regional and district specialization indicates which production of these types of products is the main and prevailing in these areas. It is formed under the influence of zonal and microzonal specialization. The decisive factor here is the geographical location of these administrative units.

Specialization of agricultural enterprises is the predominant production of the corresponding type(s) of products for which there are the most favorable natural and economic conditions. This form of specialization develops and deepens territorial specialization. In this case, there can be favorable conditions for the production of, for instance, six or more types of products, then due to the intra-economic differentiation of the natural and economic factors in a particular enterprise could be the best conditions for the production of a part of the products from their entire list inherent in this zone, microzones, etc.

Internal specialization is the further development of the specialization of the enterprise by separating production of certain types of products or its technological stages in separate internal economic units - brigades, farms, squads, echelons, cooperatives. For example, households can create dairy farms, pig farms, arable, tractor-arable, horticultural, vegetable brigades, mechanized squads for growing sugar beets and etc. The value of internal specialization is that it allows to take into consideration existing differences within many enterprises in terms of economic conditions, as well as to increase the concentration of production even if a certain industry is not a dominant one here. In this case, it increases production efficiency.

A special need for the development of internal specialization appears in large-sized enterprises, as well as in those households that are developing as a diversified farming. With the deepening of the specialization of an enterprise in a certain branch, there is a need to improve the internal specialization, as it changes character and the scale of production and organizational structure of households. Therefore, the issues of specialization of enterprises and their internal specialization have to be solved in a whole and close relationship.

According to the technological principle of production of products there are industry and intra-industry specialization. Industry specialization is the one in which a certain industry operates in the enterprise on the principle of closed (completed) production cycle. In fact, the vast majority of crops, due to their biological characteristics, are grown from sowing (planting) to receiving finished products on the same patch of land. In the process of such cultivation, the enterprise performs all technological operations, because it is impossible to separate and distribute them to other households or their units in the form of independent industries. As a rule, it is clear that inustry specialization is characteristiced for crop production.

This form of specialization is also appropriate for animal husbandry, when an enterprise develops a certain industry in a complex way - from obtaining young animals to producing the final products. For example, in large pig complexes, 12,000, 24,000, 54,000, and 108,000 pigs are fattened per year in many pig farms, in non-specialized agricultural enterprises keep the main herd, young fat stock, fat them up, and dispose meat of on a meat-packing house. Many livestock industries, such as livestock and sheep farming, are developing under the same pattern.

Intra-industry specialization means the separation of production within the same industry. There are two types of intra-industry specialization: qualitatively multilevel and staged. The first is carried out in order to ensure the qualitative state of functioning of a particular industry. For example, in the grain industry there are three or four qualitatively different levels of grain production with a complete technological cycle. The first of these - the removal of new varieties and hybrids of cereals - is carried out by research institutes and breeding stations; the second is the production of elite seeds and the first reproduction by elite-seed plants; the third - production of varietal seeds of the second reproduction - in specialized units of agricultural enterprises; fourth level - production of commercial grain. In livestock breeding, the high-quality intra-industry specialization is also developed effectively. For example, new breeds and lines of animals are brought to breeding factories and breeding stations.

Staged specialization is the allocation of production into individual stages of the technological cycle of the industry. It is mainly characterize animal husbandry. For example, in livestock breeding, separate stages can be distinguished, such as growing heifers and first-born cows, milk production, rearing and fattening of young cattle. Every stage becomes a separate production of specialized enterprises. Staged specialization also takes place in certain areas of plant growing. Thus, in beet-growing, seed production it is conducted by specialized agricultural enterprises that are allocated to independent production, and commodity production of beet-growing, which is carried out by different agricultural enterprises according to their legal status.

Specialization of agriculture has its differences, due to its specific features (land - the main producers` good, economic processes of reproduction are closely connected with the natural). These peculiarities of agricultural specialization cause the fact that the enterprises produce not one type of production, but the formation of industries in each of which receive one or more commodity products. Therefore, the specialization of agricultural production is characterized by those industries and products which share prevails in the structure of commodity production.

To determine the territorial specialization and specialization of agricultural enterprises the indicator of the structure of commodity products is used, which reflects the economic importance of individual agricultural sectors in the economy. By economic importance, the branches of the agricultural enterprise are divided into main, additional and subsidiary.

The main branches have the largest share in the structure of commodity products. The share of the main industry in the structure of cash receipts from the sale of commodity products should be more than 20%. The main industries characterize the production direction of the enterprise and determine its specialization.

Additional industries have a less share in the commodity output of the enterprise than the main ones. They provide favorable conditions for the development of major industries and the more efficient use of land, means of production and human labor resources. The rational production structure of the enterprise involves a combination of main and additional agricultural branches.

Subsidiary branches are non-agricultural industries. They are created to serve the main and additional industries or to meet the consumers` needs of the rural population. Subsidiary industries contribute to a more efficient use of agricultural productive resources and to solve the socio-economic problems of the rural areas.

Depending on the level of specialization of agricultural enterprises, the number of main industries and their correlation is distinguished by these types of specialized farms.

Narrow specialized farms have mainly one industry, which production in the structure of commodity products is 80 - 90%. These include poultry farms, livestock complexes, cattle and pig fattening farms, greenhouses and other farms. Narrow specialization is inherent in the production of agricultural products, the technology of which makes it possible to use labor and means of production during the whole year.

Deeply specialized farms have one main and 3 - 4 additional agricultural branches. The main industry, which determines the specialization of the agricultural enterprise, provides more than 50% of the returns from the sale of commodity products.

There are two main industries in specialized farms, which provide 60-70% of revenues from sales of products, as well as 3-4 additional ones.

Mixed specialization farms have three major industries, which provide for over 75% of revenues from sales of commodity products, as well as 3 - 4 additional ones.

Nowadays there are few agricultural enterprises that could be rated to one of these specialization groups. In most of them there are two or three leading industries, each of which is not dominant and in the structure of commodity production occupies from 10-15 to 30-35%. Such enterprises determine their production direction. It is advisable to include in its name two, maximum three relatively dominant branches in the industry. If, for example, the largest share in the structure of commodity production in the economy is occupied by vegetables (for example, 27%), second place - commodity milk (20%) and third - grain (14%), the production direction of such an enterprise can be formulated as vegetable and milk with advanced grain production.

The efficiency of production in agricultural enterprises depends not only on the size of the industries in which they are leading, but also on the development of other industries having a commercial character. As a rule, the more branches in such industries, the smaller their size and lower concentration of production are. This sometimes has a negative impact on the final results of management. To take into account the degree of development of all commodity industries in the enterprise, it is necessary to determine and analyze the coefficient of concentration of commodity production (Kc):

$$Industry\ production\ coefficient = \frac{100}{\sum_{i=1}^{n} Rvi\ (2Ni-1)},$$

where R_{vi} – ratio of value of industry in structure of commodity production, % ;

N_i - the order number of the certain industry in the ranked row, which is in descending order: the first place - the industries with the highest share in the structure of commodity products, and the last - with the lowest.

By using the indicator of the structure of commodity products we make a conclusion about the level of development of individual industries and the degree of specialization of the enterprise in the production of products of the main (leading) of them, the industry production coefficient of commodity concentration judges the level of specialization of the agricultural enterprise, taking into account all its productive industries. It is accepted that an enterprise is multilevel when this ratio does not exceed 0.20, with a low level of specialization - 0.21-0.30, with an average of 0.31-0.40, above the average - 0.41-0, 50, high - 0.51-0.60 and deep - more than 0.60. Otherwise, the efficiency of agricultural enterprises increases with the absolute value of the industrial production coefficient of commodity concentration, but at the same time increases the risk of loss of financial stability due to the possible deterioration of the market on branches of specialization.

To sum up, specialization should help increase volumes and improve product quality, increase productivity and reduce production costs, and increase its profitability. The economic efficiency of specialization is characterized by the following system of indicators:

1) the cost of gross production per 1 hectare of agricultural land, per average annual worker, per person-hour, per UAH 1 of fixed capital (fixed assets);

2) labor costs for the production of 100 kg of production;

3) the cost of 100 kg of production;

4) profit per 1 hectare of agricultural land;

5) the level of profitability of agricultural production.

The problem of enterprise specialization is determined primarily by the volume of production of homogeneous products. On the one hand, the higher this volume, the lower the fixed costs per unit of production, and on the other, the more sophisticated the production technology. The choice of the most economically feasible technology and the appropriate technical equipment determines the size of production. The optimality of this production or enterprise depends on the criterion which is chosen. As it is shown, production volumes have to make the complex of machinery and equipment fully loaded. In this case, the cost of production may be the lowest.

8.2. Concentration of agricultural production

The development of the productive forces of agricultural enterprises is closely linked with the deepening of specialization and the increase in concentration of production. As an objective economic process, the concentration of agricultural production is based on the laws of development of productive forces, widely using the achievements of scientific and technological progress.

Concentration of agricultural production is the process of concentrating means of production, land and labor resources in order to increase output in enterprises and associations.

Concentration of agricultural production is an objective regularity of its development and helps to increase production efficiency. With large sizes of agricultural industries, the possibilities of using advanced technologies are greatly expanded, and the means of production are used more intensively and rationally. All this is primarily manifested in increasing productivity and reducing the cost of agricultural products, which is the basis of effective management.

Concentration of production can be made both within the enterprise (maximum development of individual industries, concentrating them in production units or in areas with the best conditions for the definite industry), and on the basis of inter-economic cooperation (deepening the division of labor between individual enterprises or the cooperation of a number of households on production of any product or its part). Finally, the concentration of production is carried out in the enlargement of the size of enterprises (*absolute concentration*) and in the distribution of the total volume of production of industries between enterprises of different sizes (*relative concentration*). Absolute concentration is characterized by the volume of production and the size of production resources, and the relative concentration - by the specific ratio of an individual organization in the total volume of products and in the sales market.

Concentration of production in agricultural enterprises is carried out in the following forms: accumulation, centralization of production, combining and cooperation.

Accumulation provides extended reproduction and enhances the concentration of production. With the development of farms, the size of their fixed and working capital increases, and this is the main precondition for the concentration of agricultural production.

Centralization of production is an increase of its size by combining several households into one and establishing a single management. Both forms of concentration of production are interrelated, accompanying and complementary. Centralization greatly accelerates and completes the accumulation and concentration of production. The process of concentration of agriculture is constant and contributes to the efficiency of production. In the increase of production volumes, the effect of the economic law of the advantages of large production over small is manifested.

Combining involves unification of production and processing in one enterprise, the main production with additional, for the best usage of the enterprise resources and raw materials.

Cooperation is characterized by the unification of enterprises for joint production and maintaining their independence.

There are the following types of concentration:

- aggregate (increase of unit capacity of equipment);

- technological (enlargement of production sites and subdivisions of the enterprise);

- economic (technological concentration of associations of organizations into one);

- legal (the use of legal institutions in the process of increasing the market influence of organizations in the relevant market of goods and services).

Due to the specificity of the industry in agricultural enterprises, the process of concentration of production is more complex than in industrial enterprises, because it differs by certain features:

1) due to the limited or lack of free land the integration of production on the basis of accumulation raises some difficulties in agriculture sphere. In this case, concentration on the basis of accumulation is carried out in agriculture mainly through the intensification of production and is relatively slow;

2) the concentration of production on the basis of centralization is complicated by the extent of the main means of production - land. For this reason,

centralization does not always ensure the creation of large-scale production, as farms that have several branches of different sizes merge. In addition, it causes some difficulties in production management;

3) one of the ways of concentration of agricultural production is the specialization of enterprises in the production of a particular type of products. As a result, the volume of products for which it specializes will increase. This can be ensured on the basis of inter-economic cooperation, which opens up the possibility to organize production in the sizes that allows using the advanced machinery, technology and other advantages of large-scale production.

The main indicator of the level of concentration of agricultural production is the overall production by volume or value.

The size of agricultural enterprises is characterized by the amount of annual value of gross production, and the size of individual industries is determined by the gross output of grain, sugar beets, the volume of gross production of milk, meat, eggs and other products.

The size of agricultural enterprises is also characterized by additional indicators: the area of agricultural land and arable land, the number of average annual workers, the availability of basic means of production, the livestock and poultry productivity, etc.

The development of agricultural enterprises is naturally based on the concentration of production, because their level of efficiency depends on the size. However, due to the specific features of agricultural production, further increasing the size of farms does not give them a decisive advantage and not always ensure high efficiency. In this case, the size of agricultural enterprises should be optimal to ensure the most efficient usage of land, means of production and labor force in definite conditions.

The deepening of specialization and the increasing concentration of agricultural production are directly linked to the economic shaking off of different production types of farms.

Production type of farms is a whole complex of enterprises of the same specialization, similar to the combination of the main industries and the level of intensity. Identification of production types of farms in different natural and economic conditions and justification of their development contribute to the deepening of specialization and increase of the intensity of production. According to the method of standardizing of agricultural enterprises, the name of production types of farms is determined by the main industries and their ratio in the structure of proceeds in cash from the sale of products.

8.3. Integration processes in agricultural production

Specialization and concentration of production create favorable conditions for widespread use of scientific and technological progress and provide its efficiency increase on this basis. However, the further increase in the size of agricultural enterprises is not always justified and rational. Therefore, deepening specialization and increasing the concentration of agricultural production can be achieved through integration processes.

Integration processes are decisive factors in the dynamics of development of individual agricultural sectors and agriculture in general. At the present stage of economic development, the lack of integration of production, especially in the agricultural sector, makes it impossible for the normal functioning of agricultural and other sectors, and in general, the national economy. Nowadays, on the one hand, farms are experiencing difficulties in land use (due to lack of means of production) and on the other - in declining production of basic agricultural products and problems with providing food to the population. The best way out of this situation is agro-industrial integration, which combines agricultural and technologically related industrial production, in order to obtain final products from agricultural raw materials and achieve greater economic benefits.

Agro-industrial integration means a certain organizational combination of agricultural and technologically related industrial production in order to obtain final products from agricultural raw materials and to achieve greater economic benefits due to mutual material interest and responsibility of all participants in agricultural production.

This kind of integration is a *vertical integration*. It can organizationally combine all or major stages of agro-industrial production and circulation, including the production of agricultural raw materials, their transportation, storage, processing and sale of the final product.

Horizontal integration is developing in agriculture too as a form of inter-economic cooperation that achieves a higher economic effect and often deepens specialization at certain stages of a single technological process. Such integration is developed, for example, in grain production by establishing organizational and economic links between elite-seed reproductive enterprises and enterprises for the production of commercial grain. A kind of such integration are the scientific-production systems, which are created to be obtained by their participants - agricultural enterprises qualified assistance from the main enterprise - research institution in the introduction into the practice of advanced technologies, other achievements of STP and best practices, as well as in improving the organization of production and forms of production. In fact, any cooperation of agricultural producers is a manifestation of horizontal integration.

The organizational forms of agro-industrial integration are agro-industrial formations. There are two types of agro-industrial formations existing in Ukraine today: regional and economic.

Regional agro-industrial formations are represented mainly by agro-industrial associations, and economic ones by agro-industrial enterprises and agro-firms.

In currently functioning agro-industrial formations, first of all in economic ones, a real combination of agricultural and industrial production is achieved. As a result, the production of agricultural products, their transportation, processing and sale from separate units becomes a single production process, which from an economic point of view is characterized by mutual material interest and responsibility of all participants of agro-industrial production for the results of activity - production and sale of final products.

In the context of real integration of agricultural and industrial production, an additional synergistic effect is created, which is manifested in the higher economic efficiency of integrated production in comparison with the separated one. Sources of production of agro-industrial formations of synergistic effect are:

• a substantial reduction in the loss of agricultural products, especially perishable ones, by minimizing the gap between their harvesting and industrial processing;

• increase in the production of final products by utilizing non-standard agricultural products and by-products that are completely lost or used irrationally without integrated production (animals are often fed non-standard vegetables, fruits, etc.);

• reduction of costs for transportation of products to processing places at large processing plants and to counter deliveries of foodstuffs for consumption by the local population. This is especially important in the context of high energy costs.

It should also be noted that agro-industrial formations have an additional effect that is not part of the synergistic effect due to the production and sale of the final products. This is connected with the fact that the highest level of return on advanced capital and current expenses are reached by those agricultural enterprises that operate at the final stage of the production cycle, producing and selling final products. After all, the latter is always valued higher than raw materials due to the higher cost recovery achieved at the expense of the consumer. In the context of separate production, this additional effect is obtained by processing enterprises, while purely agricultural enterprises are deprived of the opportunity to improve their financial status due to this type of effect. In the conditions of a combination of agricultural and industrial production, the owners of this effect are agro-industrial formations The last make their own decisions about changing the range of products and sales according to market conditions, as well as conduct the necessary marketing activities in order to satisfy the consumer market and increase the profitability of their own production.

By earning more income than simple agricultural enterprises, agro-industrial formations are more successful in solving household and economic issues, providing higher social security for their employees, which is an important feature of a socially oriented market economy. Agro-industrial formations create a broad technological base for skilled workers to provide workers with fuller employment throughout the year, and often reduce the seasonality of production.

With the quantitative growth of agro-industrial formations - agro-industrial enterprises, agro-firms, agro-consortiums, etc., a competitive environment is created in the field of agricultural production, which forces the participants of agro-industrial production to produce better-quality food products with a competitive price.

On the one hand, the common material interest of all participants of regional and economic organizational forms of agro-industrial integration in achieving high end results and each of them in increasing the scale and efficiency of production of their activity, on the other, becomes the driving force that creates the necessary economic environment for wider introduction to production of the latest achievements of science and best practice, economically encourages to ensure proportional development of agriculture and processing its industry base for storage and implementation. As a result, the conditions are created not only for increasing the volume of production and improving the quality of products, but also for the rational use of raw materials, ensuring its in-depth processing, expanding the range of food. All this strengthens the economy of agro-industrial formations.

It is important to note that the creation of organizational forms of agro-industrial integration and their improvement is not in a universal means for entering agro-industrial production to a qualitatively new stage of development that meets the requirements of a market economy. Its high efficiency can be achieved through the introduction of new intensive technologies that ensure waste in the processing of agricultural raw materials, saving natural and indirect labor, reducing and completely eliminating waste of resources and finished products. This task requires constant scientific support of agro-industrial formations, widespread use of modern computing equipment, establishment of close mutually beneficial industrial and trade relations with foreign partners. All this will contribute to the entry of agro-industrial production to the modern world level.

Before considering the peculiarities of the organizational structure and the specifics of the functioning of certain types of agro-industrial formations, it should be noted that it is early to ask questions abot the advantages of one of them over the other. In the process of accumulation of these formations of practical work experience, the advantages and disadvantages of the organizations are adopted by their production structure, the degree of its flexibility and elasticity in the substantiated solution of current and prospective tasks will be more clearly manifested. This means that in terms of economic and financial autonomy of market players, development of different forms of economic management and flexible combination of different forms of ownership, economic competitiveness between agro-industrial formations, and other subjects of agro-industrial complexes will increase and as a result will be consolidated and will accelerate among them. At the same time, there will be a real opportunity to create new, still unknown formations with a high level of competitiveness of their products in the food market.

There are the following basic forms of production organization based on agro-industrial integration: agro-industrial enterprises and agro-firms; agro-industrial associations, scientific-industrial associations.

Agro-industrial enterprises are agricultural enterprises which have in their composition industrial production for processing agricultural products. The basis of their activity is the organic unity of agricultural production and its industrial processing. The agro-industrial enterprises have a permanent staff and process at least 25% of the production of one of the main industries. Agro-industrial enterprises include those farms in which the share of products made from own agricultural raw materials, together with the commodity products of the raw materials of the integrated sphere, makes up more than 20% of the proceeds from the sale of commodity products.

Agro-firms are agricultural enterprises which, in their organizational and production structure, in addition to industrial productions for processing and storage of agricultural products, have links of market infrastructure (trade enterprises, marketing services, etc.).

Agro-industrial associations are created on the basis of rational specialization and cooperation of agricultural, industrial and other enterprises under the sole economic leadership organized production, industrial processing, storage and sale of agricultural products. Agro-industrial associations are created by taking into account the sectoral and territorial division of labor. Enterprises belonging to the agro-industrial association have operational and economic independence, but their activity is conformed and coordinated in accordance with the main indicators of economic and social development of agro-industrial formation.

Scientific-industrial associations are an integration of research institutions, agricultural and industrial enterprises. Combining the efforts of the agricultural enterprise and scientific institutions contributes to a significant increase in the efficiency of agricultural production through the systematic implementation of science in practice. The main task of the scientific-industrial association is to accelerate scientific and technological progress in agriculture and to systematically integrate the results of scientific research into agricultural production.

The development of agro-industrial integration involves improving the efficiency of agricultural production, significantly improving the working conditions and life of rural workers. Integrated industries are becoming increasingly important in the development of productive agriculture and in solving the socio - economic problems of the rural zone.

QUESTIONS FOR SELF-CONTROL

1. The concept of "specialization of agricultural enterprises"?
2. What is the importance of specialization for agriculture?
3.What is intra-industry specialization?
4. Determine the division of specialization on the technological principle of production.
5. Name the types of territorial specialization.
6. For what intra-industry specialization is made?
7. What is the use of the product structure indicator?
8. Which industry is characterized by staged specialization?
9. How is the industry production coefficient determined?
10. The value of concentration of production in agriculture.

TEST TASKS

1. Specialization of agricultural enterprise is:
1) production and sale of commodity products in the enterprise;
2) preferential development of one or more industries in the production of commodity products in the enterprise;
3) prevailing development of the industry in the production of gross production in the enterprise;
4) ensuring the rational use of material and labor resources of the enterprise.

2. Specialization of agricultural enterprise is determined by the structure:
1) cash receipts from sales of products;
2) the crop area of the farm;
3) gross production;
4) production costs.

3. Indicators of economic efficiency of specialization of agricultural industry enterprises:
1) the value of fixed capital per 1 ha of agricultural land;
2) the cost of fixed capital per average annual employee;
3) the cost of gross production per 1 ha of agricultural land;
4) annual production costs per 1 ha of agricultural land.

4. Concentration indicators of agricultural production:

1) the value of gross output per average annual worker;
2) the value of fixed capital per 1 ha of agricultural land;
3) the cost of fixed capital per average annual employee;
4) the value of the gross output of the enterprise.

5. Vertical integration is:
1) cooperation of agricultural enterprises producing certain products;
2) unification of agricultural cooperatives;
3) cooperating of farm and industrial enterprises;
4) mergers of stage specialized enterprises.

6. Agro-firm is:
1) agricultural enterprise which has in its structure industrial production for processing of agricultural products and trading organizations;
2) agricultural enterprise which has in its structure industrial production for processing of agricultural products from raw materials;
3) unification of agricultural enterprises and scientific institutions;
4) unification of agricultural enterprises and trade organizations.

7. Specialization forms, depending on the object:
1) vertical;
2) domestic;
3) intra-industry;
4) territorial.

8. The specialization inherent in relatively small areas within the respective areas where certain crops that are not widely distributed in Ukraine are:
1) zonal specialization;
2) microzonal specialization;
3) regional specialization;
4) specialization of the enterprise.

9. The share of large enterprises according to the relevant size indicator in the total number of agricultural enterprises of a certain legal status is determined by:
1) absolute concentration level;
2) specialization;
3) relative concentration level;
4) agro-industrial integration.

10. Organizational combination of technologically related heterogeneous activities with inherent functions is:
1) specialization;
2) concentration;

3) integration;
4) extended reproduction.

THEME 9. EXPANDED REPRODUCTION AND ACCUMULATION IN AGRICULTURE

9.1. The essence and features of extended reproduction in agriculture

9.2. Indicators of expanded reproduction in agriculture

9.3. Gross product reproduction and distribution

9.4. Accumulation in agriculture and its sources

9.1. The essence and features of extended reproduction in agriculture

The production of material goods (capital goods and consumer goods) is a necessary condition for the existence and development of human society. This process is continuous and should periodically undergo the same stages - production, distribution, exchange and consumption. Society cannot stop consuming, so it cannot stop producing. Therefore, any social process of production, which is seen in constant communication and continuous restoration, is both a process of reproduction.

So, reproduction in agriculture is a constant repetition and continuous renewal of the agricultural production process. There are two types of reproduction: simple and advanced. With simple reproduction, the production of material goods is restored to its previous size, with expanded reproduction the volume of production is continuously increasing. Therefore, simple reproduction is always a part of and basis for extended reproduction. Implementation of expanded reproduction in agriculture involves the systematic use some of the surplus product to increase production. This not only compensates for material goods, but also creates new means of production and consumer goods, which are the material basis of extended reproduction.

The basis of social development is to improve the welfare of all its members. Therefore, the objective pattern of agricultural production is expanded reproduction, which creates the right conditions to meet the growing needs of the population.

Extended reproduction - a systematic increase in agricultural production, which makes it possible not only to provide the current level of society, but also produce more vehicles and consumer goods. In agricultural enterprises expanded reproduction can occur in two forms - extensive and intensive. In extensive reproduction, scale-up of production is carried out by attracting additional resources (increase of acreage, livestock, labor, etc.) at constant technical level. Intensive reproduction implies an increase in the production of agricultural products based on the growth of labor productivity, which is ensured by the improvement of technology, technology and organization of production, implementation of scientific and technological progress.

There are also two types of intensive expanded reproduction: *capital intensive*, when output growth is based on increased costs of production assets per unit and *capital saved* in which the increase in production is accompanied by savings in unit costs of materials. Intensification of production is a major form of extended reproduction, so improving the efficiency of material and labor resources is of great economic importance.

Agriculture provides the population of the country with food and industry with raw materials. At the same time, it is a consumer of industrial means of production. In this regard, ensuring a high rate of expanded reproduction of the aggregate social product requires the right proportions in the development of industry and agriculture.

The purpose of widespread reproduction in the economy is to ensure sustainable growth and improve the structure of social production. Creating favorable conditions for the development of this process accelerates the pace of widespread reproduction in agriculture, based on the development of those sectors that determine scientific and technological progress.

1. The main means of production in agriculture is land, which is spatially restricted and not artificially reproduced. Therefore, a prerequisite for expanded reproduction in agriculture is sustainable use of land and measures to improve its fertility. The process of reproduction in agriculture is fully influenced by soil and climatic conditions, which can increase or decrease the efficiency of use of production resources. Therefore, expanded reproduction in agricultural enterprises implies, first of all, an increase in soil fertility, taking into account the characteristics of different zones of the country, which is a necessary condition and a constant basis for increasing production.

2. In agricultural production, the economic process of reproduction is closely intertwined with the natural (biological) processes of reproduction of plant and animal organisms. Therefore, in the process of expanded reproduction in the branches of agriculture, economic and natural laws of reproduction simultaneously operate and interact. In agriculture, unlike industry, man controls the natural processes through technology. The technical means of production should create the most favorable conditions for the life and development of living organisms - plants and animals, which ensures a high level of their productivity.

3. In agriculture during this period in the working period do not coincide, so in the process of expansion is absent, which takes place on average, there is an average. This requires considerable concentration, which occupies a large number of manpower in certain periods, developing under personal cities and agro-industrial integration. Increased specialization and rational cooperation with the growing production and livestock industries make it possible to grow the seasonality of agricultural production.

4. The peculiarity of the reproduction process in agriculture is that a significant part of the means of production is reproduced in agrarian enterprises in kind. Part of the agricultural products does not take the market form here, remains in the enterprise and enters a new cycle already in the form of means of production. These are seeds, feed, livestock, poultry, organic fertilizers and other products. With the advancement of scientific and technological progress, the share

of these means of production is decreasing, but their economic importance and impact on the efficiency of agricultural production are increasing.

5. Extensive reproduction in agriculture occurs with the absolute reduction of employed labor resources. The whole volume of gross production growth is ensured by the increase in labor productivity. To further increase the production of agricultural products, it is necessary to take appropriate measures regarding the qualitative restructuring of the material and technical base of agricultural enterprises. Widespread reproduction in the conditions of increasing the level of stock and energy of employees requires a constant increase in the number of skilled personnel, strengthening the principle of material interest in improving productivity.

6. An important socio-economic feature of reproduction in agriculture is the presence of different forms of ownership and types of management. It is necessary to create equal economic conditions for them to increase the production of agricultural products and increase the efficiency of management.

Due to the availability of production resources crucial role in the expanded reproduction should belong to large farms. At the same time, significant volumes of production are being created in private households.

The process of reproduction in agriculture is based on the dialectical unity of the development of productive forces (improvement of means of production, improvement of skills of the workforce) and industrial relations. In the further development of agricultural production nowadays the central place is the restructuring of industrial relations in the countryside, which is intended to restore the peasant position of the landlord, interested in increasing production and improving its quality.

9.2. Indicators of expanded reproduction in agriculture

Expanded reproduction in agriculture involves constant updating, improvement and growth factors of production to maintain its continuity and development. It involves the following interconnected processes: growth of gross and net agricultural production; restoration and expansion of production facilities; reproduction of agricultural labor resources. On the basis of reproduction of gross production, production funds and labor resources, industrial relations are created and developed, which are the driving force for the development of productive forces.

Expanded reproduction in agriculture characterized by economic indicators - physical and value, factor and effective. The dynamics of extended reproduction of elements of the production process (land and production funds, labor resources) are reflected by factor indicators, and the resultant ones are the consequences of production, in particular the increase in gross and net production. Economic indicators expanded reproduction resulting from its essence and reflecting the interrelated processes that ensure the continuity of agricultural production.

To characterize expanded reproduction, they primarily use indicators that reflect an increase in the output of the gross agricultural product. In crop and livestock expanded reproduction characterized by increased crop yields and productivity of livestock and poultry and increased production volumes of certain agricultural products.

In addition to natural indicators, expanded reproduction is also characterized by value - an increase in the value of gross and commodity products, the growth of gross, net income and profit of agricultural enterprises. Effective indicators of extended reproduction can be expressed both in absolute terms and per hectare of agricultural land.

Indicators of expanded reproduction of production assets of agricultural enterprises - a growth in the value of total assets and increasing capital-labor ratio fondozabezpechenosti farms and rural labor workers. If the level of provision of the enterprise with fixed assets increases, it indicates positive changes in the development of its material and technical base and the creation of the necessary prerequisites for the implementation of extended reproduction.

Extended reproduction is also characterized by natural indicators, which indicate an increase in the number and quality of production facilities. This is an increase in the level of labor and energy efficiency of enterprises, the expansion of land reclaimed land and perennial plantations, the increase in the amount of organic and mineral fertilizers that make 1 hectare of arable land, an increase in livestock livestock and poultry and strengthen the livestock feed base.

Expanded reproduction of labor resources of agricultural enterprises characterized by increasing the number of skilled workers and specialists of agricultural production and costs for training and professional development. At the same time, an important indicator of the process of reproduction of labor resources is the increase of remuneration and public consumption funds, which is the basis for improving the material and cultural standard of living of rural workers.

On the basis of an increase in the production of the gross product of agriculture, the expanded reproduction of production funds and labor resources, industrial relations are being restored. Development and improvement of industrial relations in rural areas occur under the conditions of implementation of modern agrarian policy, as well as under the influence of socio-economic changes in the national economy.

9.3. Gross product reproduction and distribution

As a result of expanded reproduction, the production of gross agricultural output is increasing, which includes all material goods created during the year and is part of the country's total social product. Reproduction in agriculture occurs in natural-material and value forms, and the gross product of the industry is the aggregate of means of production and consumer goods.

Gross agricultural output in natural-material form as a set of production (seeds, feed, livestock, raw materials for industry) and consumer goods in their purpose and use belongs to the first and second divisions of the reproduction process of social production. This division of the agricultural product is important in ensuring the correct proportions of reproduction in the individual branches of agro-industrial production and the distribution of the product between them.

In the process of production of gross agricultural production, past labor, labor, and labor are consumed. Therefore, the gross production in the cost form is divided into two parts: the cost of consumed means of production *(c)* and the newly created value, or the gross income of agricultural enterprises *(V + t)*.

Cost of consumed means of production includes that part of the cost of buildings, equipment, machines, raw materials and materials, which during the current year is transferred to manufactured products. This part of the cost of gross agricultural production corresponds to the annual material costs of production and is a compensation fund. Therefore, the agricultural gross output is allocated primarily to the compensation fund and net production, or gross income.

The compensation fund is part of the value of the gross agricultural output used to recover the means and labor consumed in the production process. It is formed on the basis of depreciation and the cost of spent tangible working capital (seeds, feeds, fertilizers, medicines, petroleum products, spare parts and other materials).

Establishment of a compensation fund is a prerequisite for the proper distribution of gross output and a prerequisite for the reproduction process in agrarian enterprises. Indemnification of the spent means of production is an objective condition of simple reproduction and preservation of the reached level of production. For extended reproduction, it is necessary to first reimburse the consumed funds and then expand the production on the basis of attracting additional production funds.

The natural-material compensation fund consists of means and objects of work. In agricultural enterprises the consumed means of production are restored both in kind in their farms and by purchase at the expense of the proceeds from the sale of commodity products.

In the context of scientific and technological progress, the compensation fund not only performs the function of restoring the means of production used, but is also used for extended reproduction. Under these conditions, the recovery of consumed means of production occurs on a new technical basis at the expense of more sophisticated machinery and equipment, better quality of raw materials and materials than used in the production process.

In the context of scientific and technological progress, the share of the compensation fund in the gross agricultural output increases, which accordingly reduces the size of the gross income and reduces the efficiency of production. This tendency is formed on the basis of a regular increase in the technical equipment of agricultural production, as well as due to the increase in prices for the means of production.

The part of the value of gross agricultural production that is generated by living labor is called net production or gross income. At the same time, net production, as a newly created value in agriculture, is an integral part of the national income of the country.

Gross revenue is an economic category that reflects output. In this connection, it is important to identify in business practice the factors that determine its growth. Gross income can be increased by increasing gross output and reducing material costs through the rational use of productive assets and increased productivity.

The gross income of agriculture is created by living labor and materialized in newly created value. Therefore, the amount of gross income depends on the number of employees of agricultural enterprises and the level of productivity of their labor. With the decrease in the number of employees, the main factor in increasing gross income is the increase in productivity. The increase in gross income directly influences the improvement of material well-being of village workers and the pace of expanded reproduction in agricultural enterprises.

The net production or gross income of agriculture consists of two parts: the required product (v), which forms the payroll of the enterprise workers, and the surplus product, or net income (m). Net production or gross income is the basis for the formation of consumption and accumulation funds.

Consumption fund is a part of gross income created in agriculture, which is used for personal and public (non-productive) consumption. In natural-physical form, the consumption fund includes consumption items that meet the needs of rural workers. The sources of its formation are the necessary product and part of an additional product created in agricultural production.

The consumption fund is the material basis of reproduction of labor resources in agriculture. It includes payroll, public consumption funds created by agricultural enterprises, and contributions to social security and social insurance funds. The consumption fund of agricultural workers formed both in cash and in kind.

The main part of the consumption fund is the wages of agricultural workers. Expanded reproduction in agriculture characterized by increasing consumption funds, including wage rural workers.

The ratio in the distribution of gross income of farms should correspond to the optimum proportions that provide the necessary increase in the well-being of village workers and the corresponding rates of expanded reproduction. Scientists calculate that at a profitability level of 35-40% for personal consumption of workers it is necessary to use about 60-65% of the gross income of the economy.

Public consumption funds for agricultural enterprises ensure the social development of labor collectives. They are used for cultural, mass and wellness events and other social needs, as well as financial incentives for farm workers. This part of the agricultural consumption fund is generated by net income.

Net income is the value of an additional product created in agriculture. Due to the fact that material costs and wages represent the cost of production, the net income of agricultural enterprises is defined as the difference between the cost of gross production and the cost of its production. The magnitude of net income depends on the amount of agricultural output, the level of sales prices and production costs. Therefore, an increase in the production of gross output, an improvement in its quality and a decrease in the cost of production contribute to the growth of net income.

The amount of net income generated by agriculture is divided into two parts. One of them, after sales of products through tax and prices, goes directly to the state budget, and the second is used by agricultural enterprises. At the same time, only a portion of net income is used for consumption, and the vast majority of it is credited to the accumulation fund, which is the main source of expanded reproduction in agriculture. If the size of the consumption fund depends mainly on the amount of gross income, then the accumulation fund is formed only at the expense of net income.

The accumulation fund is a part of net income that is used for extended reproduction of agricultural production based on the growth of fixed assets (production and non-productive) and tangible working capital and the creation of appropriate reserves and reserves. In agricultural enterprises, net income is determined only in the part that they actually receive after the sale of marketable products.

The realized part of the net income takes the form of profit of the agricultural enterprise, its mass can be realistically distributed and used. Therefore, the main source of formation of the accumulation fund is the profit of the enterprise.

In its natural form, the accumulation fund includes the means of production, fixed assets of non-productive purposes, insurance funds and reserves of means of production and consumer goods.

Gross production as the end result of economic activity of agricultural enterprises is at the same time the basis of expanded reproduction and accumulation in agriculture. Therefore, gross agricultural output (G) is allocated to compensation funds (CompF), consumption funds (ConsF) and accumulation funds (AF):

$$G = \text{CompF} + \text{ConsF} + \text{AF}$$

The distribution of gross output and the creation of appropriate funds meet the objective requirements of expanded agricultural reproduction. It is important that in the process of distribution of the gross product of the agricultural enterprise to ensure its further development, to improve the working conditions and increase the well-being of its employees.

The ratio of consumption and accumulation in the distribution of income of agricultural enterprises should ensure an increase in production funds and increase the standard of living of employees. In order to ensure expanded reproduction in agricultural enterprises, the appropriate allocation and use of profits are of particular importance.

Significant changes have taken place in the structure of profit utilization in recent years. The dynamics of the distribution of profits in farms show that payments to the budget have decreased and the share of profit remaining at the disposal of agricultural enterprises has increased accordingly. At the same time, there was a decrease in the share of profits that was used for the industrial development of enterprises and for the promotion of their employees. All this did not create the necessary preconditions for extended reproduction in agricultural enterprises.

In market conditions, expanded agriculture is carried out mainly at the expense of own funds. In this regard, the development of enterprises based on extended reproduction causes an increase in the production of gross income and profits, which is the basis for the growth of consumption and accumulation funds.

9.4. Accumulation in agriculture and its sources

The implementation of extended reproduction in agriculture requires certain material prerequisites, first of all, the use of part of the additional product to increase production facilities and the formation of the necessary reserves. Extended reproduction becomes possible and occurs when an additional product is created in agriculture and part of it is used for accumulation.

Accumulation in agriculture is an economic process of increasing the quantity and improving the quality of the means of production, as well as the development of the non-productive sphere. Necessary conditions and material basis accumulation in agricultural enterprises is used to expand production of disposable income, which forms the foundation of accumulation. It is formed in natural and value forms. Part of the means of production (seeds, feed, livestock, etc.) is reproduced in the farm in kind and is used to increase the production of agricultural products. The accumulation fund in this part does not acquire cash and is formed at the expense of the net income of the enterprise.

The bulk of the accumulation fund is formed from the profits of the enterprise. Therefore, profit is the main source of accumulation. The amount of accumulation in agricultural enterprises is determined by the mass of profit received, as well as by the proportions of its distribution between consumption and accumulation funds.

The amount of profit of agrarian enterprise depends on the quantity, quality and structure of sold products, the level of selling prices and the volume of production costs. Therefore, increasing the production of high-quality products, increasing its level of marketability and reducing the cost are the main ways to increase the size of profits and the accumulation fund in agricultural enterprises.

An important source of accumulation in agriculture is *differential land rent*, the material basis of which is additional net income. It is formed by the use of the best in fertility and land location or as a result of the intensification of agricultural production.

Farms use land of varying quality, so farms that have relatively better land fertility and are more conveniently located, receive additional net income, or differential rent I. Additional net income obtained under better conditions does not require additional material and labor costs, is not the result of the economic activity of this enterprise and through the price mechanism is withdrawn at the disposal of the state. Differential rent I comes into centralized central government revenue and is used for the benefit of the whole society, including the expansion of agricultural production.

Additional net income in the form of differential rent II is generated as a result of additional investments in the process of intensification of agricultural production. The additional net income generated by the higher level of production intensity and the efficiency of additional costs remains almost entirely on the farm and is a source of accumulation and an important factor of expanded reproduction.

In the formation of the accumulation fund significant role belongs *to credit* and *funds* centrally allocated from the state budget for agricultural production.

Accumulations in agricultural enterprises also depend on the ability to effectively use the funds allocated for the purchase of machinery, equipment, materials, mineral fertilizers, fuel and other means of production. The pace of real accumulation depends on the level of prices for the means of production, the achievements of agricultural science, the production of more reliable and high-performance equipment and the possibilities of introduction of intensive technologies.

The rates of extended reproduction in agriculture depend on both absolute and relative size of the accumulation. The following indicators are used to characterize the opportunities and rates of expanded reproduction: the rate of accumulation, the rate of expanded reproduction of funds, the rate of profit, the level of profitability of agricultural production.

The rate of accumulation in an agricultural enterprise is determined by the ratio of the accumulation fund to net income and is expressed as a percentage. In agriculture, the rate of accumulation reflects one of the most important proportions of enhanced reproduction. The dynamics and dimensions of this indicator characterize the opportunities and determine the pace of expanded reproduction in agricultural enterprises. The ratio of the funds of accumulation and consumption in the gross income of farms is called the norm of proportionality.

The rate of extended reproduction of funds is determined by the ratio of the accumulation fund to the average annual value of fixed and current assets and is expressed as a percentage. This indicator characterizes the relative share of farm savings in production funds and the possibility of their extended reproduction.

In order to accumulate, agricultural enterprises must achieve an appropriate level of profitability that would allow for enhanced self-financing reproduction. The level of profitability and the rate of return characterize the achieved level of economic efficiency of production, which is the basis of extended reproduction.

The problem of acceleration of expanded reproduction in agriculture especially urgent today. Ensuring a stable food supply to the population of the country requires the creation of prerequisites for increasing agricultural production and improving economic efficiency. This most fully meets the requirements of a harmonious combination of the interests of individual workers, labor collectives and society as a whole.

QUESTIONS FOR SELF-CONTROL

1. What are the features of extended reproduction in agriculture?
2. What are the indicators of widespread reproduction in agriculture?
3. What indicators characterize the intensive form of expanded reproduction in plant growing?
4. What indicators characterize the extensive and intense form of extended reproduction in livestock?
5. Extended reproduction and distribution of the gross agricultural product?
6. What are the conditions for simple and extended reproduction in agriculture?
7. What are the sources of extended reproduction and accumulation in the village of enterprises?
8. What is the essence of accumulation in agriculture?
9. What indicators characterize the opportunities and rates of extended play?
10. What are the main areas of improvement of industrial relations in terms of development of productive forces of agriculture?

TESTS TASKS

1. Extended reproduction of agricultural is:
1) the repetition of the production process in terms of reducing the cost of production;
2) repetition of the production process in the conditions of increase of gross output;
3) repetition of the process of production of agricultural products; products;
4) repetition of the production process in the conditions of constant volumes of gross production.

2. Indicators of expanded reproduction in agricultural enterprises:
1) increase in feed costs per 1 ton of livestock production;
2) improving productivity;
3) increase in production of gross output;
4) reducing the cost of production.

3. Indicators of expanded reproduction in agricultural enterprises:
increase in the mass of profit;
increase of labor productivity;
reduction of production cost;
increasing capital efficiency.

4. The main source of extended reproduction and accumulation in the enterprise:
1) the value of gross output;
2) the income of the enterprise;
3) sales revenue;
4) profit of the enterprise.

5. What indicators characterize opportunities and rates expanded reproduction?
productivity;
capital output;
cost of production;
level of profitability of production.

6. What indicators characterize opportunities and rates of expanded reproduction?
1) capital return;
2) rate of return;
3) labor productivity;
4) the cost of production.

7. What indicators characterize the expanded reproduction of the company's workforce?
1) increase of capital return;

2) raising wages;
3) improving labor productivity;
4) increase of capital of employees.

8. The part of the value of the gross agricultural production used for the recovery of the consumed means and objects of labor in the process of production is:
1) the accumulation fund;
2) compensation fund;
3) profitability fund;
4) distribution fund.

9. The part of the value of gross agricultural production that is created by living labor is called:
1) gross production;
2) net production;
3) profit;
4) revenue.

10. The cost of an additional product created in agricultural production is:
1) gross income;
2) profit;
3) net income
4) additional income.

THEME 10 . SCIENTIFIC FOUNDATIONS OF RATIONAL NATURAL USE IN AGRICULTURE

10.1. The essence of rational use of nature in agriculture

10.2. Greening of agricultural production

10.3. Economic efficiency of environmental measures

10.4. Improvement of the economic mechanism of nature management and environmental protection

10.1. The essence of rational use of nature in agriculture

The functioning of the agricultural sector is directly related to the use of natural resources - land, water, forest and others. In this regard, raising the technical level of agriculture involves human intervention in the wild and the need to ensure the environmental compatibility of technical means and production technologies. The interaction of man, means of production and nature creates a multifunctional ecological and economic system . There are three types of communication in this system: first, the economic ties (relationships) that arise between people in the process of production, which is always accompanied by the transformation of nature; second, technological connections between people, means of production and the natural environment (for example, in the process of agricultural production); thirdly, the ecological links between the individual elements of nature, through which the latter create appropriate natural conditions.

Thus, humanity cannot exist without the use of natural resources, and this affects the quantity and quality of the natural environment, and changes it. Accordingly, changes in the natural environment that are associated with human activity, commonly called anthropogenic . According to the state and methods of environmental management depends not only the productivity of agricultural production, but also the protection of nature, which is the primary source of all production resources.

The term "environmental management" is one of the most common in the scientific literature, but it is filled with various meanings. For the first time, the concept of "nature management" was proposed by the scientist-ecologist Y.M. Kurozhakovsky in 1959. By its definition, nature management is the regulation of all types of use of natural resources for the economy and health. In a more general interpretation, it means the totality of human influence on the geographical envelope of the Earth. In the modern interpretation under environmental understand the process of exploitation of natural resources to meet the physical, cultural and recreational needs of society**.** This process is an opportunity to use the beneficial properties of the environment - ecological, economic, cultural and wellness. That is, in all cases, the use of nature means the totality of all forms of exploitation of the natural resource potential and measures for its conservation, distinguishing from this process the following aspects: 1) extraction and processing of natural resources, their restoration or reproduction; 2) use and protection of natural habitat conditions; 3) preservation, restoration (restoration) of ecological equilibrium of natural systems, which serves as a basis for preserving the natural resource potential of society.

There are three stages in shaping an environmental strategy**:**

The first stage - early 20's - mid 50's of the twentieth century. Economic science was dominated by the concept of free natural resources. It was believed that since natural resources are not objects of purchase and sale, it is methodologically incorrect to value them in terms of value, and the introduction of natural resources into economic practice will hinder the development of minerals, expansion of agricultural production. Natural resources were perceived as inexhaustible, and therefore extensive farming practices prevailed in agricultural production. In particular, virgin lands seemed to be a large reserve for extensive agricultural development.

The second phase of the environmental strategy began in the 1960s and continued until the early 1980s. Characteristic for him was the depletion of reserves of agricultural land suitable for exploitation, deterioration of conditions for extraction of resources in the fields, which resulted in an increase in the cost of extracted raw materials. The result of these negative processes was an awareness of the misconception of natural resources as a free, inexhaustible gift of nature to man.

The third stage (early 80's of the twentieth century) is related to the awareness of the objective necessity of rational use of natural resources and the substantiation of the methodology of economic evaluation of natural resources on the basis of certain value criteria.

Thus, considering the concept of environmental management in historical terms, it is advisable to distinguish the following types of environmental management:

–extensive nature management , in which the growth of material production is carried out by the expansion, increase of the number of material objects and territories involved in the existing nature management and increasing load on the environment;

–intensive nature management, in which the growth of material production is carried out at the expense of deeper intensive development of basic natural objects with the maximum use of resources;

–balanced and balanced nature management when society controls its development, with the aim of reducing the anthropogenic burden on the environment and utilizing the potential for self-renewal of ecological and natural systems.

With regard to the third type of environmental management, it should be noted that in recent decades, it has been found that the popular model of aggressive economic development is unpromising, first of all, due to the scarcity of non-renewable natural resources. At the same time, it turned out that the polluted environment, the tense ecological state of an individual national economy affect the functioning of other national economies - since they are correlated in the ecological and economic space.

Such management has led to a significant exacerbation of the environmental situation, which in turn has a negative impact on the socio-economic processes occurring in our country. Especially negative extensive use of nature affected the agricultural sector, where economic results are largely determined by the number and quality of natural objects involved in the economic turnover.

Today, forms of nature management are implemented in the form of**:** general and special nature management.

General use of the nature does not require special permission. It is exercised by citizens on the basis of their natural (humanitarian) rights, which exist and arise as a result of birth and existence (for example, the use of air).

Special use of nature is carried out by natural and legal persons on the basis of permission of the authorized state bodies. It has a purpose character, is paid and by types of objects used is divided into land use, forest management, water management, subsoil use, wildlife (wild animals, and birds, fish stocks).

Nature and its resources are the environment, the object, the result of life and economic activity of people, which lead to both positive and negative consequences. Therefore, it is accepted to distinguish between two main types of nature management: rational and irrational.

The rational (optimal) use of natural resources means the study of natural resources, their economical exploitation, protection and reproduction, taking into account not only the present but also the future interests of the country's economy development and preservation of the population's health. Irrational use of nature is accompanied by a loss of nature's capacity for self-healing, self-regulation and self-purification, impaired balance of biological systems, depletion of mineral resources, impaired performance of recreational, wellness and aesthetic functions in relation to natural objects.

Modern nature management is based on the fundamental requirements of current legislation. The basic principles of legal regulation are reflected in the Laws of Ukraine "On Environmental Protection", "On the Nature Reserve Fund of Ukraine", "On the Flora", "On the Animal World", Land Code, Water Code, Forest Code and other legislative acts. It should be noted that modern natural resource regulations point to the need for rational use of natural resources, but they do not provide a legislative definition of the concept of rational use of nature.

The implementation of the aforementioned legislative acts necessitates the observance of the relevant principles of rational use of nature, which means certain economically determined rules of behavior of man and society in the natural environment. Adherence to the principles of rational use of nature will allow to develop measures for environmental protection, restore broken relationships in ecosystems, prevent aggravation of environmental situations.

The following basic principles are a prerequisite for sustainable environmental management:

1. The principle of rational and efficient use of nature. This is a fundamental factor in the legal regulation of the use of natural resources. The content of this principle is determined by the functions that nature performs in relation to man and society. Rational and effective environmental management means economically necessary and environmentally sound environmental management, which simultaneously takes into account the economic and environmental interests of nature and society. The environment performs economic, biological and social functions, provides the production of the necessary natural resources, maintains an adequate level of human health and contributes to the further development of society.

2. The principle of "zero level" consumption of natural resources. Its essence is that the level of primary natural resources used by the enterprise for the previous year is taken at zero level , and the next - the excess of this level of consumption is limited on a state scale by a well-defined coefficient (at the level of 2-7%). Observance of the coefficient is mandatory, since the offender is charged a fine that can exceed the profits of the enterprise. This principle has been implemented in many developed countries to regulate the consumption of primary natural resources at state level, including agricultural land.

3. Principle of conformity of anthropogenic load to the natural resource potential of the region. Adherence to this principle avoids disturbances of natural equilibrium through a well-defined balanced cycle of use and recovery. Such violation of the laws of functioning of natural ecosystems occurs in two cases: a) if the level of anthropogenic load, which is expressed in an excessive concentration of production, is exceeded. For a long time in the practice of territorial planning proceeded from the fact that the cost of production decreases with increasing concentration of production. Not only were the limited restorative properties of the

region's natural resource potential ignored, but often the consumption of certain types of resources exceeded their availability. Yes, there were regions of acute environmental crisis in Ukraine. However, due to the excessive concentration of production, the implementation of environmental measures is becoming a big problem; b) if the specialization of production does not match the specificity of the natural resource potential. Such discrepancy is especially observed in the recreational regions of Ukraine, where a more optimal use of recreational resources would contribute to the formation of a recreational complex and production of its maintenance. However, the development of environmentally hazardous industries has led to a deterioration of air quality, land resources, drinking water and other sources.

4. The principle of preserving the integrity of natural systems in the process of their economic use. This principle follows from the laws of interconnectedness of natural components. Human influence on individual components of nature and certain types of resources is not limited to changes in them. Changes to one component of the natural system lead to changes in the other, and sometimes change the quality of the ecosystem as a whole. Thus, the drainage of swamps in the Polissya area has led to a change in the quality of many ecosystems, as a result - arable land has been flooded, small rivers have dried up and so on.

5. The principle of preservation of the natural cycle of substances in the process of anthropogenic activity. The essence of the principle in agriculture is that the technological processes of its specific industries are a series of stages, linked to each other by the complexity of the processing of raw materials, or their stepwise use. After all, the natural resource that is recovered from the natural systems, having passed the cycle of "resource-production-consumption", again returns in the form of waste in ecosystems. If this return approaches the natural cycle, it does not harm nature, and the substance is gradually assimilated. Violation of this principle has led to the generation of a large amount of waste that is not included in the natural circulation of substances and changes the properties of many ecosystems in specific regions.

6. Principle of prioritizing environmental optimality over the prospect of economic efficiency of current environmental management. Natural processes that ensure the rational use of nature over time and are determined by factors of both short and long duration. Therefore, there is a need to take into account their effect and the possible consequences in the current and future production activities.

It is necessary to adhere to the principles of rational use of nature in all regions of our country. Maintaining a common ecological equilibrium is possible provided the equilibrium of the natural systems of individual regions is maintained. In addition, the problem of sustainable environmental management cannot be fully addressed in the agricultural sector or even within the national borders. This is a global problem that is inherent in the entire planet.

One of the most significant environmental factors is the activity of agro-industrial enterprises. Many scientists believe that agro-industrial production outperforms other industries in terms of anthropogenic load. This is primarily due to the territorial distribution of its units, especially agricultural production. In addition, the reproduction process in agriculture is closely linked to natural processes. The environmental impact of the agro-industrial complex has been especially enhanced with the intensification of agricultural production, namely: large-scale mechanization, excessive plowing of the territory and deep plowing, chemicalization and land reclamation, high concentration of production of modern agro-holding companies.

In terms of land, Ukraine is one of the largest European countries, and one of the richest countries in the world in terms of quality soil composition and bio-productive land. The prevalence of fertile land, high population density and historically developed agricultural features have led to a high level of land development. Thus, at the beginning of 2018, the land fund of Ukraine was 60.4 million hectares, with the share of agricultural land constituting 68.7% and arable land in their composition - 53.9% (Fig. 1). This is the highest level of land acquisition and use in agricultural production, with similar rates in Germany, France and England accounting for about 32%. At the same time, if Ukraine occupies 5.7% of the territory in Europe, its agricultural land is 18.9% and arable land - 26.9%.

High plowed land is one of the reasons for the development of water and wind erosion. Almost 50% of arable land is covered by various forms of erosion in Ukraine

(14947 thousand hectares of agricultural land), with the area of eroded land increasing annually by 80-100 thousand hectares. As a result, a large amount of nutrients are annually removed from the soil (11 million tonnes of humus, 0.5 million tonnes of nitrogen, about 4 million tonnes of phosphorus, 1.7 million tonnes of potassium), whose losses are only partially offset by fertilizer application. Annually, ecological and economic losses from soil erosion are estimated by specialists at UAH 13.9 billion. High plowing of the territory, a small area of forest protection plantations lead to intensive development of wind erosion and dry winds.

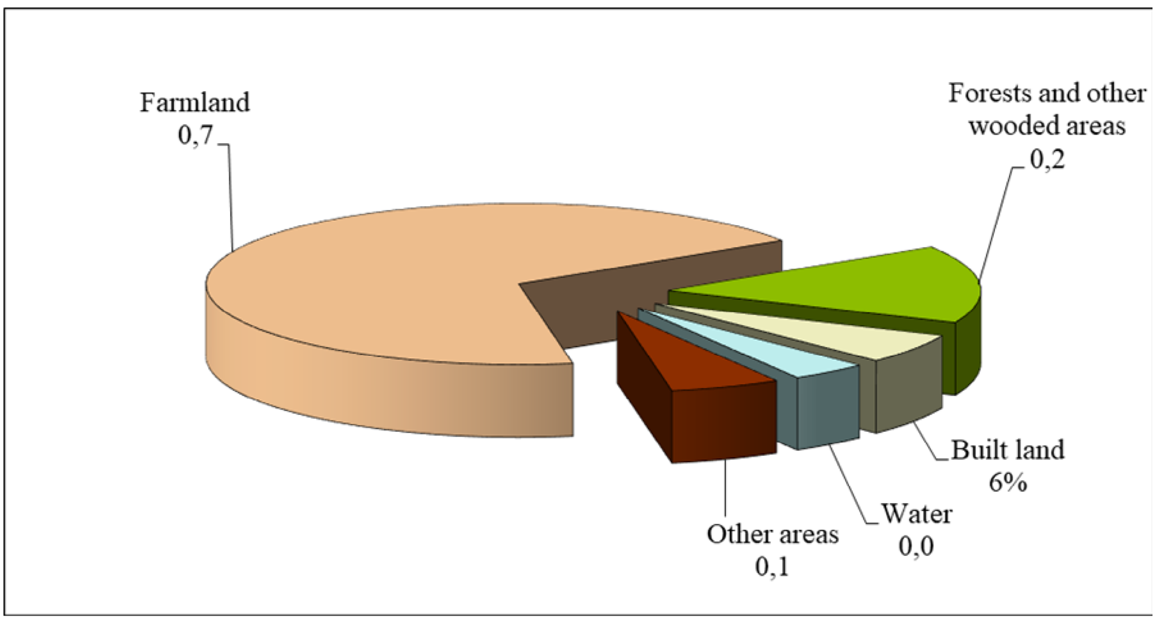

Fig. 10 .1. The structure of the land fund of Ukraine (as of 01.01.2018 g.))

Total area of land with disturbed soil layer at the end of 2016. It made up 187.6 thousand hectares, of which 2.8 thousand hectares were utilized during the year and 1.8 thousand hectares were reclaimed. Increase of fertility of low-productive lands by fertile soil layer was carried out by 2,3 thousand. hectares of agricultural land (1.6 times more than in 2010). The total amount of soil stock laid down decreased by 15.3 million m ^{3} compared to the previous year (by 22%) and amounted to 75.3 million m ^{3}. The status of soil protection measures for liming and plastering of soils is given in Table 10 .1.

These tables show that over the analyzed period, the area of land under which the measures for liming of soil are conducted increased by 42%, which is a positive tendency for the use of land resources. The main results of the introduction of lime preparations into the soil are considered to be a decrease in the acidity of the substrate and an increase in the concentration of calcium. However, in addition, there are a number of other, not less valuable for soil changes: enrichment of the substrate macro and microelements, especially magnesium; soil structure becomes more loose; Soil fertile layer better retains moisture; rapidly replicates and increases its activity useful soil microflora; plants accumulate much less toxic substances.

Table 10 .1.

Liming and plastering of soils, areas where plant protection products were used *

Indicators	2010	2013	2014	2015	2016
Area of liming of soils, thousand ha	73,2	97.8	97,2	88.1	103,7
Introduced lime flour and others limestone materials, thousand tons	340,8	487,3	417,8	454,1	374,6
Soil plastering area, thousand ha	4.4	6.2	6,7	7.1	11,1
Gypsum and other gypsum-bearing rocks, thousand tons	23.4	22.5	24.1	16.0	32,4
Area covered by plant protection products, thousand ha:	12239,0	14981,8	14005,3	13854,1	14321,1
including pesticides	10836,3	13598,7	12660,1	12469,1	13798,0

** 3a according to the State Geodaster of Ukraine [1]*

Also, according to official data, the areas where plastering was carried out, as one of the important types of land reclamation aimed at improving the physico-chemical and physical properties of saline soils, increased 2.5 times, which also reflects positive changes.

At the same time, it is worth mentioning the threatening situation regarding the increase of soil areas, which use soil protection by 17%, including pesticides by 27%, which are for the most part prohibited by the relevant European standards.

An important factor for maintaining soil fertility and cultivation of agricultural products is the application of the best standards of mineral and organic fertilizers (Table 10.2)/

The analysis of the data of the table shows that with a slight fluctuation of the acreage of agricultural crops the application of mineral fertilizers is increased by 62%, but in practice there is often observed non-observance of the ratio between the standards of application of nitrogen, phosphorus and potassium fertilizers.

Organic fertilizers are also essential for soil condition and crop production. Experts estimate that an average of 12t / ha of organic fertilizers must be applied to maintain a deficient balance of humus, with 0.5t / ha being applied over a long period. This factor adversely affects the productive and environmental condition of the soil. This is due to the refusal of most agricultural structures from the livestock sector, which is time consuming and costly.

Table 10 .2

Application of mineral and organic fertilizers under crops *

Indicators	2010	2013	2014	2015	2016
Sown area of crops, thousand hectares	18139,7	18962,4	17992,2	17889,1	17982,2
Mineral fertilizers:					
Contributed to the soil in nutrients under crops, thousand tons	1064,2	1493,8	1471,7	1415,0	1728,9
including					
nitrogen	776,6	1042,9	1021,2	985,0	1197,4
phosphorus	158.2	237,1	241,1	223,2	287,0
potassium	129.4	213,8	209,4	206,8	244,5
Contributed to the soil in nutrients per 1 ha of acreage, kg					

	58	79	82	79	96
Organic fertilizers:					
Contributed to the soil under crops, thousand tons	9874,1	9602,6	9860,9	9636,3	9132,5
Contributed to the soil per 1 ha of acreage, t	0.5	0.5	0.5	0.5	0.5

** According to the State Statistics Service of Ukraine*

In addition, an average of 5.4 thousand hectares of agricultural land is removed annually for the needs of industry in Ukraine. As a result, over the last three decades the area of agricultural land in Ukraine has decreased by more than 2, 8 million hectares, including arable land - by almost 1, 6 million hectares. Expert estimates indicate that if such rates of destruction of arable land continue, in 20-30 years one third of arable land will be destroyed. Unlike the atmosphere and water, the earth is a low-mobility environment and migration of pollution is slow, and their concentration is constantly increasing and affecting man not only directly, but also because of the quantity and quality of the crop. According to the Ministry of Health of Ukraine, every sixteenth of the tested soil samples for sanitary and chemical indicators did not meet the hygiene standards and every thirteen (in 2016 - every tenth) - microbiological

Therefore, the issue of rational land use remains particularly important for the agricultural sector, as land is a major means of production in agriculture. Under rational land use is understood not only the use of land for its intended purpose, but also its protection. There are two main problems of land protection: economic - protection from exhaustion and degradation of productivity; environmental protection against pollution.

The traditional transformational approach to land use, which has led to a deep disturbance of ecological balance in regional land use systems, is complicated by the continuation of land reform, when the conflicts between land use, ownership and protection deepen, economic and environmental contradictions are exacerbated. Soil protection measures and the possibility of financing them.

It should be noted that the most systematic land protection measures were carried out in 1995. In the future, due to the crisis in the economy, the decrease in the level of financing, there is a significant decline in the volume of land protection measures, which exacerbates the environmental and economic problems of land use.

Exacerbation of ecological and economic contradictions in land management, loss of valuable productive lands, reduction of their fertility and significant deterioration of ecological functions at the present stage should be considered as a threat to economic independence and national security of Ukraine. Therefore, the issues of land protection, optimization of their use and restoration should be brought to the level of the main priorities of sustainable development of the country and the most important direction of the state policy in the field of environmental protection.

Water has a special place among natural resources because it is used in all spheres of human activity and it plays an important role in agricultural production. It destroys, dissolves and transports inorganic substances, promotes the deposition of sedimentary rocks and soil formation, significantly influences the formation of climate and weather, is an important means of production in irrigated agriculture.

According to the State Agency for Water Resources of Ukraine, the total freshwater resources of Ukraine are 216.8 km^3, of which river runoff resources are 209.8 km^3 and the volume of groundwater included in the resource part of the water management balance is 7.0 km^3. However, supplies of water (runoff) in Ukraine for 1 person is about 1.8 thousand. M^3 per year, which is one of the lowest in Europe (for example: Norway - 96.9, Sweden - 24.1 ; Finland - 22.5; France - 4.6; Italy - 3.9; England - 2.7; Poland - 1.7; Germany - 1.3 m^3 per year).

Intake of fresh water industries enterprises in 2016 amounted to 9.325 billion. M^3 including agriculture - 3156000000. M^3 (34%), which is the biggest specific share of the 11 other industries.

Over the last decade, there has been a trend of decreasing volumes of water directed to agricultural needs (5.8 times, irrigation - 4.9 times, industrial and drinking - 3.8 and 2.0 times respectively. 80% of agricultural water consumption is related to irrigation of crops, the rest of the water is spent on watering pastures, livestock farms, settlements. The peculiarity of the use of water resources in agriculture is a significant proportion of irreversible water supply, the gap exceeds 75% of the abstracted water, while it is almost an order of magnitude lower in other sectors of the national economy.

An important environmental problem is water pollution. Thus, in 2016 in the reservoir dropped to 4.2 billion. M ^{3} polluted, and the proportion of contaminated wastewaters in the total wastewater has more than doubled.

The irrational farming led to the deterioration of the hydrological and hydrogeological regime of entire regions. In order to increase the area of agricultural land, large-scale drainage reclamation works were carried out (especially in the Polissya region), which were accompanied by a significant decrease in the level of groundwater. Particularly negatively, such measures have affected the water content of small rivers - a steady drainage has decreased by 30-40%, which has led to their grinding and even complete drying up.

According to the data of the Ministry of Health of Ukraine in 2016, out of six samples of water taken from the system of drinking and drinking supply, one in six did not meet the sanitary and hygienic requirements for compliance with the sanitary and chemical parameters and one in ten for microbiological ones. Almost every fifth sample of water taken in the areas of water use in rural settlements recorded non-compliance with sanitary and hygiene requirements and in every microbiological requirement. Such contamination is particularly dangerous in its ubiquity, caused by the ingress of poisonous chemicals into water sources, residues of mineral fertilizers when they are flushed from the soil cover and when the contaminated groundwater enters the reservoirs. In addition to chemical contamination, agriculture causes organic and bacterial contamination, which occurs as a result of non-compliance with sanitary rules when storing livestock farm waste. Thus, agriculture is not only a significant water consumer but also a polluter of water sources.

Economic activity of human society is increasing every year and adversely affects the state of the hydrosphere of our planet. The negative impact is manifested: first, in the form of depletion of sources of water supply by unregulated water abstractions ; secondly, in violation of hydrological and hydrogeological regimes in large territories ; third, surface and groundwater pollution.

Of all the planet's plant resources, forests are the most important in nature and human life. It is an important and most effective means of maintaining the natural state of the biosphere and an indispensable factor of cultural and social importance. Their water protection, hydrological, soil protection and other functions protect the soil from water and wind erosion, and rivers from drying out and muddy. As a result of the positive impact of the forest on the hydrometeorological process, the climate is mitigated, which contributes to improving the efficiency of agriculture. As a biological system of forests, it better absorbs and converts solar energy than other types of land biocenoses, creates primary biological products, updates biomass reserves, accelerates the circulation of substances and energy in the biosphere.

Ukraine's forests are unevenly distributed: in Polissya –29%, in the forest-steppe - 14%, in the Steppe - 5%, in the Carpathians - 40%, in the Crimea (mostly in the mountains) - 10%. One resident of Ukraine accounts for 0.18 hectares of forested land. The main task of forestry is the restoration of forests and forest resources, ensuring extended reproduction and improving the productivity of forest lands. According to the State Agency of Forest Resources of Ukraine, sowing and planting was carried out on an area of 34.7 thousand hectares, including 1.7 thousand hectares of new forests were created, and 18.5 thousand hectares of natural regeneration were added to the reforestation. Overall, in 2017, 51.5 thousand hectares of forest were recovered, which is 1.5 thousand hectares more than in 2016. However, due to the lack of budget financing, forestry work was performed at 95%.

The forests are seriously damaged by fires. In 2017, there were 92 wildfires in an area of more than 5 hectares, 2.5 times the number and 5 times the area, compared to 2016. Experts estimate losses from forest fires at 43.8 million hryvnias. This is largely due to the reduction in preventive fire prevention due to lack of budget financing.

The state of forests is influenced by a number of negative anthropogenic factors, under the influence of which the growth of wood is reduced, there is a partial or complete loss of crowns, drying of individual trees and plantations. During 2006, 12.8 thousand hectares of forest plantations were killed by damage to insects, forest diseases, the effects of adverse weather conditions and forest fires, which is 0.7 thousand hectares more than the previous year.

The water protection and protective role of forests as a natural factor has not yet received the proper economic assessment, which has had an impact on the environment - the devastating effects of the systematic deforestation and the reduction of forest cover. In addition, protective forestry is an integral part of the scientific system of agriculture, which is used to prevent the negative impact of natural and anthropogenic factors on agricultural land. According to the results of many years of research, every 10% of additional forest cover additional precipitation up to 40% of rainfall, increase inland and soil drains by 6-8%, increase river nutrition by groundwater by 0.7 –0.9 cubic meters per year. It has been established that hectare of forest protects 30-35 hectares of adjacent fields, and under the influence of protective forest strips crop yields increase by 2-3 c / ha, and in some cases - by 6-7 c / ha.

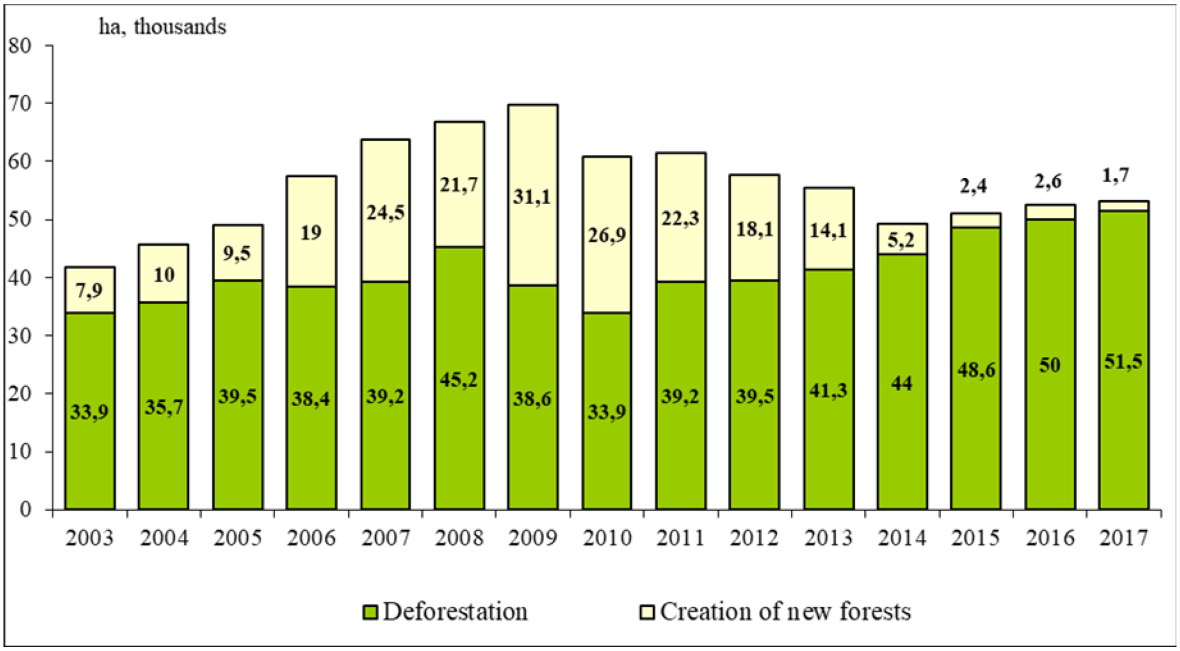

Fig. 10 .2. Dynamics of forest management and creation of new forests in Ukraine *

Calculated according to data

The creation of new forests has had a positive trend from 2003 to 2009, with some variations in this indicator. Currently, there is a tendency to increase the share of land for forest management to 51.5% compared to 2003. - 33,9%.

In 2016, compared to 2000, the number of forest strips decreased by 94% (by 30 thousand hectares). Over the past 5 years, there have been as many forest strips as there have been annually in recent years. In addition, the majority of forest strips were created in the 60-70s, and their validity is 60 years. Due to the reform of agricultural enterprises, the system of forest strips is practically not implemented.

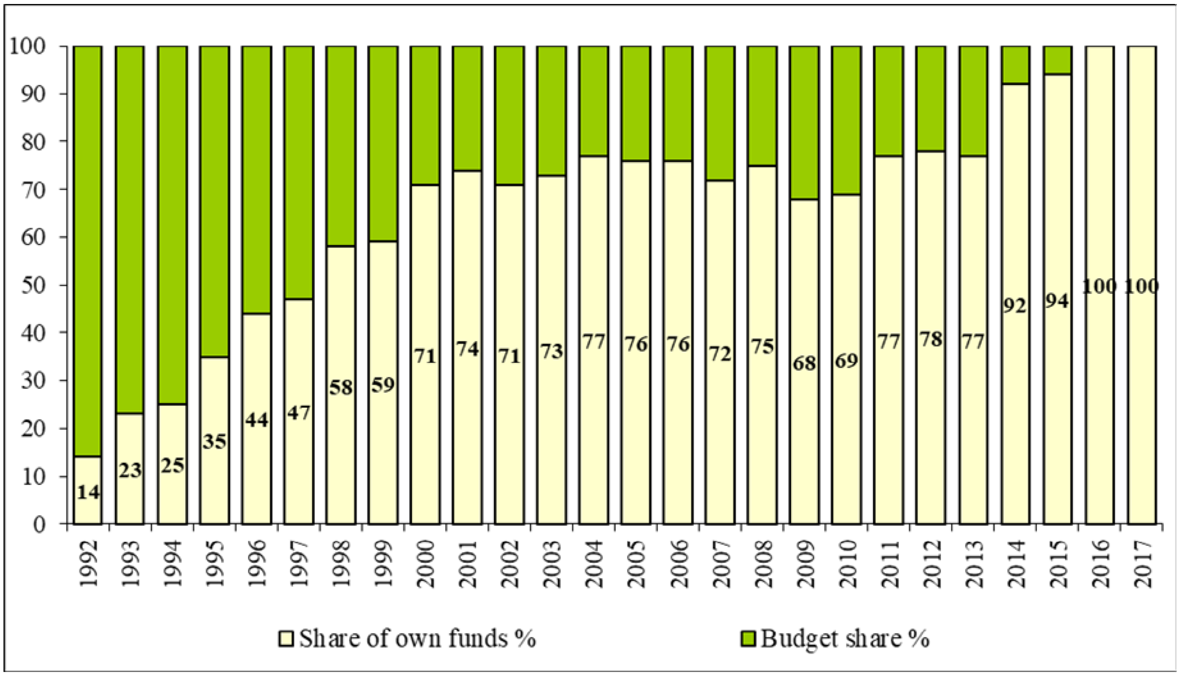

Fig. 10 .3. Dynamics of financing of the forestry industry *

** Calculated according to data*

Thus, the problem of protection and economical use of forest resources remains especially urgent for Ukraine with low afforestation of its territory, uneven distribution of forest plantations, an important protective role of forests.

Environmental and economic activities should be combined in the process of management to provide people with quality living conditions . Implementation of scientific and technological progress should be aimed at harmonizing economic and environmental activities, reducing the negative consequences for the environment.

10.2. Greening of agricultural production

Providing the population with quality, environmentally friendly and economically accessible food, as well as forming the necessary insurance reserves, is an important component of national agricultural policy. Therefore, the decisive steps to implement the concept of sustainable economic development is the transition of agro-industrial complex to the production of environmentally friendly products.

The state of the agro-industrial complex of Ukraine can be defined as a crisis. The food security situation in a country where agricultural production has recently made up more than 30% of GDP, which is characterized by the world's best land resources, indicates a difficult economic situation. Whether Ukraine will become a civilized, developed state will depend on Ukraine's ability to provide the population with sufficient high quality food. At the same time, it should be borne in mind that in Ukraine with its historical, political and demographic features, the agro-industrial complex is the basis of the economy, an important export industry, the basis of material well-being of the population.

According to experts, a country where at least 80% of the food required for the population is produced is capable of providing food security. On average, in 2010 - 2017, 60% of the necessary foodstuffs are produced in Ukraine, thus another 40% of agricultural raw materials and foodstuffs are imported by import. However, the cost of all food imports in Ukraine is low compared to other countries. On average, in 2000-2005 all imports accounted for 0.6% of the global total.

The level of regulatory and actual consumption of the main types of food in the dynamics by years is shown in Table 10 .3.

In terms of consumption of basic food components, Ukraine is significantly behind the leading countries in the world. Data Analysis of Table 7.3. shows that during the analyzed period, the consumption of such products as bread, eggs, vegetables, sugar and oil was close to the scientific standards.

There is a positive upward trend in the consumption of meat and meat products, but this is only 64.3% of the norm. Consumption of such essential foodstuffs as fruits, berries (59,2% of the recommended standard), fish and fishery products (47,8% of the recommended standard), milk and dairy products (55,1% of the recommended standard) remains low.

Table 10.3

Average annual food consumption per capita in Ukraine, kg

Products	Recommended consumption rates	Actual consumption				2016 in % to consumer normation
		2000	2005	2010	2016	
Bread products	104,0	124,9	123,5	111,3	101,0	97.1
Meat and meat products	80,0	32,8	39.1	52,0	51,4	64,3
Milk and dairy products	380,0	199.1	225,6	206,4	209,5	55.1
Eggs, pcs.	280,0	166,0	238,0	290,0	267,0	95,4
Potatoes	123,0	135,4	135.6	128, 9	139.8	
Vegetables and melons food crops	154.0	101,7	120,2	143.5	163,7	113,7
Fruits, berries and grapes	84,0	29.3	37,1	48,0	49,7	59,2
Fish and fish products	20,1	8.4	14.1	14.5	9.6	47,8
Sugar	38,0	36,8	38,1	37,1	33,3	87.6
Oil	12.6	9,4	13.5	14,8	11.7	92.5

The environmental aspect of food security lies not only in providing adequate quantities of food but also in quality. About 1,000 toxic chemicals can be found in humans, where they get in with water and food. More than 45% of all energy a person spends on their disinfection. Increasing these costs, while constantly reducing the quality of food, threatens human health.

Therefore, the problem of quality assurance and food security is now one of the main ones, due primarily to the sharp decline in the quality of many food and raw materials, in particular meat and dairy, fruit and vegetable products and grain due to the breach of production technologies. Also, products with a high content of harmful metals, pesticides, and uncontrolled food additives occupy a large share.

Thus, the problem of rational nutrition is gaining importance for many reasons. In particular, increasing the efficiency of agriculture is achieved mainly through the use of fertilizers, herbicides and pesticides, the development of mechanization, the removal of new varieties of plants and animal species, the introduction of advanced technologies for growing crops, specialization of farms.

From an environmental point of view, not all of these products are equally safe. The intensive chemicalisation of agriculture causes an increased risk to the environment and human health. According to WHO (World Health Organization), the number of pesticide poisonings reaches 1,5 million cases annually.

No less significant impact on the environment is caused by mineral fertilizers. Despite its high economic effect, soil enrichment with nitrogen, phosphorus, potassium and other trace elements, fertilizers have a certain ballast. Particularly dangerous in this regard are heavy metals and radionuclides. Concentrating in soil, they inhibit plants, accumulate in them at concentrations that exceed the limit values, worsen the condition of the soil, inhibit microflora. Excessive accumulation of these chemical elements in fodder plants is also a cause of animal disease, affecting the quality of dairy and meat products.

Scientists have found that the environment is the main source of harmful substances entering raw materials. Among the environmental problems - the withdrawal of areas of extensive land use and low yields, reduction of plowed land, environmentally sound land cultivation, restoration of natural fertility of soils as a natural resource and quality of living environment.

According to estimates of domestic experts, in Ukraine, the share of losses caused to agriculture from pollution of the atmosphere accounts for 20% of the complex economic damage and 15% of the pollution of water resources. In 2015, economic losses in agriculture from atmospheric and water pollution alone were estimated at $ 58.6 million, representing 1.9% of Ukraine's national agricultural income. Environmental damage caused by the use of an unreasonable system of mineral fertilizers is estimated at $ 18-22 million annually. Even greater losses are due to the use of plant protection chemicals.

Therefore, agricultural production requires the development of environmental standards that prevent the intensive pollution of air and water basins, land resources, as well as cover the processes of waste disposal, protection of groundwater from pollution by nitrates and other chemicals.

Balanced, efficient development of organic food production is impossible without solving a set of ecological and economic problems, which can be classified in two directions : first, ensuring economic efficiency of production and second, determining the priority and effectiveness of measures for greening production.

Modern scientific approaches allow to identify the main components of the reproduction mechanism of greening production of agricultural products, which can be attributed to: reproduction of environmental demand; environmentally oriented production base; environmentally-friendly human factors and motives for greening.

The problem of healthy eating should become a national problem of paramount importance in the example of many developed countries in the world. The concept of national security of Ukraine provides that the main possible threats to food security as a component of Ukraine's national security in the environmental sphere are:

• significant anthropogenic disturbance and technogenic congestion of the territory of Ukraine, negative ecological consequences of the Chornobyl catastrophe;

• inefficient use of natural resources, large-scale use of environmentally harmful and imperfect technologies;

• uncontrolled import of environmentally hazardous technologies, substances and materials into Ukraine;

• the negative environmental impact of defense and military activity.

Thus, the development of an economic mechanism for the implementation of the environmental concept of food security will reduce pollution, reduce environmental tensions and improve the reproductive function of natural ecosystems in agricultural production. The environmental component of solving these problems should and will be decisive because of the severity of environmental problems now and in the future.

Greening production in the agroindustrial complex should prevent the negative impact of technological processes on the state of the environment. The main tasks of greening agriculture are to reduce technogenic load, maintain natural potential through a self-renewing regime of natural processes, and stimulate the production of environmentally friendly products.

10.3. Economic efficiency of environmental measures

The main issues of the economics of environmental management are related to the choice of rational ratio of environmental costs and acceptable economic losses and determining the effectiveness of environmental measures. It is a search for a social compromise between economic development and environmental activities.

By conservation measures include all business activities aimed at reducing and eliminating the negative human impact on the environment. These include the construction and operation of treatment plants, the development of low-waste and non-waste technologies, the protection and reproduction of flora and fauna, the protection of subsoil, the fight against soil erosion, the location of enterprises and the transport network in accordance with environmental requirements.

The set of environmental measures should ensure maximum economic impact, which components are: economic, environmental and socio-economic result.

The economic result of environmental measures includes:

• prevented economic losses from environmental pollution, that is, by reducing the environmental costs of material production, the non-productive sphere and the population;

• increase economic (monetary) valuation of natural resources, preserve or improve their conservation through the implementation of these measures;

• Increase in the proceeds from the sale of products obtained through the complete utilization of raw materials and other material resources as a result of environmental protection measures.

The environmental level of environmental measures is caused by the reduction of negative impact on the environment and is manifested in limiting the flow of pollutants into the biosphere, increasing the quantity and improving the quality of land, forest, water and other natural resources suitable for use.

The environmental result of environmental activities is due to the reduction of negative impact on the environment and is manifested in the reduction of the amount of pollutants entering the biosphere, increasing the number and improving the quality of land, forest, water, biological and other natural resources.

Socio-economic outcomes are based on saving or preventing the loss of natural resources, living and past labor in all areas of the economy, as well as in the field of personal consumption and include:

• improving the ecological comfort of living, living conditions and well-being of the population;

• improving the physical condition of the person and reducing morbidity, increasing life expectancy;

• meeting the intangible (cultural, aesthetic, educational) needs of the person;

• maintaining ecological balance;

• creating favorable conditions for the growth of the creative potential of the individual, raising his / her level of consciousness.

The economic justification for environmental measures requires an approach that requires mandatory consideration of external effects:

a) the coverage of social, environmental and economic results of environmental activities in different areas of economy - both in the near future and now;

b) full coverage of all costs associated with the implementation of different environmental options;

c) taking into account the time factor in assessing the costs and results of environmental measures;

d) a cross-sectoral approach, taking into account the need to save costs and ensure a more efficient use of natural resources across the territory under consideration (district, oblast, country).

The overall effectiveness of environmental measures (full economic effect) is manifested by:

• in the field of material production - an increase in net production or profit, and in some industries or enterprises - a decrease in the cost of production;

• in the non-productive sphere - saving on the costs of performing works and providing services;

• in the area of personal consumption - reducing the costs of personal resources of the population caused by environmental pollution.

Absolute and comparative economic efficiency of nature conservation activities. The economic rationale for environmental programs is based on comparing economic results from the implementation of environmental measures with the costs of their implementation. The condition for calculating the cost-effectiveness of environmental spending is the choice of options within one area where the same (normative) environmental quality is achieved.

The methodology for determining the cost-effectiveness of environmental measures involves the use of a large number of indicators, generalizing among which are indicators of absolute and comparative efficiency.

The absolute effectiveness of environmental measures is determined by the formula:

$$\mathring{A}_{\grave{a}\acute{a}\tilde{n}} = \sum_{i=1}^{n} \sum_{j=1}^{m} \left(\frac{P_{ij} - C_1}{K_i \cdot \varepsilon} \right) \quad (10.1)$$

where E_{abs} is an indicator of the absolute ecological and economic efficiency of financing nature conservation measures; P_{ij} - the annual result (effect) *and* nature conservation activities to prevent loss (reduction of negative externalities) of the *j* type; C_i- annual operating costs (cost) for implementation; K_i- the volume of financing (capital expenditures) for the implementation of the *i*- th kind of environmental activity; *ε* is the discount rate.

Absolute efficiency shows how many times the result exceeds the cost of environmental management. The feasibility of implementing appropriate environmental measures is determined by comparing this indicator with the normative indicator of return on equity (EN).

The effect (result) of environmental measures is manifested in the increase in economic valuation of products, resources or in the increase in net income, the decrease in the cost of production. In particular, in agriculture the result (Pc / x) can be calculated by the formula:

$$P_{c/x} = (O_2 - O_1) \cdot S, \text{ or} \quad (10.2)$$

$$P_{c/x} = (U_2 - U_1) \cdot S, \quad (10.3)$$

where O_1, O_2 is an annual economic assessment of the lands in accordance with and after the implementation of environmental measures; P_1, P_2- the corresponding volumes of production of pure products; S - Areas of land within which environmental activities are carried out.

If multi-purpose measures are implemented (for example, aimed at improving product quality), the result ($P_{s/x}$) can be calculated by the following formula:

$$P_{c/x} = V_2(C_2 - C_2) - V_1(C_1 - C_1) \quad (10.4)$$

where V_1, V_2- the average annual volumes of the products obtained in accordance with and after the implementation of environmental measures; C_1, C_2- the price of products in accordance with and after the implementation of environmental measures; C_1, C_2- the cost of production in accordance with and after the implementation of environmental measures.

However, in this case environmental activity is considered as the sum of measures without taking into account the individual features and efficiency of each of them separately. Therefore, in order to compare the options of individual environmental decisions, it is advisable to use the indicator of comparative economic efficiency (E_p):

$$E_n = P\text{-}3, \qquad (10.5)$$

where *P* is the ecological and economic result of the event; *3* - the cost of holding a specific event.

In the economics of nature, the concept of "effect" and "efficiency" are distinguished. The effectiveness of a business project should be considered in the light of all costs and long-term consequences. At the level of short-term observations or near-term goals, the project may have some economic effect, whereas analysis of long-term (prolonged) effects may change the estimate to the opposite. For example, during the 70-80-ies was spent large sums on land reclamation program, but the end result - higher yields - was negated environmental consequences that led to involve additional non resources to meet new environmental and economic problems. Thus, given the long-term goals and results, the land reclamation projects were unprofitable, despite the short positive effect.

The task of adequately analyzing the effectiveness of projects related to intervention in natural systems is of particular importance. Therefore, environmental measures require a thorough study of their socio-economic effectiveness.

Comparative options should meet the requirements set out in regulations on working conditions, technical and economic indicators, integrated use of waste, secondary resources, etc. This indicator can be defined as a pure economic effect.

Pure economic effect of environmental measures. The net economic impact of environmental measures in agriculture is determined in order to provide a feasibility study to select the best environmental options that differ in environmental impact, as well as the production performance of the industries that carry out these activities. Determining the net economic impact of environmental measures is based on comparing the costs of their implementation with the economic result achieved through these measures.

The economic results of environmental measures (P) is often determined by the magnitude of economic losses (B_{PR}), which thanks to these measures, managed to escape and value of additional income (ΔD) from the reuse of disposed materials or other products if conservation measures are multi-direction, ie, :

$$P = B_{pr} + \Delta D. \qquad (10.6)$$

Annual expenditures for the implementation of environmental measures are determined by the formula:

$$C = C + E_n K, \qquad (10.7)$$

where C - operating costs; E_n - normative coefficient of efficiency of capital investments; K - one-time expenses (capital investments). The size of the regulatory coefficient of efficiency of capital investments depends on the rate of profitability in the industry, the life of equipment and equipment, macroeconomic indicators, on average it is 0.15.

The state can regulate the normative discount rates by reducing them for projects related to the use and protection of natural resources. For example, in the UK for public investment, the discount rate ranges from 6%, in Russia for the assessment of conservation and restoration of forest resources, the discount rate is reduced to 3.3%, although the average for the economy is 12%. Taking into account formulas 10 .6 and 10 .7 the normative coefficient of efficiency of investments can be determined by the formula:

$$E_n = (B_{pr} + \Delta D) - (C + E_n K). \qquad (10.8)$$

There is a distinction between the actual and the expected (projected, projected) net economic effect of environmental measures. *Actual net economic effect* is determined to implement targeted interventions based on a comparison of actual costs and actual economic results achieved in the project.

The expected net economic effect is calculated at the stages of development of programs, projects, creation of new environmental technology, production of environmentally friendly products on the basis of multivariate analysis of the expected costs and results in order to choose the optimal one, which provides the maximum economic effect while meeting the current environmental quality requirements.

Current costs, results and net economic impact are generally calculated for one year. Sometimes it is necessary to determine the overall comparative economic effect for the entire duration of the conservation measure. Then the total capital expenditure should be used in the calculations, and the annual running costs (cost) and annual result should be discounted according to what was proposed in determining absolute economic efficiency in formula (1.1). It should be borne in mind that due to macroeconomic processes (for example, inflation) there is a change in value, which necessitates the need to additionally use economic instruments to bring monetary (value) indicators to the comparative form.

Economic efficiency of nature conservation measures in agriculture. The effectiveness of environmental measures in agriculture is a complex value, characterized by economic, environmental and social components and is determined through an appropriate system of economic indicators.

The economic component of environmental measures is determined by the following indicators:

• the actual and possible level of satisfaction of the population's needs for agricultural products;

• increase in production of basic agricultural products per capita;

• share of agricultural production in the structure of the entire national income;

structure and growth rate of resource returns;

• productivity (production of basic products per 1 ha of agricultural land);

• Fund return (the cost of gross output per UAH 1 of fixed assets);

• recoupment of production costs (cost of gross output per UAH 1);

• material output (production of products per 100 UAH of material costs);

• reducing the cost of production of crop production;

• efficiency of capital investments;

• overall quality of crop production;

The environmental component of efficiency is determined by the following indicators:

• the coefficient of environmental efficiency (the ratio of actual indicators of the ecological efficiency of land protection measures to science-based standards);

• dynamics of the state and quality of land resources;

• dynamics of conservation of individual species of plants and animals;

• dynamics of indicators of negative anthropogenic impact (intensity of use, pollution, change of landscape, radioactivity);

• the rate of reproduction of the natural state of land resources (reclamation, system of agriculture, creation of reserves, etc.).

Social performance is characterized by the following indicators:

• the rate of increase of labor productivity;

• saving living labor;

• population morbidity;

• the level of satisfaction of material and spiritual needs of village workers;

• dynamics of living standards of rural population (education, health, culture, housing and communal services, social, transport);

• the structure of income generation and use.

Along with the economic assessment of soil pollution losses in agriculture, it is important to determine the costs to prevent their degradation. These costs can be called environmental (funds for liming, plastering, construction of anti-erosion, hydraulic structures, reclamation, afforestation, etc.).

Costs for basic production must necessarily include costs for the protection of land resources, that is, environmental costs must be included in the cost of production and pay off income. The payback period comes when the sum of the effect of carrying out environmental measures in agriculture is equal to the cost of conducting them. When determining payback, it should be borne in mind that environmental costs in agriculture not only reduce soil pollution, but also increase production efficiency and product quality. Therefore, it is necessary to determine the economic effectiveness of each individual measure for the protection of land resources (the use of advanced technologies, the use of fertilizers and poison chemicals, the implementation of anti-erosion measures, land reclamation, etc.).

All measures aimed at the protection and rational use of agricultural land contribute to improving their productivity and the level of monetary value.

10.4. Improving the economic mechanism of environmental management and environmental protection

The environmental management mechanism is a system of management, planning and economic incentive measures aimed at sustainable environmental management.

To increase the ecological and economic level of agroindustrial complex, to regulate the environmental motivation of land users, a system of evaluation indicators is needed for both production and environmental activities. Currently, the latter is assessed within the definition of organizational, technical and technical and economic level of production, so it is not comprehensive.

The economic mechanism of rational use of nature plays a leading role in the effective use of the environment, its tools and instruments can directly or indirectly affect the rate of natural resources depletion, the degree of water and air pollution and soil erosion, as well as the presence or absence of danger of disappearance of the flooding. .

One of the main components of the economic mechanism in the agricultural sector is the economic stimulation of the rational use and protection of natural resources. From the practice of its application the following *main directions* are known : stimulation of intensity and efficiency of agrarian land use and agricultural production; protection of agro-landscapes and related aquatic ecosystems; concentration of land ownership and land use. Each of these directions has its own set of economic means of regulation and methods of their practical implementation.

The most well-known methods of economic stimulation of the intensity and efficiency of agricultural use are:

• financial participation of the state in the development of rural infrastructure, agrarian science, education and retraining;

• granting concessional loans and subsidies to agricultural entities for the purchase of environmentally sound production facilities;

• maintaining the level of prices for agricultural products and incomes of agricultural producers.

The experience of foreign countries shows that the application of this group of methods loses its relevance as the market for agricultural products becomes saturated. The main is the solution of socio-environmental problems of the agricultural sector, budget support for agriculture is changing its focus. Methods of economically stimulating agricultural producers for activities related to the protection of agricultural landscapes and related aquatic ecosystems are of particular importance. These methods include:

- financing by the state of the creation of land reclamation;

- hectare payments to land users for liming, plastering and other types of chemical tillage;

- subsidizing new types of tillage that are soil-protective;

- Production subsidies for organic products based on agricultural biology;

- annual rent payments to farmers for their voluntary removal from cultivation and conservation of degraded land, financing works for the depopulation and afforestation of these areas;

- subsidizing anti-erosion measures on agricultural land;

- payment of funds for the preservation of areas under the marshes, ensuring a water balance.

The mechanism of economic stimulation of agricultural nature requires development, but it depends on the speed of market transformation, agri-environmental policy and, above all, on the financial capacity of the state. The latter are too limited in Ukraine, which has become a major hindrance in the development of an economic incentive mechanism for the rational use of natural resources and nature conservation in agriculture. Of its three constituent elements, which are known from the practice of regulation of agricultural land use in developed countries, only one in Ukraine has been developed so far - economic stimulation of the intensity and efficiency of agricultural land use and agricultural production; two others - economic incentives for agricultural environmental users for activities related to the protection of agro-landscapes and related aquatic ecosystems, and economic incentives for the concentration of land tenure and land use - are not yet included in the system of state regulation.

The current mechanism of economic stimulation of rational environmental management in the agrarian sphere of Ukraine is to some extent similar to that applied in the Western European countries in the first post-war decades. This similarity is characterized by the purpose of state intervention in the process of environmental management and agricultural production, which is to increase production of agricultural products and achieve guaranteed food security. In Western Europe, it was reached in the 1970s, while in Ukraine the decline in agricultural production continues. The main reasons for this decline are: price disparity for agricultural and industrial products consumed by agriculture; imperfection in the market conditions of collective ownership of land and property; low efficiency of the current mechanism of economic stimulation of the subjects of agricultural activity.

The problem of lagging farmers' incomes and price parity also exists in countries with advanced market economies. But there it is solved with the participation of the state with the help of a specially created mechanism for maintaining the level of farm prices and incomes. In Ukraine, such a mechanism has not yet been put into practice in economic regulation, although the problem of price parity for agricultural and industrial products has been around for several years.

In developed countries, state subsidies, subsidies, compensation payments, which are provided on a non-repayable basis and provide farmers with a level of income sufficient not only to organize the next production cycle, but also to capitalize some of them, are the main means of economic stimulation of agrarian environmental management. In Ukraine, the main means of state aid to agricultural nature users are budgetary loans and commodity loans on a returnable basis and preferential taxation. Without them, the vast majority of agricultural enterprises, which have been operating at a loss for several years, would not be able to organize the production process. However, the level of their provision is such that there is absolutely no money left to accumulate in order to further invest them in logistical means of agricultural production.

The predominant use in the economic mechanism of incentives for agricultural environmental users based on public commodity loans and tax benefits is due to a lack of financial resources from the state, which now makes it impossible to apply direct subsidies on a non-repayable basis more widely. But this approach also gives hope that in the near future the effectiveness of the mechanism of economic stimulation of the intensity and effectiveness of agricultural land use and agricultural production in Ukraine will increase. Nowadays, such an important method of economic stimulation as the maintenance of prices and incomes of agricultural producers has been introduced into economic practice, which in the developed countries has proved its efficiency and is at the present stage the main condition for intensive and highly efficient agricultural production.

The promotion of intensive and cost-effective use of natural resources in agriculture does not automatically solve the environmental problems of the industry. It is necessary to use special methods, which with the help of financial and economic means could make economic entities interested in carrying out measures to protect and restore the productive power of the earth, to preserve the ecological functions of the soil cover and water resources, to improve the environment as a whole. The subjects of agrarian nature management should be economically stimulated for specific, beneficial to them and the society, activities that are carried out at their expense and directly or indirectly ensure the sustainability of agro-landscapes and adjacent water bodies. These measures include: conservation of arable land and other types of agricultural land; construction of anti-erosion hydraulic structures; creation of field protection strips, forest plantations in water protection zones of rivers and around reservoirs, in ravines and beams; backfill and placement of ravines; terraced slopes; cultivation of natural forage; chemical and hydrotechnical soil reclamation; soil erosion control. Increased fertility of land and production of environmentally friendly agricultural products based on agricultural biology should be added to the list of measures.

Financial and economic incentives for agrarian environmental users to implement conservation measures should be based on direct and indirect incentive methods. Direct economic incentives should be based on direct subsidies and include appropriate methods (Fig. 10.4).

In order to stimulate agricultural producers in the production of organic products, scientists have proposed an economic mechanism, the main elements of which are:

1. Economic levers and incentives that promote interest in the production of environmentally friendly products. It is realized through preferential taxation; preferential lending; increasing the amount of additional payments to the purchase price; centralized capital investments; preferential prices for services and means of production; state insurance.

2. Economic sanctions applicable to environmental pollutants. Include elements: reduction of prices for environmentally contaminated products; a system of penalties for the misuse of natural resources.

3. A system of legal measures that ensure the efficiency of the use of certain elements of the economic mechanism and are implemented through the setting of clear standards for agricultural products, quality control, environmental monitoring and information support.

№ p / n	Measures	Incentive method

1	Conservation of arable land by tilling	Annual indemnification of part of the lost income and compensation for the value of grass seeds and the cost of their sowing
2	Preservation of arable land and other farmland. land by afforestation	Annual rent payments for the conservation of degraded land and compensation for the cost of planting timber and the cost of planting and maintaining them before the crown is closed
3	Anti-erosion tillage	Provision of subsidies for the purchase of soil protection equipment and hectare payments for the conduct of anti-erosion agrotechnical measures at the village. lands
4	Creation of forest protection strips	Annual indemnification of underserved income from planted land and offsetting costs for planting and maintaining plantations prior to crown closing
5	Creation of plantations on the banks of rivers and ponds, in ravines and beams	Compensation for planting costs
6	Construction of anti-erosion hydraulic structures	Reimbursement of construction costs and annual compensation of underserved income from areas of land occupied by structures
7	Backfilling and laying of ravines	Compensation for the costs of the works
8	Terracing of steep slopes	Reimbursement of the costs of the works
9	Cultivation of natural forage	Compensation for the costs of purchasing seeds and carrying out cultural works
10	Conducting of soil chemical reclamation	Reimbursement of expenses for the acquisition of ameliorants and execution of works
11	Increasing the fertility of land	Periodic payments for soil fertility
12	Production of agricultural products without the use of pesticides	Payment of subsidies for produced and sold environmentally friendly products

Fig. 10.4. The system of direct economic incentives for agricultural environmental users to implement environmental measures

In order to stimulate agricultural producers in the production of organic products, scientists have proposed an economic mechanism, the main elements of which are:

1. *Economic levers and incentives* that promote interest in the production of environmentally friendly products. This instrument is implemented through: preferential taxation; preferential lending; increasing the amount of additional payments to the purchase price; centralized capital investments; preferential prices for services and means of production; state insurance.

2. *Economic sanctions* applicable to environmental pollutants. Include elements: reduction of prices for environmentally contaminated products; a system of penalties for the misuse of natural resources.

3. *System of organizational and legal measures* that ensure the efficiency of the application of certain elements of the economic mechanism and are implemented through: setting clear standards for agricultural products; quality control; environmental monitoring; information support.

4. *The system of economic incentives for environmental users* should be developed on the basis of: preferential tax regime; different types of preferential credit, other methods that allow you to perform work without allocating funds from the budget, through the accumulation of agricultural producers own resources. Various types of tax breaks and preferential credits are introduced to stimulate the investment activity of agricultural producers to use modern scientific and technological achievements in order to replace environmentally destructive technology and production technology with a new, environmental and resource-saving, as well as to create environmental protection.

In the practice of economic stimulation of environmental activities, they can be implemented using the following specific methods:

1. Exemption from the payment for land from the area of: a) preserved agricultural land; b) employed for the creation of forest protection strips; c) occupied by anti-erosion hydrotechnical structures.

2. Exemption from the payment for the land under agricultural development or improvement of their condition during the period stipulated by the project of works.

3. Provision of tax benefits due to accelerated depreciation of soil protection equipment and anti-erosion hydraulic structures.

4. Exemption from taxes of the part of the income which is directed to the solution of environmental problems.

5. Granting of preferential credits for purchase of anti-erosion equipment, construction of anti-erosion hydro-structures, realization of timber land reclamation, chemical reclamation of soils, other land restoration and nature conservation measures.

It is also expedient to develop, legislate and implement a system of offsetting in the account of payments for the use of land and water resources (payment of FSP) of the funds spent by the subject of agrarian environmental management for the implementation of environmental measures. Such a system will also provide economic incentives for the implementation of conservation measures, since part of the payments for the use of natural resources is transformed into a source of environmental investments and will remain with the agricultural producer. In an economic crisis, where direct economic incentives cannot be fully developed due to a lack of financial resources from the state, a side incentive system is the main means of accumulating funds for environmental investments.

QUESTIONS FOR SELF-CONTROL

1. Name and disclose the content of the basic principles of environmental management.
2. Identify the main problems of the agricultural use of the agricultural sphere and justify perspective directions of their solution.
3. What is the concept of "greening production"?
4. What causes the need to increase the production of environmentally friendly products?
5. Discover the experience of foreign countries on greening production.

6 . What is the essence of economic, environmental and social effectiveness of environmental measures?

7 . What factors affect natural resource efficiency?

8 . Justify the need and procedure for determining the net economic impact of environmental measures.

9 . What indicator system characterizes the economic, environmental and social component of the effectiveness of environmental measures in agriculture?

10 . What methods are used to economically stimulate the intensity and effectiveness of agricultural use?

TEST TASKS

1. The term "environmental management" means:

1) the totality of human influence on the geographical envelope of the Earth;
2) the level of use of natural resources in the process of social production in order to meet the material and cultural needs of society;
3) a combination of all forms of exploitation of natural resource potential and measures for its conservation;
4) all of the following definitions are true.

2. The objective need for rational environmental management is due to:

1) increasing anthropogenic load on natural resources and aggravation of environmental situation;
2) extension of extensive use of natural resources;
3) processes of degradation and pollution of natural resources;
4) depletion of usable agricultural reserves.

3. The essence of the principle of rational and effective nature management is:

1) in the need to ensure the natural circulation of substances in the process of anthropogenic activity;
2) in economically necessary and environmentally sound environmental management, which simultaneously takes into account the economic and environmental interests of nature and society;
3) in avoiding disturbances of natural equilibrium due to the well-defined balanced resource potential of the region;
4) in consideration of the cyclic rhythm of the functioning of raw materials and processing units of agroindustrial complex.

4 . Environmental measures include:

1) construction and operation of treatment facilities;
2) development and implementation of low-waste and non-waste technologies;
3) all kinds of economic activities aimed at reducing and eliminating negative anthropogenic impact on the environment;
4) all types of economic activities aimed at the production of environmentally friendly products.

5 . The economic result of environmental measures is:
1) preventing economic damage from environmental pollution;
2) reducing the amount of pollutants entering the biosphere;
3) increase of ecological comfort of living, living conditions of the population;
4) increase in net production resulting from the implementation of environmental measures.

6 . The environmental result of environmental activities is:
1) increase in economic (monetary) assessment of natural resources;
2) preventing economic damage from environmental pollution;
3) increasing the number and improving the quality of usable natural resources;
4) improving the physical condition of a person, reducing morbidity, increasing life expectancy.

7 . What is the indicator that characterizes the absolute economic efficiency of environmental measures:
1) discount rate;
2) result (effect) of environmental activity;
3) costs of conducting an environmental event;
4) economic losses that have been avoided.

8 . The effect (result) of environmental measures in agriculture is manifested in:
1) increase in economic evaluation of natural resources;
2) increase in net income;
3) reduction of production costs;
4) all listed answers are correct.

9 . What indicator characterizes the comparative economic efficiency of environmental measures ?:
1) average annual increase in output;
2) comparing the costs of implementing an environmental measure with the economic result achieved through these measures;
3) economic losses that were prevented as a result of the event;
4) increase in net income from production activities.

10 . Indicators of economic efficiency of environmental measures in agriculture are:

1) increase in production of basic agricultural products per capita;
2) dynamics of the state and quality of land resources;
3) the rate of reproduction of the natural state of land resources;
4) level of satisfaction of material and spiritual needs of workers.

SECTION 2. ECONOMY OF PLANT INDUSTRIES

THEME 11. ECONOMY OF GRAIN PRODUCTION

11.1. Economic and social importance of grain production

11.2. Development and distribution of grain production
11.3. Cost-effectiveness of grain and grain products production
11.3. Development and regulation of the grain market and grain products in Ukraine
11.4. Areas for increasing the economic efficiency of grain production

11.1. Economic and social importance of grain production

Grain farming is a basis fot the country's agricultural production and guarantees its food security, for this reason it is considered an area of strategic importance. Grain holds a special place among the basic agricultural products that guarantee the country's food security. This is due to its crucial importance directly for the production of high-calorie foods and, above all, bread. In most countries of the globe, there is no alternative for this staple food of the population,

Grain is used in the form of bread, cereals, pasta, and confectionery. These products are characterized by high nutritional value and taste qualities, containing sufficient protein, carbohydrates, vitamins, amino acids, and mineral salts.

At the same time, grain is the main and indispensable feed in the production of livestock products. By-products of growing cereals are also used as forage - straw and chaff. Each livestock industry requires a large number of compound feeds, and industries such as pig breeding and poultry cannot actually exist without the compound feeds that are based on grain.

Cereal production provides raw material for the production of alcohol, beer, medicines, a number of other valuable products - starch, cellulose, paper and the like.

In almost all historical stages of human development, grain was and still is an important source of wealth for Ukraine. It is an important export product that provides significant foreign exchange earnings, and is the backbone of cash inflows and profits for agricultural companies. When stored grain almost does not lose its quality, so it is suitable for creating state reserves for food and fodder.

In Ukraine, grain farming has long been a leading sector of agricultural development, an important source of improving the material well-being of the people.

Favorable soil and climatic conditions, favorable geopolitical, territorial and economic location, hardworking Ukrainian people, led to significant development of grain production in our country. In terms of the size of the sown areas of cereals and legumes, Ukraine ranks 6-7 among foreign countries, and takes 5-6 place in grain production per person.

Table 11.1

Balance of cereals and legumes (including grain processing products in terms of grain), (thousand tons)

Indicator	2005	2010	2015	2016	2017
Production	38016	39271	60126	66088	61917
Change of stocks at the end of the year	-314	-2054	-3204	2130	-1465
Imports	226	175	190	240	255
Total resources	38556	41500	63520	64198	63637
Export	12650	14239	38338	41451	42499
Spent on feed	13817	14787	14189	12278	11011
Spent on sowing	3294	3222	2597	2330	2120
Losses	375	794	1400	1350	1106
Processing for non-food purposes	670	1650	1089	1044	1246
Consumption Fund	7750	6808	5897	5745	5655

The country's overall grain demand is determined by the amount it consumes for food, processing, feed, seeds, exports, and government reserves. The largest share in this volume is the grain consumed by livestock and used by the population as food. In Ukraine, from the total amount of grain produced 40-50% is used for cattle and poultry feed, for food - 20-21%, seeds - 8-10%, processing for food purposes - 2-3%, and loseses during storage and processing account for 2-3% .

Based on scientifically grounded standards for bread and baked goods consumption and livestock development needs in concentrated feeds, grain exports to the world market are increasing annually. Yes, from 2005 to 2017, it increased from 35% to almost 70% (Table 11.1).

Therefore, the grain industry in Ukraine has always been and remains the basis of filling the market and is traditionally considered strategic, since all basic needs are met thanks to our own production. In the appropriate economic conditions, Ukraine is able to provide itself with the necessary quantity of grain and ensure the export of a considerable amount of it to the world market.

11.2 Development and distribution of grain production

Under the influence of socio-economic, technical and technological factors grain production in Ukraine during the 20th century. has become a multi-vector development. There have been great shifts in the structure of the acreage, their regional location, yields, gross harvests, and quality grain composition. Already in 1913, grain was sown on an area of 24.7 million hectares, accounting for 88.4% of all crops in Ukraine. Particularly high grain saturation was characterized by crops of the steppe regions, where they reached more than 94%.in the structure of the sown areas.

The average yield of cereals was 9.4 c/ha, and the gross harvest was 23.2 million tons, much of which was exported abroad. Since the early 20th century, Ukraine has been increasing its grain exports year after year, gaining recognition from the granaries of European countries. Thus, in 1909-1913, its export deliveries averaged 5.1 million tons per year.

With the development of scientific and technological progress and the intensification of production in Ukraine, areas of industrial crops, including sugar beet, sunflower, flax, and fodder crops began to expand rapidly, which led to a significant reduction of crops with a significant increase in their yield. Thus, over the period from 1913 to 1990, the cereals area decreased by 41% and amounted to 14.6 million hectares, and their yield increased from 9.4 to 34.9 c/ha, the gross harvest increased 2.2 times and reached a record high - 51 million tons.

Grain acreage over the 2005-2017 period fluctuated slightly and amounted to 14.5 million hectares in 2017, yields - 42.5 c/ha and gross grain harvest - 61.9 million tons (Table 11.2).

Table 11. 2

Dynamics of grain production development
(all categories of farms)

Indicator	2005	2010	2015	2016	2017
Harvested area, thousand ha	14605	14575,7	14640,9	14337,1	14560,3
Yield, kg/ha	26,0	26,9	41,1	46,1	42,5
Gross yield, million tons	38,0	39,3	60,1	66,1	61,9

The absolute size of cereals in Ukraine and their share in the total acreage has remained almost stable over the last decades. In the structure of sown areas of cereals for the winter of 2005-2017, winter cereals occupy on average about 48.0% per year, spring cereals and legumes -52.6%. Winter cereals still account for the largest areas under winter wheat - 78.5% of the total winter cereals. Among the grain cereals barley accounts for 50.5%, legumes for 4.9%.

Grain production by farm category is given in Table 11. 3.

Agricultural companies have reduced production of grain products in recent years. However, their share in the total grain production remains high and in 2017 will be 77.4%

Table 11.3

Grain production in Ukraine by categories of farms, thousand tons

Indicator	2005	2010	2015	2016	2017
All categories of farms including:	38015	39270,9	60125,8	66088,0	61920,0
agricultural companies	28790	29779,3	46506,6	52022,2	47910,0
Individual households	9225	9491,6	13619,2	14065,8	14010
Share of agricultural companies in grain production,%	75,7	75,8	77,3	78,7	77,4

The major producers of commodity grain will remain large agricultural companies, although their domestic structure will change. Branches, teams will be part of unions (associations) and cooperatives that will interact on the basis of market relations (purchase and sale of products and services) and will participate in the development of industrial and social infrastructure on the basis of new cooperation of their means.

11.3. Cost-effectiveness of grain and grain products production

Cost-effectiveness is determined by the ratio of the result to the cost incurred and is characterized by a system of natural and value indicators. The system of indicators of economic efficiency of production of food grain includes such indicators as yield, labor productivity, cost and price of realization of 1 centner of grain, profit per 1 centner of grain, level of profitability. At the same time, there are certain features in determining the economic efficiency of fodder grain production. The system of cost-effectiveness indicators includes: yield, yield of feed units and digestible protein per 1 ha of sowing, labor costs per 1 centner of grain and 1 centner of feed units, the cost of 1 centner of grain and 1 centner of feed units, net income per 1ha of forage crops.

The level of economic efficiency of grain production in Ukraine is shown in Table 11. 4.

Table 11.4

Cost-effectiveness of grain production in agricultural companies of Ukraine

Indicator	2015	2016	2017
Yield, centner / ha	43,8	50,0	45,6
The cost of 1 centner of grain, UAH.	203,67	246,94	301,73
The selling price of 1 centner, UAH.	291,38	340,22	377,16
Profit per 1 centner of grain, UAH	87,71	93,28	75,43
Profitability level,%	43,1	37,8	25,0

The cost of 1 centner of grain has tended to increase in recent years. In particular, it increased 1.5 times between 2015 and 2017, with prices also tending to increase over the same period. In 2017, the selling price was UAH 377.16 and the cost of 1 centner of grain was 301.73 UAH, which resulted in a 25.0 percent profitability level.

Grain production in Ukraine is a very profitable sector of agriculture and the main impact on the formation of its level is the cost of 1 centner of grain and selling prices.

An important part of the grain subcomplex, especially at the regional level, is the system of harvesting, storage, and processing of grain.

Elevator farming is the most important link in the organization of grain harvesting and the movement of commodity grain from production to consumption. Timely and uniform intake of grain from producers is important for ensuring high rates of grain harvesting, eliminating its losses, fulfilling orders for the formation of the state agricultural fund.

According to the research, there is still no relevant institution in Ukraine that would take care of the elevator farm. The problems that arise between the links of the grain subcomplex in the process of economic relations are caused by the uncertainty of property relations.

Post-harvest processing and storage of grain is a continuation of the production process in the sphere of circulation. Thus, the elevator farm is the first and most active link in the movement of grain from the production sector (agricultural producers) to the consumer (processing industry). As the elevator industry, in addition to bread-making companies and elevators, also includes sales bases, this gives grounds to claim that the supply function of all types of bread products of the national economy is the most important function of the elevator industry.

While performing the storage function, the elevator farm has a significant impact on the quality of the grain, since when necessary, it brings the grain to basic, seed and export conditions, forming its homogeneous lots for more complete use in processing. Post-harvest processing of grain with the use of specialized high-tech equipment carried out on elevators frees agricultural producers from performing this work in the fields, reduces social labor costs.

Currently, there are about 1,200 elevators in Ukraine with a combined capacity of 48 million tonnes. At the same time only 832 granaries with a capacity of 36.3 million tons were certified.

Despite the fact that the industry is developing - over the past 10 years the capacity of the granaries has increased by 10-12 million tons - demand exceeds supply. Quite a few agricultural producers, especially small and medium-sized businesses, need elevators to store their crops before selling them to large traders.

Grain storage capacity is scarce in all regions. Four areas are the least well-off. In particular, elevators in the Donetsk region cover only 24.3% of the total needs of the region, Transcarpathian - 25.9%, Ivano-Frankivsk - 27.2%, and Lviv - 30.1%.

The most favorable situation regarding the ratio of grain production - storage capacity is in the Odessa region - 69.3%, taking into account the turnover ratio of 1.2, Zhytomyr - 65.2%, Mykolaiv - 63.9%, Poltava - 60.6%, and Kherson - 57.9%.

Another problem is the obsolete grain elevators, which are inefficient, where in principle it is problematic to store grain properly. Due to improper storage of grain, losses account for about 15% of the crop. Old granaries are less energy efficient, which is why prices for their services are at least 10% higher than modern ones.

In addition, due to outdated equipment, the time for loading and unloading of grain trucks is increased. This results in additional costs and risks of loss.

Now only a quarter of Ukraine's elevators are modern, with a complete technological cycle and the possibility of shipment of up to 5 thousand tons per day.

11.4. Development and regulation of grain and grain products market in Ukraine

Functioning of a rational grain market will contribute to the development and efficiency of grain production in Ukraine. Based on the laws of the market economy and the specifics of the grain economy, the development of the market should include: economic independence of producers and creation of conditions for competition to participants in the market trade in grain and grain products; the existence of different forms of ownership and types of management of the system of harvesting, storage and processing of grain; a certain order of formation and distribution of state resources of grain; economic methods of regulating market relations in grain sales.

The grain market is the functioning of the grain subcomplex, which is a set of exchange operations through which economic relations are regulated and the sale of grain and products of its processing are carried out.

The definition of market supply and demand in the grain market has its own peculiarities. An important factor affecting grain supply is the cost of production. Compared to price, they determine whether a producer will increase production to increase supply or reduce it. As for the supply of commodities that are products of grain processing (flour, cereals, compound feeds), its volume depends on the price in the market, the cost of the manufactured goods, available production capacity and the degree of their loading, and the price of replacement goods.

Determining market demand for cereals and their products is much more complex than determining supply. The demand is a more subjective category than the supply and depends on many more factors.

The demand for feed grain consists of the demand of individual farms - buyers for grain for the livestock industry, as well as the demand of feed mills for grain as a raw material for the manufacture of their products.

The demand for food grain comes from the demand for flour and cereals. Demand for flour is derived from the demand of bakeries and pasta factories. The total demand for bakery, pasta, and confectionery products depends on the population's demand for bakery, pasta, confectionery, and cereals.

The grain market infrastructure is presented in Figure 11.1. As can be seen from the diagram, the normal functioning of the grain economy is assessed not only by how many and which bakery products are produced, but also by how the unity of interests is ensured throughout the product vertical. A special position in this structure goes to the link of grain producers, whose essence and functional purpose ends only with the intermediate (raw) nature of the produced products. Therefore, it cannot be assumed that the value of the final output depends on the cost of the grain produced.

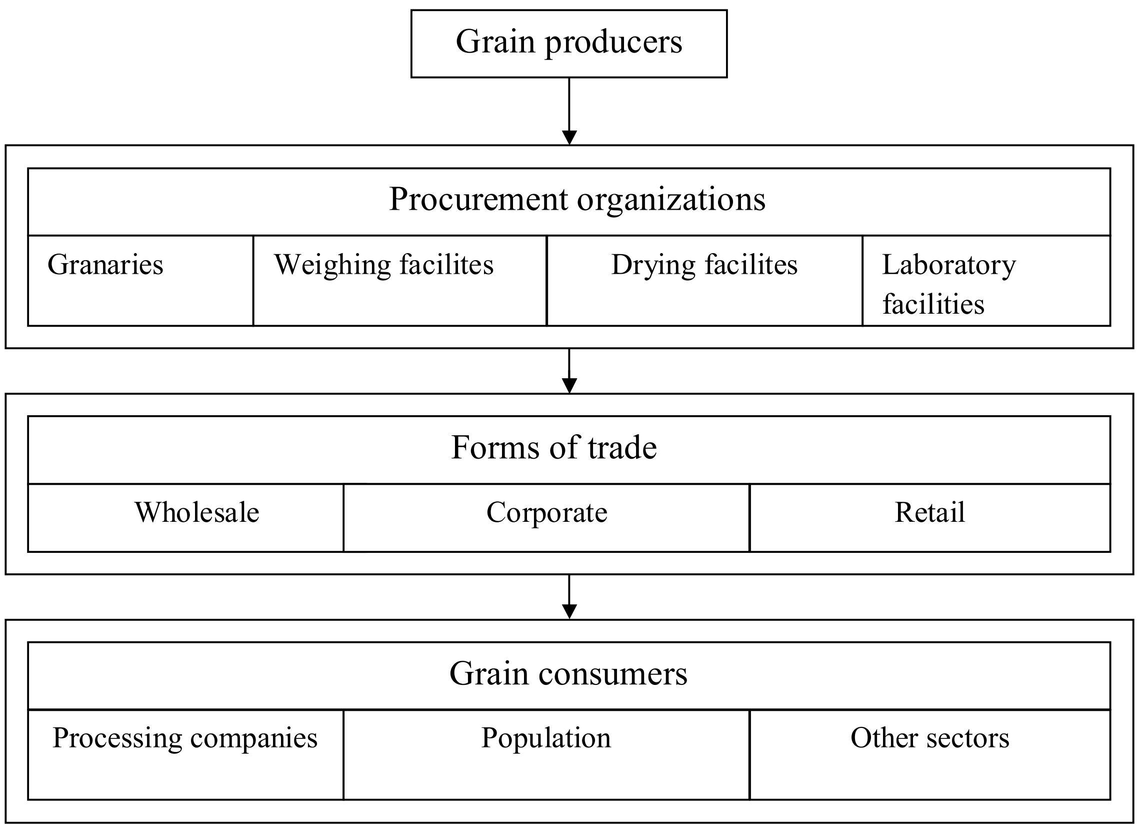

Fig. 11.1. Grain Market Infrastructure Scheme

In the grain subcomplex, economic relations have developed in such a way that agriculture, which has the highest share in total costs of integrated industries, receives a profit of 1 UAH of expenses much less than all the following links -

from the passage of grain as a raw material up to the sale of bread and bread products. Meanwhile, the role of agriculture is crucial.

Under such conditions, the main task of state regulation should be to protect the interests of grain producers and consumers in order to ensure the profitability of grain production and to control the equivalence of grain prices and the means of production supplied to the countryside to support the functioning of the market mechanism and adjust its development in the direction required for the country.

This regulation should be carried out mainly by economic methods and should be based on the interest and voluntary participation of market actors in the implementation of government programs. Of particular importance is the state's pricing policy and the terms of grain supply to the market.

In the grain market, one of the key problems remains volatility and unpredictability of positions caused by significant fluctuations in the gross grain harvest. In recent years, due to the low level of logistical support of agricultural companies, fluctuations in the levels of grain production between their minimum and maximum values have been 2.5 times.

An important condition for creating a grain market and for developing competition in its implementation is also the development of a grain storage system by producers in their own and leased warehouses, which allows to maintain a certain level of grain supply during the year and prevent monopolization of its stocks by intermediary firms, eliminate obstacles to the movement of commodity grain flows in the territory of Ukraine. This will allow grain producers and resellers in different regions of Ukraine to compete in the sale and purchase of grain at wholesale markets and exchanges.

The difficult financial situation in most farms, the relatively low sales prices for grain and the sharp rise in the cost of material resources, the unsatisfactory resolution of lending issues do not allow for a progressive grain-growing technology based on innovation. This leads to a much higher supply fluctuation in the grain market than domestic demand. Domestic demand is more stable than total supply or total demand; it reflects the capacity of the domestic market. Since 1991, there has been a tendency to decline in domestic demand, mainly due to a reduction in the cost of grain forage.

The use of grain for food purposes tends to decrease, which is explained by population decline. By far, wheat is the largest share in the consumption fund.

Sales of grain products through marketing channels show that the vast majority of grain (over 80%) is sold by commercial producers and other non-market entities.

Grain traders buy up to 70% of wheat sold by producers.

Large fluctuations in grain production over the years are the main cause of significant fluctuations in its export volumes.

The geography of Ukrainian grain exports is quite wide - from the countries of Europe to the countries of North Africa, the Middle East and Asia. The main reason for limiting grain exports to some extent is the traditionally low competitiveness of domestic food wheat and the supply of better quality Argentinean grain products.

Recently, domestic barley exports have intensified significantly. Ukraine is one of the world's largest exporters. The reason for such success is the favorable geographical location relative to the main importer - Saudi Arabia. Demand for it will continue to grow.

Corn exports are increasing and Ukraine will continue to consolidate in the markets of the countries of the Mediterranean region and Iran.

Imports of grain to Ukraine are low. Mainly imported is high quality varietal material, including corn hybrids, rye seeds, and buckwheat. The largest share in imports of cereals is rice for food purposes.

Taking into account the specifics of functioning of grain subcomplex, the Law of Ukraine "On grain and grain market in Ukraine" was adopted. The law defines the basic principles of state policy for regulating the grain market. The state recognizes the priority of the grain market, promotes its development and stable functioning of the industry. It is fundamentally important to strengthen the state's control over the movement of grain in the country and its export, stimulate the sale of grain by producers with the right to choose any form of sale.

The stability of the functioning of the grain market and market conditions should be maintained through the mortgage prices and the sale of the mortgage. The use of mortgage prices in the practice of purchasing grain is a form of support for grain producers. The system of sale of grain on a collateral involves payment of it at the level of predetermined, guaranteed prices, which indirectly insure the producer from the need to sell grain to any buyer at a low price. In addition, the producer retains the right to return ownership of the mortgaged grain with its subsequent sale at market prices; the producer shall reimburse the credit received and the costs of grain storage in accordance with the tariff stipulated by the agreement.

The stability of the functioning of the grain market should also be supported by the implementation of intervention purchases and intervention sales of grain. The state-owned joint-stock company Khlib Ukrainy is to act as a state agent with the provision of a state mortgage purchase of grain, which will facilitate the process of introducing a new form of price incentive for grain production.

11.5. Areas of increasing the economic efficiency of grain production

A significant increase in grain production and an increase in the economic efficiency of the grain economy is a prerequisite for providing the population with food, as well as raising the efficiency of production of other agricultural products and strengthening the financial position of companies.

Ways to improve the efficiency of grain production, which provide a further increase in production volumes and reduce costs per unit of production, include a set of the following basic measures: improving the use of land, increasing its fertility; introduction of complex mechanization and automation of production; deepening of specialization and concentration of production on the basis of inter-economic cooperation and agro-industrial integration; rational use of production funds and manpower; introduction of intensive and resource-saving technologies and industrial production methods; improving the quality and preservation of products; widespread use of progressive forms of organization of production and remuneration; development of agricultural production on the basis of various forms of ownership and types of management and creation of equal economic conditions necessary for independent and initiative work.

In the context of measures to improve the economic efficiency of grain production, the most important is to improve the use of land on the basis of increasing its fertility and increasing crop yields. These challenges are being successfully addressed by growing crops using programmed crop technology, using science, best practices and high quality work.

An important area of increasing the economic efficiency of grain production is to improve the quality of grain, especially due to the strong and hard wheat varieties with high protein content (15-17%) and gluten (28-36%). The category "product quality" includes a set of properties that characterize a measure of the ability of a given product to meet the needs of consumers according to its intended purpose. Grain quality is important, as purchasing prices for grain are set based on its quality. Increased production and improved quality of grain help increase the profitability of the grain economy and, consequently, strengthen the economy of agricultural companies. However, difficult economic situation of modern agriculture and, in particular, lack of the required amount of mineral fertilizers, plant protection products have led to a decrease in soil fertility and deterioration of the main indicators of effective management in crop production - yield and product quality. So today the question arises: how to compensate for what is lacking in the soil, and how to stabilize yields and improve grain quality. One of the possible ways of partial compensation of nitrogen is the use of legumes, which not only increase the fertility of the soil, but also improve its structure. This ultimately has a positive effect on yield levels, grain quality and, to some extent, reduces disease and pest damage. In the present situation, when nitrogen fertilizers are in short supply, one of the main ways of replenishing soil with nitrogen is to use nitrogen fixing systems or create interspecific agrophytocenoses. This significantly improves the quality characteristics of winter wheat grains.

At the same time, introduction of intensive type crops and varieties into production may have negative consequences. Development of agricultural intensification without observance of appropriate conditions leads to deterioration of soil structure, increase of land degradation rates and aggravation of ecological situation.

One of the directions to increase the economic efficiency of grain production is the introduction of integrated mechanization and automation of production. The solution to this problem contributes, first of all, to the increase of productivity in agricultural production, which is the main qualitative factor of economic and social development. Strengthening the material and technical base of the industry, the introduction of intensive production technologies and progressive forms of labor organization led to an increase in grain yields and an increase in grain production. At the same time, the production level achieved does not meet the needs of the area concerning grain.

The best practices of domestic agriculture and the world practice show that scientific and technological progress has at its disposal effective means of protecting soils from destruction and increasing their fertility. Also, the agrobiological properties of crops determine the optimum duration of harvesting.

The optimum harvest time for different varieties of cereals is 5-7 days. However, in practice, due to adverse weather conditions and low harvesting factor, harvesting time is increased to 10 days. An increase in the agrotechnical harvesting period causes an increase in crop losses due to grain shedding. In addition to the optimum agrotechnical term, it is necessary to determine the economically feasible duration of harvesting, that is, at which the cost of crop losses does not exceed the cost of purchasing and operating additional harvesters. This will create a combine harvester pool that will provide harvesting with minimal reduced operating costs and maximum profit. Also, significant losses of grain during transportation, storage, processing and use are to be avoided.

The development and improvement of the economic efficiency of the grain sector is a prerequisite not only for providing the population with food, but also for improving the efficiency of production of other agricultural products.

In our opinion, important factors for the further development of the Ukrainian grain economy are: logistical support for production; supply of high-yielding, valuable food and feed varieties of seeds; sufficient application of mineral and organic fertilizers; introduction of scientifically sound crop rotations with optimal saturation and rational placement of crops. Due to the difficult economic situation, domestic agricultural producers are increasingly focusing on the extensive path of development of production, which does not allow to achieve high efficiency and yield when growing products.

Thus, to bring grain production to the proper level and ensure its profitability, first of all, producers need financial support from the state, which would be directed to the acquisition and use of the latest technologies for growing grain; high-yielding, disease-resistant seed varieties; development of scientifically sound programs of grain production that would actually work.

Also, on the basis of the above, it is possible to allocate the main measures for improving the economic efficiency in grain production by the levels at which they determine the economic efficiency (Table 11.5).

Thus, increasing the economic efficiency of cereal production is on the one hand, maximizing production and on the other a systematic struggle for cost efficiency. The more products are produced and the less resources are consumed to produce them, the more efficient the production and the greater the amount of profit on farms.

In the agricultural sector, the primary importance is to increase the competitiveness of domestic grain production, which is the main source of income for most agricultural companies and plays a significant role in the formation of the state budget.

Table 11.5

Distribution of measures to improve economic efficiency in grain production

Levels of definition of economic efficiency	Measures for improvement
National economic efficiency of agriculture	Improvement of the legislative base and state control over the activity of agricultural producers, subsidizing agricultural producers
Economic efficiency of crop production	Sectoral planning of crops, control of harvesting, impact on pricing, strengthening of material and technical base
Economic efficiency of production of grain subcomplex companies	Cost reduction through vertical integration of production, joint production, implementation of scientific and technological progress, introduction of progressive forms of labor organization
Economic efficiency of grain production	Introduction of intensive technologies for grain production
Economic efficiency of agricultural measures	To implement the achievements of science and best practice in the use of land resources; introduce mineral and organic fertilizers, introduce new local high-yielding varieties of plants; optimize the time of sowing and harvesting of cereals; and update the machine and tractor fleet of companies

One of the factors influencing the system of economic relations and contributing to the stabilization of grain production and its further efficient and competitive development is the integration of agricultural growers with the grain products processing and trading companies. The integration is due to the same reasons as the cooperation, i.e the increase in specialization, the expansion of production, the need for coordination of actions in the whole system of grain production.

One of the main areas is the introduction of measures that contribute to the improvement of grain quality. These include, namely, the introduction of improved reception, storage, processing, sale of grain and its processed products;

introduction of changes and additions to the current standards in order to update them and adapt the state standards of Ukraine for the main agricultural crops to EU standards.

QUESTIONS FOR SELF-CONTROL

1. What is the economic significance of grain production and what is the current level of its production?
2. What is the economic importance of grain production for an agricultural enterprise?
3. What is the structure of grain production?
4. Which cereals occupy a leading place in the grain balance of the country?
5. What indicators characterize the development of grain production?
6. What indicators characterize the economic efficiency of grain production?
7. What factors cause a decrease in the complexity of grain production?
8. What factors contribute to increasing the profitability of grain production?
9. What market regulation measures does the Law of Ukraine "On Grain and the Grain Market in Ukraine" envisage?
10. What are the main ways to improve the efficiency of grain production?

TEST TASKS

1. Economic importance of grain production for agricultural enterprises:
1) the main source of cash income and profits;
2) strategic storage product;
3) production of flour, alcohol;
4) basis of livestock development;
5) the basis of human nutrition.

2. Indicators of grain production development:
1) production costs per 1 ha of sowing;
2) 1c grain cost;
3) gross grain harvest;

4) the price of selling 1c of grain.

3. Commodity grain production is concentrated in natural-economic zones:

1) Polissia
2) the northern and central Steppes;
3) foothills and mountain areas of the Carpathians;
4) foothills and mountainous regions of Crimea.

4. Indicators of economic efficiency of grain production:

1) revenue from the sale of grain;
2) job creation;
3) 1c grain cost;
4) grain yields.

5. Indicators of economic efficiency of grain production:

1) job places creation;
2) profit per 1ha of sowing;
3) revenue from the sale of grain;
4) level of marketability;
5) level of profitability.

6. What factors cause a reduction in labor costs per 1c of grain?

1) increase in the area of sowing;
2) increase of productivity;
3) rotation system;
4) forms of management.

7. What factors directly affect the level of profitability of grain production?

1) the cost of selling 1c of grain;
2) grain yields;
3) volume of grain sales;
4) level of marketability.

8. Indicators of the level of grain production intensity:

1) annual production costs per 1 ha of agricultural land. land;
2) annual production costs per 1 ha of arable land;
3) annual production costs per 1 ha of grain crops;
4) grain yields.

9. Indicators of the result of intensification of grain production:

1) the value of gross output per 1 hectare of agricultural land. land;
2) the cost of gross production per 1 ha of arable land;
3) grain yields;
4) production of grain per 100 hectares of arable land.

10. Reserves to increase the economic efficiency of grain production:
1) increase in feed grain production;
2) increase of grain marketability;
3) expanding the acreage of cereals;
4) improvement of grain quality.

THEME 12. ECONOMICS OF TECHNICAL CULTURAL PRODUCTION

12.1. Technical cultures and their national economic significance

12.2. Economy of flax production

12.3. Economy of sugar beet production

12.4 Economy of oilseeds production

12.1. Technical cultures and their national economic significance

Large groups of crops are technical crops. Their products are raw materials for light, food and other types of processing industry.

In Ukraine, over 30 industrial crops are grown (Fig. 12.1). By the nature of their use they are divided into two main groups: for spinning and food.

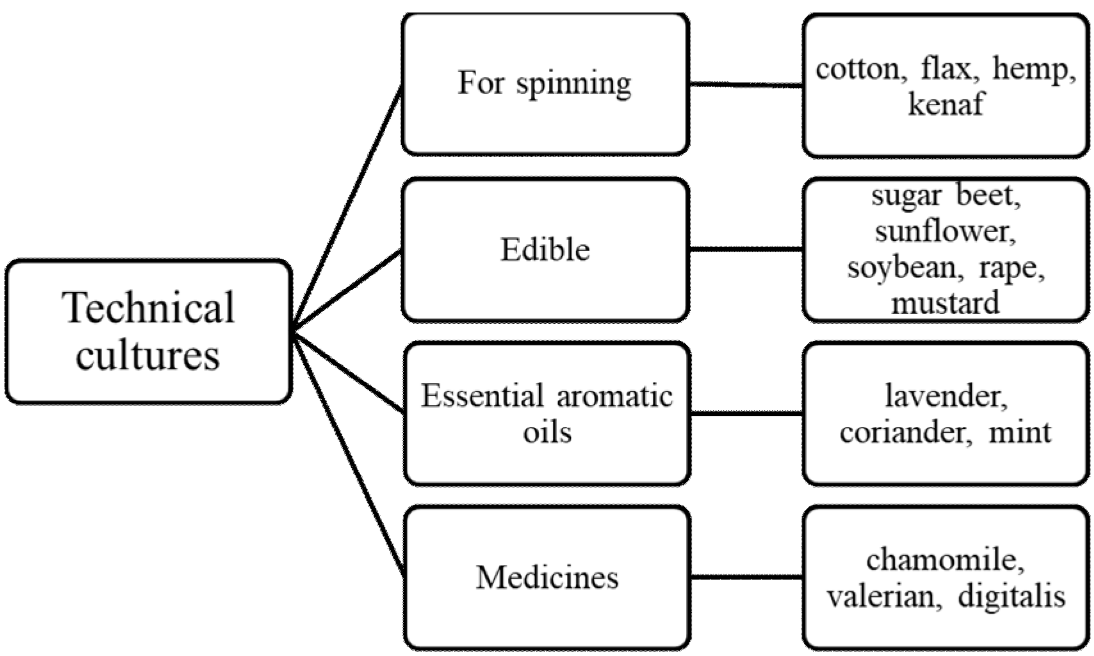

Fig. 12.1. Classification of technical crops by the nature of their use

The first includes cotton, flax, hemp, jute, kenaf and others that provide fiber for fabric production. The second one is sugar beet, sunflower, soybean, rape, ricin, mustard and others whose products are used as raw materials for the food industry. In addition, technical crops include aromatic oils (roses, lavender, coriander, mint, etc.), medicinal plants (chamomile, valerian, transgenic), as well as hops, tobacco and other crops.

In the process of growing and processing industrial crops, along with the main products (fiber, oils, sugar, aromatic substances), by-products (stems) and industrial processing waste (cellulose, molasses etc.) are used as feed for livestock.

Technical crops in 2017 occupy 38.7% in the structure of agricultural crops in Ukraine.

In total area of industrial crops in 2017 the largest share is sunflower (65,95%), soybean (21,57%) and rape (+ colza) (8,54%). The rest (3.94%) consists of sugar beets (3.41%), mustard, flax (Figure 12.2).

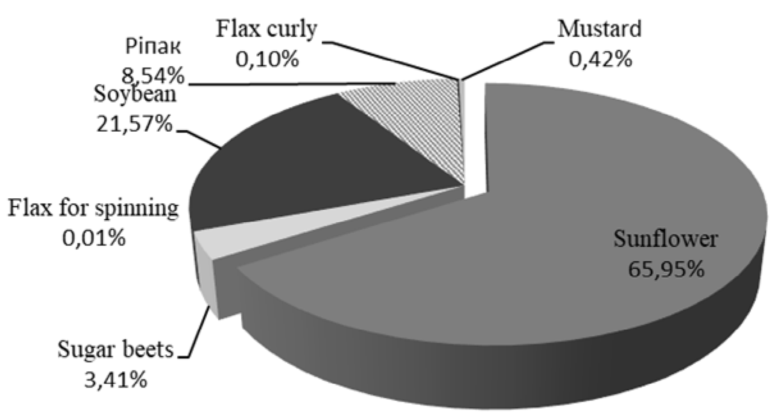

Fig. 12.2. Share of technical crops in their collected area in 2017,%

Consider the specific weight of each of the industrial crops grown in Ukraine in their total gross collection in 2017 (Figure 12.3).

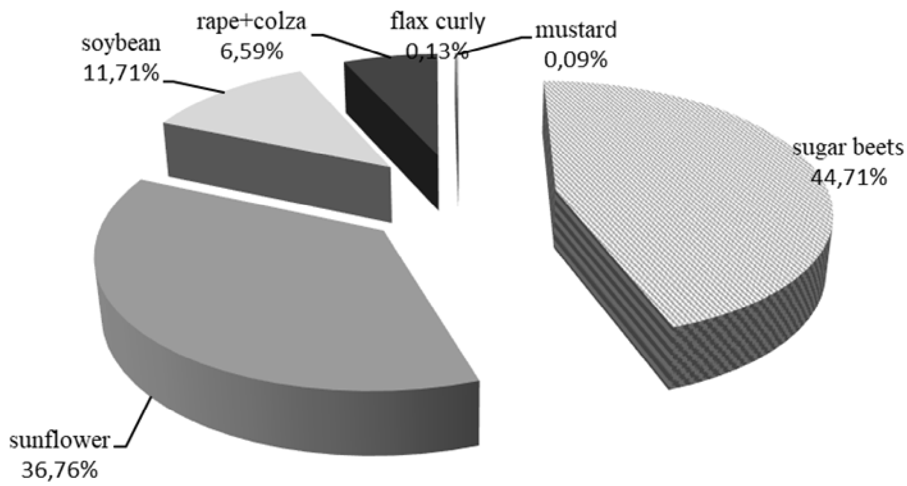

Fig. 12.3. The share of technical culturals in their collected area in 2017,%

Regarding the gross harvest of industrial crops, the largest share of sugar beets is observed here (44.7% of the total gross tax), sunflower – 36.75%, soybean – 11.71%, rape (+colza) – 6.59%, the rest is flax and mustard.

After analyzing the dynamics of production of industrial crops in Ukraine for the period of 2005-2017 (Table 12.1), we note that, although the sown area under sugar beets decreased (by 49.69%), but gross harvest in 2017 compared to 2005 declined at 3.79%. This is mainly due to an increase in yielding of 1.9 points. Significantly reduced sown area in 2017 compared with 2005 for flax by 94.07%, mustard – by 64.18%. In the same period there was an increase in the sown area of soybeans (4,56 points), rape (+colza) (3.8 points), flax curly (1.84 points) and sunflower (1.64 points).

At the same time, we have increased yielding for rape (colza) (1.9 points), flax (1.76 points), sunflower (1.58 points), mustard and soybeans (1.36 points). Regarding the yielding of flax curly, in 2017, compared with 2005, there is a significant decrease by 12.5%.

Table 12.1

Dynamics production of technical culturals in Ukraine in 2005-2017

Cultures	2005 year	2010 year	2015 year	2016 year	2017 year	2017 till 2005, %
Collected area, thousand hectares						
Sugar beets	623,3	492,0	237,0	291,1	313,6	50,31
Sunflower	3689,1	4525,8	5166,2	6086,7	6060,7	at 1,64 points
Flax for spinning	23,6	1,0	1,4	1,5	1,4	5,93
Soybean	438,5	1076,0	2158,1	1869,4	1999,8	at 4,56 points
Rape (+colza)	207,4	907,4	682,4	455,1	788,5	at 3,8 points
Flax curly	25,6	58,9	62,2	68,4	47,1	at 1,84 points
Mustard	113,6	129,1	66,9	45,2	40,7	35,82
Total volume	5121,1	7190,2	8374,2	8817,4	9251,8	at 1,8 points
Gross harvest, thousand tons						
Sugar beets	15467,8	13749,2	10330,8	14011,3	14881,6	96,21
Sunflower	4706,1	6771,5	11181,1	13626,9	12235,5	at 2,6 points
Flax for spinning	12,7	0,4	1,2	1,3	1,3	10,23
Soybean	612,6	1680,2	3930,6	4277,0	3899,4	at 6,37 points
Rape (+colza)	284,8	1469,7	1737,6	1153,9	2194,8	at 7,7 points
Flax curly	28,2	46,8	68,6	91,8	45,6	at 1,62 points
Mustard	46,8	64,4	43,6	35,6	31,0	66,23
Total volume	21159	23782,2	27293,6	33197,8	33289,2	at 1,6 points
Yielding, centners per hectare						
Sugar beets	248,2	279,5	435,8	481,5	474,9	at 1,9 points
Sunflower	12,8	15,0	21,6	22,4	20,2	at 1,58 points
Flax for spinning	5,4	4,0	8,9	9,0	9,5	at 1,76 points
Soybean	14,5	16,2	18,4	23,0	19,7	at 1,36 points
Rape (+colza)	14,6	17,0	25,9	25,7	27,9	at 1,9 points
Flax curly	11,2	8,3	11,0	13,5	9,8	87,50
Mustard	5,8	6,0	7,4	8,0	7,9	at 1,36 points

Placement of crops technical cultures in Ukraine has developed in accordance with zonal natural and economic conditions. So, farms of Polissya and Carpathians specialize in the cultivation of flax; Forest-steppe – sugar beets, sunflower, winter rape, soybeans; northern and central Steppe – sunflower. The same pattern is observed in the placement of enterprises in the processing industry. There are flax processing plants in Polesie, sugar factories in Forest-Steppe, and factories for oilseed processing in the northern and central steppes, which shortens the time and distance of transportation of raw materials to processing sites, reduces losses during transportation and storage, improves the efficiency of the production of the final product.

Among the special technical cultures grown in Ukraine are essential oils: coriander, mint, cumin, lavender, rose, sage, anise, etc. (Table 12.2). They are grown to produce essential oils, which are widely used in perfumery, cosmetics, food, soap, confectionery, pharmaceutical and other industries. Their cultivation is concentrated in specialized farms in different regions of Ukraine.

An important technical culture is hops. Its cones are used after processing in the food industry, mainly for the production of beer and yeast. In addition, they are used in baking, perfumery, pharmaceutical and other industries.

The annual demand for hops from domestic brewers is about 100 tons. However, the share of Ukrainian hops is quite small. Today the brewing industry buys the bulk of hops abroad.

More than 60% sown area of hops are concentrated in farms of Zhytomyr region. The level of profitability of its production in 2017 was 17.7%. The modern Ukrainian hop market is under significant external influence of world production. Therefore, in a fierce competitive struggle, economic performance indicators at the level of profitability and sustainable development can only be achieved by those enterprises that make every effort to improve the efficiency of economic activity.

Table 12.2

Production of special technical cultures in Ukraine in 2017 year

Indicator	Enterprises of all categories			Agricultural enterprises			Households		
	Collected area, thousand hectares	Production volume, thousands of quintals	Yielding, centners per hectare	Collected area, thousand hectares	Production volume, thousands of quintals	Yielding, centners per hectare	Collected area, thousand hectares	Production volume, thousands of quintals	Yielding, centners per hectare
Mustard	39,5	310,0	7,9	35,3	287,4	8,2	4,2	22,6	5,5
Rizhy	0,0	0,2	4,5	0,0	0,1	4,4	0,0	0,1	5,0
Poppy for oil	2,2	12,7	5,7	2,2	12,7	5,7	-	-	-
Hemp Middle Russian and Southern (for seeds)	2,6	10,0	4,3	2,6	10,0	4,3	-	-	-
Hemp Middle Russian (for seeds)	1,4	6,2	4,8	1,4	6,2	4,8	-	-	-
Hemp southern (for seeds)	1,2	3,8	3,6	1,2	3,8	3,6	-	-	-
Pumpkins (for seeds)	4,6	18,4	4,0	3,6	13,9	3,8	1,0	4,5	4,9
Flax for spinning (straw)	1,4	59,8	43,0	1,4	59,8	43,0	-	-	-
Flax for spinning (fiber)	1,4	13,2	9,5	1,4	13,2	9,5	-	-	-
Flax for spinning (tresta)	1,4	47,7	34,3	1,4	47,7	34,3	-	-	-
Spices	x	25,0	x	x	23,3	x	x	1,7	x
of them: anise and bodian	x	0,2	x	x	0,2	x	x	-	x
coriander	3,1	23,9	7,9	2,8	22,2	8,3	0,3	1,7	5,1
cumin	x	0,7	x	x	0,7	x	x	-	x
Essential oilseeds	x	54,3	x	x	53,8	x	x	0,5	x
of them: coriander	7,3	42,6	5,8	7,3	42,1	5,7	0,0	0,5	8,7
sage	x	9,1	x	x	9,1	x	x	-	X
mint	x	0,6	x	x	0,6	x	x	0,0	x
fennel	x	0,4	x	x	0,4	x	x	-	x
Medicinal plants	x	41,3	x	x	37,4	x	x	3,9	x
of these: chamomile	x	4,5	x	x	4,5	x	x	0,0	x
valerian	x	1,3	x	x	1,3	x	x	0,0	x
dog-rose	x	0,1	x	x	-	x	x	0,1	x
pumpkin seeds	x	20,1	x	x	20,0	x	x	0,1	x
others	x	14,9	x	x	11,4	x	x	3,5	x
Tobacco	0,5	14,3	26,6	0,4	11,4	27,7	0,1	2,9	23,2
Nicotiána rústica	0,0	0,1	12,0	-	-	-	0,0	0,1	12,0

Thus, in order to ensure the effective functioning and further development of the domestic industry of hops, it is necessary: to increase the volume of production and sale of hops; restore the processing and marketing infrastructure; to resume financing of the branch from budget allocations (subsidies) in support of development of hop harvesting; optimize customs tariffs for the import of hops to protect domestic producers; to finance research and development work aimed at developing the production of hops.

One of the most important factors in the stabilization and further development of hop harvesting is the widespread introduction into the technological operations of growing, harvesting and primary processing of hops of already created technical products and implements, and improving them during the exploitation.

In Ukraine, a technical culture such as hemp is grown. The trend of hoop production is gaining in popularity in Europe, and the seeds of this culture in their qualities are equated with superfoods. Under the hemp in the European Union in 2016-2017, there were about 28 thousand hectares and the area has been steadily increasing since 2011.

In Ukraine, a technical culture such as hemp is grown. The trend of hemp production is gaining in popularity in Europe, and the seeds of this culture in their qualities are equated with superfoods. Under the hemp in the European Union in 2016-2017, there were about 28 thousand hectares and the area has been steadily increasing since 2011.

As a result of hemp processing, raw materials are obtained for the pharmaceutical, perfumery and food industries. Up to 50% of raw materials for the needs of pharmaceuticals are exported, the rest – to the Ukrainian market. Fibers are mainly for the production of paper and cellulose. And in the EU, dusts from the primary processing of the stem are even added to the surface of the road to make it more durable. Processing of products can also be put to manufacture fabrics, sacks, cords and ropes.

There are three hemp-growing technologies. The first one is used for seed production. The second is the production of high-quality fiber ("green" technology). This allows you to get high-quality fibrous material, albeit at a high cost. And the third is complex when hemp is grown for both seed and stem.

In Ukraine, hemp is grown a little: in 2017 – 2,6 thousand hectares. Sowing area is fragmentary, located in Zhytomyr, Poltava, Sumy, Kyiv and Kharkiv regions. At the same time, they are small in size and range from several hundred to 800 hectares.

There are also several processing plants – two old plants in Sumy and one in the Zhytomyr region, which is in the process of re-equipment.

Construction of a new plant will cost $ 1 million to $ 10 million, depending on the scale of production. Therefore, Ukrainian farmers are in no hurry to invest such funds. Instead, hemp growers use mobile units that recycle their crops in the field.

Growing hemp is an expensive but highly profitable business. Prices for products produced on the Ukrainian market are growing rapidly - from 2014 to 2017, the cost of various types of products increased by 150-270%. However, with increasing demand and competition in this market, the price is stabilizing. However, the market should be able to develop exactly by domestic producers.

The main disadvantage of growing hemp is the need for specialized agricultural machinery and the high costs of production and processing. However, the high profitability of the culture offset these disadvantages.

The leading oilseed crop, which is related to technical crops, is coriander.

Coriander seeds contain from 0.8 to 1.6% essential oils, the main component of which is terpene alcohol linalool (60-80%), which is the starting product for the synthesis of a number of odoriferous substances used in the perfume and cosmetics industry and the food industry. . Coriander seeds also contain from 18 to 28% of fatty oil, which is used in the soap and textile industry, as well as in polygraphic production.

Coriander seeds are used in the food industry as spicy seasoning when preserving fish, salt cucumbers, etc. Coriander shrot contains about 6% fat and up to 30% protein and is used for livestock and poultry feed. Due to the fact that the plant, namely herbs, contains vitamins A, B and B2, C, PP it is also used in medicine. Coriander is also a honey plant.

Today, coriander is one of the crops that can bring a farmer's material incomes. Thus, the price per ton of commodity coriander fluctuates within 20-30 thousand UAH. Depending on the season. Manufacturers of ready-made spices and bakery buy these spices. Used in demand and green coriander – cilantro.

Coriander is a heat-loving plant, therefore its cultivation zone is timed to the South of Ukraine and the yielding of a crop in Ukraine can reach 30 c / ha. However, the yielding in 2017 was 5.8-7.9 centners per hectare.

It is possible to sow the coriander after the winter wheat - in this regard, it is an alternative to sunflower crops without reducing the profitability of production, besides the culture does not drain so much soil, and the harvesting terms that end at the end of June allow to prepare the field qualitatively.

Thus, growing coriander is quite promising, especially in small farms in the South of Ukraine, which allows to expand the alternation of crops and to get high profits. Coriander seeds are mainly bought by Asian countries, which account for about 75% of total exports and European countries (20%).

To date, an important group belonging to technical culturals is medicinal plants.

There are 12 main categories in which therapeutic plants are divided into: camphor plants (camomile, frankincense, jasmine, valerianum, etc.), citrus fruits (orange, bergamot, lemon, bigardi and others), spices (marjoram, rosemary, etc.) honey (fennel , anise, stevia, etc.), menthol (melissa, mint, verbena and others), sweet-spicy (muscat, pepper, cloves, ginger, cinnamon and others), woody (sandal, vetiver and others), sweet cherries (neroli , geranium, pink tree, ylang ylang and others), coniferous (fir, pine and others), bitter (eucalyptus, thyme, wormwood and others), lavender (cypress, lavender, sage, etc.) and myrtle plants (ginger, cedar, etc.).

In Ukraine, more than 50 species of medicinal plants are grown. Some of them give a net profit of up to 250 thousand UAH from two hectares each year.

The largest areas are dandelion, chamomile medicinal, purple echinacea, peppermint, sage medication, threefold herb, valerian medication, altea officinalis, thyme common, melissa officinalis, real mint, calendula, oreganum.

Profit depends on the plant being grown. From one hectare of field each year it is possible to collect raw materials, which will cost from 50 thousand (0,5 tons of chamomile flowers) to 300 thousand UAH (3,5 tons of dry root valerian). The costs of growing plants vary from 25 thousand UAH (cultivation of chamomile) to 170 thousand UAH (cultivation of valerian).

The largest consumers of medicinal plant raw materials are pharmaceutical companies. Medicinal plants are also used in the production of cosmetics and food. Tea-herbs producers from medicinal plants buy much of the raw material.

To grow most medicinal plants it is necessary to adhere to specialized crop rotation. The farms distinguish between several types of plants (5-10), most adapted to local conditions. Motivated crop rotation with medicinal plants should be based on the principles of wide fetal change, where main crops are placed after better predecessors, which ensures high soil fertility, purity of fields from weeds, accumulation of necessary moisture reserves, and soil treatment under optimal terms.

When developing crop rotation for medicinal plants, special attention should be paid to the technologies of their cultivation. All herbs are cultivated in field conditions as crop rotation, which requires a lot of manual labor for their care and harvesting. For the definition of crop rotation of crops it is necessary to predict and eliminate the possibility of contamination by poisonous plants of subsequent crops of medicinal plants, as well as fodder crops. Hazardous and poisonous predecessors are: ordinary fool, black hawthorn, which is provided by the restoration of the aspiration of seeds.

On the market of medicinal plants in Ukraine, there are a number of restraining factors for its development:

deficit of medicinal plant material with the corresponding certificates of quality and conformity of it for use in the pharmaceutical industry;

low level of competitiveness of domestic producers of various types of products from medicinal plant raw materials on the domestic and foreign markets;

depreciation of technological equipment, shortage of production capacities for certain types of processing of medicinal plant raw materials;

underdeveloped infrastructure for the storage, transportation and logistics of commodity goods manufactured from medicinal raw materials;

insufficient compliance with environmental and sanitary requirements in industrial zones of organizations that process medicinal raw materials;

absence in production of technologies of obtaining qualitative raw materials on the basis of modern biotechnologies.

Thus, it is necessary in the modern conditions to transfer the sub branch of medicinal plant growing to an industrial basis, which involves the creation of a network of specialized farms, equipping them with modern means of mechanization and equipment, as well as ensuring the organization of primary processing of raw materials. An important aspect is the organizational support of environmentally-oriented production of medicinal plant raw materials, and one of the main conditions for the successful sale of medicinal plant growing products on the international market is compliance with international quality standards.

For agricultural enterprises, technical crops, as a rule, are high-yielding products.

A rational and effective territorial organization of the productive forces of the country should be based on scientifically substantiated consideration of not separate conditions and factors, but of their totality. In this regard, the organization of the monitoring service (monitoring) becomes very important due to various factors influencing the placement of technical cultures.

The volume of production of all types of technical raw materials should further increase, first of all, by increasing the productivity and quality of technical cultures. In this regard, the most important task in the production of technical crops is to provide farms with new varieties and hybrids and to develop progressive energy-saving, environmentally-appropriate technologies for their cultivation.

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12.2. Economy of flax production

Of all cultures for spinning in Ukraine, the greatest importance, as a technical culture, is flax. This group also includes hemp, jute, kenaf and a number of other crops. The value of flax for spinning is determined primarily by the product obtained as a result of processing. Three types of products are produced from flax: fiber, seeds and a small stem.

Economic and social value of flax production. In flax stems 25-31% fibers with the most valuable technological properties - flexibility, toning and high durability, by which it prevails cotton fiber twice, and wool - three times. Flaxen fabrics are strong and hygroscopic in conditions of high humidity, high hygienic and most suitable for tailoring linen, etc.

Cotton fiber is an indispensable raw material for the textile industry. From it make clothes, linen, sackcloth, canvas, etc. Ropes and twine are made from short fibers of flax. Wood products are in great demand both in the domestic and in the world markets.

Waste textile production – a small stem, used for the production of heat and sound insulation materials, cardboard, acetone, plates for furniture production and construction. An ash from such a stalk, which contains 4.8% phosphorus, 6.3% potassium, is useful as phosphorus-potassium fertilizer.

A seed of flax contains 35-40% of high quality oil and about 25% of protein substances. Flaxseed is widely used in food, paint, paper, electrical engineering and medicine. The product of flaxseed meal processing is a valuable concentrated feed for animals.

In Ukraine, there are only three oblasts (Sumy, Zhytomyr and Chernihiv), in which farmers grow flax fiber (flax for spinning). As for flax crops in Chernigov region, this year they reach 320 hectares in the Horodnyansk district. Grown crops are within the same farm. This is due to the fact that the sowing, cultivation and harvesting of this crop requires special equipment, which in the vast majority of farms is no longer left.

It should be noted that in recent years there has been a significant reduction in crop of flax for spinning in Ukraine, as well as a decrease in its production volumes (Table 12.3).

Table 12.3

Dynamics production of flax for spinning in Ukraine (all categories of enterprises)

Indicator	2005 year	2010 year	2013 year	2015 year	2016 year	2017 year	2017 till 2005, %
Collected area, thousand hectares	23,6	1,0	1,5	1,4	1,5	1,4	5,9
Yielding, centners per hectare	5,4	4,0	7,3	8,9	9,0	9,5	by 1,76 times
Gross harvest, thousand tons	12,7	0,4	1,1	1,2	1,3	1,3	10,2

As can be seen from the given data there was shrinkage of sown areas of flax for spinning (by 94.1%) and, despite the increase in yields almost twice, the volumes of flax fiber production (reduced by 89.8%). The level of profitability of flax seed production in 2017 was 10.8%. The main reason for this is the restriction of sales markets due to the low quality of products and the closure of light industry enterprises in Ukraine.

It should be noted that the term flaxseed traditionally refers to the cultivation of flax as a technical crop for the purpose of obtaining fiber and seeds. This involves growing mainly flax for spinning, although for these purposes two other types of flax are also suitable: curler and intermediate (mezheumok).

Now in Ukraine the branch is narrowed to growing so-called oil flax, and in fact - an intermediate form of flax exclusively for the production of technical oil.

In the meantime, the market needs high-quality flax seed with the specified quality parameters for obtaining healthy food and treatment. Tones of such seeds are more expensive than usual at 150-200 EUR.

As regards the use of such an important part of the plant as a stem, it is not used very much. This leads to incomplete use of flax and reduces the profitability of the industry.

Obviously, in order to increase the profitability of flaxseeds, it is necessary to use flax straw for the production of at least fuel briquettes or granules. This does not require significant investment, so they will pay off quickly. So, usually collecting 20 quintals of flax per hectare, you can get about 100 euros of additional profits.

The next step should be the production of short fiber with of flax straw. This requires bigger and long-term investments, but as a result, the basic conditions for the complete revival of industry and the production of flax as a whole as a highly profitable industry will be created.

At the same time, existing enterprises of primary processing of flax straw in the Zhytomyr region do not work due to lack of raw materials, and flax in the southern regions is burned in the fields.

Due to the fact that flax growing is not intensive, Ukraine's share in world flax seed production is only 2% with an annual volume of 40-60 thousand tons, and in the production of flax fibers is not noticeable. As a result, flax is not an attractive crop for agrarians and is sown unstable (Table 12.4). In addition, the obstacle to the development of the industry is the effect of export duties on flax seeds.

Table 12.4

Dynamics production of flax curly (oilseed)
(all categories of enterprises)

Indicator	2005 year	2010 year	2013 year	2015 year	2016 year	2017 year	2017 till 2005, %
Collected area, thousand hectares	25,1	56,3	20,2	62,1	68,0	46,4	by 1,84 times
Yielding, centners per hectare	28,2	46,8	24,7	68,6	91,8	45,6	by 1,62 times
Gross harvest, thousand tons	11,2	8,3	12,2	11,0	13,5	9,8	87,5

In general, flax curly is a heat-loving culture, that is, it likes the south. In Ukraine, in recent years there has been a gradual increase in the area under this crop. Thus, in 2017 compared to 2005, 1.84 points increased an increase in the collected area and the gross harvest was 1.62 points. However, the yielding of this crop decreased by 12.5%.

A common stereotype is the low yielding of flaxseed oil and, consequently, low profitability. Therefore, this culture has not yet gained sufficient popularity among Ukrainian agrarians. However, the main reasons for its low yielding are the use of outdated varieties, poor quality seeds and failure to meet the basic requirements of cultivation technology. Therefore, understanding of the potential of high profitability of oilseed flax by farmers will make this culture a worthy place in the structure of agricultural crops in the steppe and forest-steppe zone. There are new varieties whose cultivation is expanding. For example, Lirina in 2016 successfully cultivated in the Chernihiv, Kiev, Zhytomyr, Odessa and Mykolaiv regions.

However, in Ukraine domestic consumption of flax and its processing at industrial enterprises are insignificant. In order to promote healthy eating a compulsory element is flax. But this is not popular in Ukraine. The factories of olive oil are also not involved in the processing of flax seeds. To perform the processing of such seeds, it is necessary to form the proper raw material to ensure the continuous operation of the technological lines.

The processing of flax in Ukraine is carried out by very few enterprises. The Nizhyn and Chernigov Factories, Agrosilprom, LLC Faktoriya process the largest volumes. The most promising way to organize processing is cooperation with cooperatives.

The Public Association "Ukrainian Flax and Hemp Development Association" sees its main goal - informing producers about additional opportunities and prospects of the industry. The Union is ready to propose a program of priority measures for increasing the competitiveness of flax growing, which will be an indicator of the expansion of sown areas.

Flax curly is a highly profitable crop due to high oil content (45-50%), potential yielding (2.0-2.5 t / ha), low costs of cultivation and minimal use of chemistry. At an average yielding of 1.5 t / ha, the profitability of its cultivation is about 150%.

Seeds of varieties of flax curly contain from 42 to 50% of linseed oil. It includes, depending on the selection variety and growing conditions, five fatty acids: olein – 17.6%, linolenov – 56.6, linoleum – 14.5, palmiticum – 5.7 and stearin – 3%. Iodine number of oil is 165-192. Usually seeds and flaxseeds are used as drugs. linseed oil is also actively used in paint, leather, and soap industry. From it make linoleum, films, drying oil. As for the fodder value: 1 kg of seeds contains 1.8 k.o., in macuhu – 1.2 k.o. The flaxseed contains 33% protein and about 9% fat. By fodder qualities, it prevails makuhu of other plants, are easy to assimilate for animals. Straw containing up to 50% of cellulose is a raw material for the production of cigarette paper and cardboard.

Mezheumok and curler - these are the plants that cultivate for the production of oil. This is because they receive the largest seed yield and yield of oil.

Straw`s fibers of flax curly are mainly used for making cotton wool, paper, as well as packaging material. The low-growing flax can be seen in the highlands of Tajikistan and Uzbekistan. In Ukraine for the production of oils (Table 12.5), for the most part, grown flax-mezheumok (from which it is possible to get coarse fiber).

Table 12.5

The main features of groups of oilseed flax compared with flax for spinning

Indicator	Mezheumok	Curly	For spinning
Weight of 1000 seeds, g	up to 6	up to 8	up to 5,5
Oil content in seeds,%	up to 42	up to 45	up to 39
Stems per plant, pc.	1-2	4-5	5-10
Of fruits on the plant, pcs.	15-20	30-60	5-10
Plant height centimeters	50-75	30-50	70-125

In seedlings of flax varieties, sortimental renewal is very important. However, in many farms, seed is used as seed material even below the third reproduction; it is already commodity flax. And it does not take into account the deterioration of the characteristics of the variety and the substantial decline profitability of cultivating the crop. Varietal seeds with high sowing and yield qualities can be found only in a high culture of agriculture, using a set of substantiated and tested agro measures.

The production of oilseed flax seeds in Ukraine refers to export-oriented industries. According to the Ukrainian Agribusiness Club, Ukraine ranks 7th among the world's exporters of this culture.

The most promising market for Ukrainian oilseed flax is the European Union, which annually imports about 900 thousand tons of this crop. The main suppliers in the EU are countries such as Kazakhstan, Russia and Canada - up to 180-190 thousand tons each. Market experts predict that global demand for flax will increase. Thus, it is anticipated that its market in the USA and Canada (the world's largest producers) will increase to $ 308 million by 2021.

In 2017, Ukrainian exporters delivered 51.08 thousand tons of flaxseed to foreign markets, estimated at about $ 17.19 million. The world price of flax seeds in 2010-2015 ranged from $ 500-700 / tonne, but in 2016, unfortunately, it decreased slightly and amounted to $ 320 / t. It should also be noted that the country has an export duty on flaxseed, which results in an internal Ukrainian price slightly lower than world prices.

The largest importers of flax from Ukraine are Vietnam (42.4%), Poland (11.4%), Egypt (10.2%). The share of our country in the world structure of flax production is modest 1.6%, but the area of crops is increasing.

Table 12.6

Approximate costs for growing 1 hectare of oilseed flax (VAT, taking into account wages and without taking into account depreciation of machinery and land lease)

Operation	Costs, UAH	
	minimum	maximum
Discarding in the fall	110	150
Spring fertilization	1500	2000
Pre-sowing cultivation	110	150
Seeds (40-50 kg / ha)	2700	3420
Sowing	150	180
First cultivation with herbicides	800	900
Second cultivation with herbicides	800	900
The introduction of microfertilizers (combined with one of the herbicide treatments)	0	180
Treatment with insecticides (combined with one of the herbicidal treatments)	0	90
Treatment with fungicides (if necessary)	0	470
Collection	330	450
Transportation to drying place	40	60
Cleaning	40	50
Drying (if necessary)	0	110
Total	6580	9110

The average cost of growing this crop (Table 12.6) is from 6.5 ths. UAH / ha and above, depending on a set of factors (fertilizers, seeds, soil cultivation, protection, fuel consumption, etc.).

Thus, with the price of flax seed approximately 10400 UAH / t (VAT) on EXW conditions and 1 ton / ha yield, which involves minimal technology, the profitability will be about 35-40%. Such productivity and profitability do not stimulate agrarians. But the problem of low productivity can be solved by using high-yielding varieties and strict adherence to the technology of flax cultivation.

Among the variety of varieties registered for cultivation on the territory of Ukraine, the German oilseed flax Lyrina should be noted. This variety is considered to be one of Germany's most productive yields and yields an average of 2.5-2.9 t / ha for optimal conditions and compliance. The Lira variety was first tried in 2016 and received a yield of 21 c / ha, while receiving it for 350 hectares of sandy field.

Even with the price of oilseed flax offered by the market today, the yield of 2 t/ha can provide an average profitability of 100-170%. And with a yield of 2.5 t/ha, the average profitability can reach up to 250%. It should be noted that, in addition to high profitability, the cultivation of oilseed flax has a number of other benefits:

the possibility of growing in different natural and climatic zones of Ukraine;

Drought tolerance. The root system of flax is characterized by continuous growth in depth almost to the end of the vegetation. Due to this, the plant absorbs moisture from the deeper layers of the soil and can withstand drought more than other crops;

Convenience in crop rotation. Oilseed flax is an alternative crop of racy and sunflower for placement in crop rotation. The short growing season allows you to harvest flax at the end of July and use it as a good predecessor for winter crops;

High resistance to scalding and sinking;

Simple growing technology and resistance to disease and pests;

Non-susceptibility to soils (may be sandy or loamy).

Seeds of flax are placed in multi-crop rotations. The most desirable predecessors are winter wheat, barley, oats, legumes, the field after which remains clear of weeds. In order to reduce the damage, flax does not sow after cabbage cultures. You cannot sow flax curly after sunflowers, rape and turnips because of the severe clogging of crops by the fall of these crops. Particular attention is paid to keeping an interval of 5-6 years between crops of flax in one field. Soils – sandy loam or light loam with slightly acid reaction.

The best indices of the crop structure and the highest yield of flax are provided for its cultivation after the spring wheat and peas. If there are no these predecessors, the culture can be placed without noticeable decline in yield after buckwheat, soya and corn. To undesirable predecessors for flax are sugar beet, and to the inadmissible – the very culture of flax curly.

Economic efficiency of flax production and directions of its increase. The following indicators are used to determine the level of economic efficiency of flax production: labor costs per 1ts of seed, linseed and flax straw, cost of 1ts of seeds, linseed and flax straw, selling price of 1ts of seeds and flax straw, weight of profit per 1 cc of products and 1 ha of crops, level profitability.

The indicators of the economic efficiency of flaxseed are their inherent properties, due to the fact that flax is both for spinning and oilseed crops, and provides several types of products - seeds, straws and slobacillary stems. This is due to the multi-stage flax production technology and the need to determine the economic efficiency of production of each individual product at different stages of the production process.

The level of economic efficiency of flax production is shaped by the influence of many different factors and conditions that are actually intertwined, causing and complementing each other. The most important factors include: technology, specialization and concentration of production, organization of labor, economic mechanism of management. Depending on the level of their implementation, these factors can be divided into internal, external, industry and inter-industry.

Internal economic factors are factors influencing efficiency at the level of primary production, namely: mechanization of production processes, organization of labor, internal economic relations. External economic factors include the quality and cost of industrial resources involved in industry, flax prices, etc., as well as sectoral and inter-sectoral - sectoral and inter-sectoral management, inter-farm cooperation and agro-industrial integration, research, etc.

Of the many factors that determine the further increase in flax production and increase its economic efficiency, crop growth and product quality are of key importance.

In particular, the quality of the straw is determined by six indicators, the trust is for the seventh. In this regard, the selling prices for various varieties of linen products are differentiated: for straw – 18 sortimental numbers, for fiber - 20 varietal numbers. Therefore, for an objective economic assessment of the production of flaxseeds, it is necessary to take into account the quality of these products, which determines the level of realization price, which in turn affects the profitability of production.

Growth of flax yields can be achieved through the introduction of intensive cultivation, harvesting and processing technologies. Intensive culture technology requires: placement of flax after better predecessors; application of scientifically substantiated norms and ratios of mineral fertilizers, methods of soil cultivation; use of conditioned seeds of high reproduction with the norm of sowing 22-25 million pcs / ha; integrated crop maintenance and mechanized harvesting and marketing of crops by streaming and transshipment without straw sorting manually; obtain high yields of fiber and seeds with minimal material costs.

According to the Institute of Agriculture of the Ukrainian Academy of Agrarian Sciences, for the production of 10 centners, fiber from 1 hectare of sown under flax needs to add 10-12 centners of mineral fertilizers.

When placing flax in crop rotation, it should be borne in mind that it does not withstand the frequent return to the previous place. It happens that the productivity and quality of the flax are sharply reduced, and sometimes it even dies due to significant accumulation of pathogens in the soil (fusariosis, anthracne and polysorbiosis). Among the effective means of avoiding this, it is first necessary to observe the alternation of fields in crop rotation with the return of flax to the previous field no earlier than 6-7 years.

Collection of flax is the most responsible and time-consuming process. When cultivated it accounts for more than 60% of material and labor costs. Reducing costs in this period is one of the factors reducing the cost of flax production.

However, the most effective for increasing yield is varietal replacement: the replacement of old varieties with new, better than economic and valuable indicators. As a result of sorting, the crop yield increases by 15-20%.

A key role in the development of domestic flax production is the creation of a balanced and efficient price system in the Ukrainian flax market. Different price tools and methods should be aimed at regulation, revival and progressive development of flax production. Pricing processes on the flax market are extremely complex and varied. On the one hand, price policy is an integral part of the state's economic policy, on the other hand, when determining the value of flax, it is necessary to take into account a number of aspects. In addition to production and market factors, the regulatory and financial-legislative mechanisms have a significant influence on the flax price formation, and all these processes together determine the complexity of the pricing processes in this market.

Increasing the efficiency of flax production and its products leads to the strengthening of economic ties between farms and factories, organizations of agro-industrial enterprises and associations, the final results of which depend on the effective activity of each participant of the cooperative.

The spontaneous formation of the flax market without sufficient and consistent state support leads to a number of unresolved issues, the most acute of which is the reduction of sown areas under flax and the reduction of the economic efficiency of its cultivation and primary processing. Lack of effective flax market infrastructure and reliable and long-term economic interconnections between different fields of production and processing of flax production, state support to the industry. Another important problem of the flax industry is its export orientation, resulting in almost 90% of the highest quality domestic flax fiber dispatched to the foreign textile industry. At the same time, the vast majority of finished flax products sold in Ukraine, imported from China, Russia, Belarus, Baltic countries, etc.

Ukraine has lost its raw material base for the textile and light industry, and economically, the independence in the production of consumer goods made of natural fibers. At the same time, it has certain potential opportunities and reserves for stabilizing the state and further development of flax growing, first of all, favorable soil and climatic conditions, availability, albeit outdated, of the material and technical basis of processing in the regions of the placement of this culture, traditions and skills of the rural population in production linseed

Effective use of existing reserves and optimal combination of state regulation and the functioning of the market mechanism of self-regulation will contribute to the revival of the industry of flax.

So, flax should be progressive: you need to be guided by the new requirements. In 2017/2018 marketing years, there was a record export of products from its processing from our country. Customs statistics show that in the period from September 2017 to January 2018, Ukraine exported 5 thousand tons of flaxseed cake (+ 70% compared to the average of the last three seasons). The main market is Italy (the share is 38%).

Consequently, the creation of associations, similar to Canadian, government programs aimed at flax promotion and producer support, systematic research and analytical work to improve the quality and market forecast combined with the abolition of export duty will create the prerequisites for the powerful entry into the international arena of such Ukrainian goods as seeds flax.

12.3. Economy of sugar beet production

Sugar beet is one of the main industrial crops. At yields of 400 c/ha provide yield of 50-55 c of sugar, 150-200 c of hogs, 260-280 c of crude pulp, 15-18 c of meat used for forage.

Sugar is a valuable food. The body, high in calories, easily absorbs it. The physiologically sound sugar limit for humans does not exceed 100 g per day. The nutritional value of sugar beets is much higher than fodder. 100 kg of root crops correspond to 26 feeds. units and contain 1.2 kg of digestible protein, and 100 kg of leaves - 20 feeds, respectively. units and 2.2 kg of protein. It is one of the most productive crops. Sugar beets are a valuable precursor for many crops and increase the overall productivity of field crops.

Sugar beets are derived from wild-growing forms taken from the Mediterranean coast. Sugar content was only 5-6%. By breeding, the sugar content is increased to 19-21%. German scientist Markgraf first obtained sugar from sugar beets in 1747.

The first sugar mill in Ukraine was built in 1824 in the Chernihiv province in the village. Makoshino, and in 1826 - in Kiev and a year later - in the Podolsk province (in Bershad). But the area of crops of sugar beet was still insignificant - only 1250 tenths. Only Count O. Bobrynsky, who built a powerful sugar mill in Smila in 1840, initiated the extensive development of sugar beet production in Ukraine.

At present, around 40% of sugar is produced from sugar beets and 60% from sugar cane.

Sugar beet is grown in many countries. The largest areas are in Ukraine, Russia, France, CILA, Portugal, Germany, Italy, Romania, Czech Republic, Slovakia, England, Belgium, Hungary, Turkey.

About 80% of all acreage and gross sugar beet harvest is in Europe. Beet crops in Ukraine in the 1980s amounted to 1.7 million hectares, in the mid-1990s they decreased to 1651.6 thousand hectares, and now they are much smaller - 313.6 thousand hectares.

Their main crops are located in the forest-steppe zone. In the Steppe, they cover about 25% of the acreage.

The experience of many farms in Ukraine shows that with constant increase of crop culture it is possible to get yields of sugar beet 350-450 c / ha steadily.

A fundamentally new technology has been developed, which envisages a significant increase in the yield of sugar per hectare with a high level of mechanization of production processes and a decrease in the number of crop treatments with pesticides. It was named Ukrainian intensive beet growing technology. For its development a complex of perspective wide-grip machines was developed, in particular, cultivator KRSh-8DA, seeder SST-24B, automatic beet thinner PSA-5,4. When grown using this technology, beet yields reach 450 - 550 c / ha.

Economic and social importance of sugar beet cultivation. Sugar beet is an important industrial crop (the largest areas are in the forest-steppe, in particular in Vinnytsia (57.6 thousand hectares in 2017), Khmelnytsky (35.9 thousand hectares), Poltava (35.5 thousand hectares), Ternopil (30.0 thousand hectares), Kharkiv (23.7 thousand hectares) and Kiev (21.5 thousand hectares) regions; there are also crops in the southern regions of Polesie and the northern regions of the Steppe. production (pulp, molasses) are used as feed in animal husbandry. Sugar beet is an intensive agricultural crop, that is, requiring nachnyh cost of material and labor resources. At the same time, sugar beet (under certain conditions) are highly profitable and promotes business economics.

Sugar beet is a highly profitable crop. In the Steppe (Dnipropetrovsk, Kirovohrad Oblasts, part of Poltava, northern part of Mykolayiv Oblasts), their yield is 380-497 c / ha, in the Forest-Steppe and Polissya - 500-731 c / ha.

With a yield of 450-500 kg / ha of root crops and corresponding minimization and combination of technological methods for one pass of the unit, labor costs per 1 kg of root crops are 0.14-0.16 people / hour. The cost of sugar beet is 2-3 times higher than the cost of cereals, profitability is 110-140%. The bioenergetic efficiency of crops compared to cereals at yields of 250-300 c / ha is also much lower, depending on the cost of total energy for fuel, pesticides, and harvesting.

However, when the yield is increased to 450-500 c / ha, it reaches the level of grain profitability. Applying (mostly or completely) a mechanical weed control, despite some fuel consumption increases, can save up to 9% on energy.

In Ukraine, traditionally, sugar beets were the most important technical crop, with profits accounting for the lion's share of the profits from all crop production. The level of development of sugar beet production largely determines the state of the economy of the agro-industrial complex and the activity of formation of the domestic sugar market.

Sugar beet is of great importance both for the economy of the whole economy of Ukraine and for the economy of every beet-growing economy.

First, the sugar beet root is a raw material for the production of food – sugar; secondly, from the sale of sugar raw materials, beet-cutting enterprises receive up to half of the cash income and up to one third of the total net crop income; third, sugar beets – a significant source of replenishment of feed resources in the form of a hog, as well as pulp, molasses and compound feeds, which receive farms for the sale of sugar beet (at a yield of 300-350 c/ha farms receive about 65 cc units from 1 ha, equivalent to a barley yield of more than 40 c/ha); fourth, sugar beets increase overall crop rotation productivity.

By the 1990s, Ukraine accounted for up to 15% of the world's sugar beet crops and up to 14% of their gross fees and 10% of sugar production. And now Ukraine is in the top five in the world for the production of sugar beet per capita.

In 2017, the total harvest of sugar beets for industrial processing amounted to 14.9 million tonnes, which is 6.4% more than in 2016, mainly due to the expansion of the harvested area (by 7.7%), although the yield decreased in 2017 compared to 2016 by 1.37%) (Table 12.7).

For the first time in the world a single-seeded form of sugar beet was bred in Ukraine, which marked a real revolution in beet-growing.

Table 12.7

Dynamics of sugar beet production in Ukraine (all farm categories)

Indicator	2005 y.	2010 y.	2015 y.	2016 y.	2017 y.	2017 y. to 2005 y, %
The area collected is thousands of hectares	623	492	237,0	291,1	313,6	50,3
Yield, kg / ha	248,2	279,5	435,8	481,5	474,9	by 1.9 times
Gross collection, million tons	15,5	13,7	10,3	14,0	14,9	96,1
Production of sugar beets per person, kg	328	300	241	328	350	107,0
Sugar production, million tons	2,1	1,8	1,5	2,0	2,0	95,2

Sugar beet yields the highest yield per hectare among all traditional Ukrainian crops. However, even the prospect of earning high profits does not tempt many agrarians to start sugar beet, as this crop is still one of the most difficult to grow and requires significant production costs.

Currently, the beet-growing industry in Ukraine is in crisis. The acreage was reduced more than twice, almost three times – sugar production, which led to the bankruptcy and closure of dozens of sugar factories and food processing enterprises. The main cause of the industry's depression is the lack of an effective program to regulate the sugar industry and a proper protectionist policy of the state that would protect the domestic producer from competitors.

Sugar beet production is concentrated mainly in agricultural enterprises.

In 2017, they accounted for 95.6% of total production. The cultivation of sugar beets in small disparate areas of the households reduces the efficiency of production of this crop. This is evidenced by the level of crop yield: in 2017, it was much lower in households (335.5 c/ha) than in agricultural enterprises (474.9 c/ha) (Table 12.8).

Table 12.8

Production of sugar beets by category of farms

Indicator	2005 y.	2010 y.	2013 y.	2015 y.	2016 y.	2017 y.
All categories of farms, thousand tons	15468	13749	10789	10331	14011	14882
Agricultural enterprises	12145	12663	9101	9554	13349	14227
including farms	1373	1155	611	619	973	1105
Households	3322	1086	1689	777	662	654
Specific weight agricultural enterprises,%	78,5	92,1	84,4	92,5	95,3	95,6
households	21,5	7,9	15,7	7,5	4,7	4,4

Concentration of sugar beet crops in more favorable areas requires the development of agro-industrial integration that would combine their production and processing. It is necessary to rationally organize the raw material zones of the sugar plants, when the optimal ratio between the production capacity of the plant and the capacity of the farms for the production of raw materials is achieved.

Economic efficiency of sugar beet production and directions of its increase. Sugar beet production is associated with high financial and labor costs. Thus, production costs per hectare of sowing of cereals and legumes in 2017 amounted to UAH 7832.6, and for 1 hectare of sugar beet sowing – UAH 29513.5.

The ratio of production costs to the results characterizes the level of economic efficiency of sugar beet production. The most important performance indicators and indicators of economic efficiency include yield, labor productivity, the cost of 1 c of roots, the level of profitability (table. 12.9).

The above data show that the highest level of profitability of sugar beet production by agricultural enterprises was achieved in 2015 – 28.2 %. In the conditions of unstable price of sale (in 2005 - 17.70 UAH. In 2016, the increase to

84.86 UAH. In 2017 – the decrease to 82.53 UAH per 1 ton of roots) profitability level in 2017 amounted to 12.4%.

Table 12.9

Economic efficiency of sugar beet production in agricultural enterprises

Indicator	2005 y.	2010 y.	2013 y.	2015 y.	2016 y.	2017 y.
Yield, kg / ha	248,2	279,5	398,9	435,8	481,5	474,9
The cost of 1c, UAH.	17,03	41,76	38,89	57,99	65,3	62,61
Sales price 1ts, UAH.	17,70	48,73	39,96	78,86	84,86	82,53
Profit per 1c of roots, UAH.	0,82	6,97	1,06	1,01	1,09	1,16
Profitability level,%	4,8	16,7	2,7	28,2	24,3	12,4

The main reasons for the low efficiency of beet growing are the significant rise in prices for material resources (fuel, fertilizers, seeds, poison chemicals) and the failure to adhere to the technology of growing sugar beets. In particular, the reduction of mineral and organic fertilizers, the poor state of technical support (wear and tear and lack of combines), which leads to significant losses in the collection and reduction of sugar yield.

Table 12.10

Sugar balance (including main sugar-containing products, in terms of sugar)

Indicator	2005 y.	2010 y.	2013 y.	2015 y.	2016 y.	2017 y.	2017 y. to 2005 y., %
Production of sugar, thousand tons	2139	1805	1263	1459	2021	2043	95,5
Change of stocks at the end of the year	247	32	-680	-463	27	72	29,1
Imports	177	90	11	4	5	7	4,0
Total resources	2069	1863	1954	1926	1999	1978	95,6
Export	154	65	163	153	505	617	by 4 times
Spent on feed and losses	120	94	105	105	74	71	59,2

Consumption Fund	1795	1704	1686	1528	1420	1290	71,9
per person, kg	38,1	37,1	37,1	35,7	33,3	30,4	79,8

The Law of Ukraine «On State Regulation of Sugar Production and Sales» regulates supply and demand for sugar and sugar beets, where one of the main principles of state regulation of the sugar market is the determination of quotas for the supply of sugar for their intended purpose. The dynamics of sugar consumption in Ukraine tends to decrease (Table 12.10)

Thus, the Fund of sugar consumption in Ukraine in 2017 compared to 2005 decreased by 28.1%, per 1 person by 20.2%. At the same time, there was a 4-fold increase in exports in 2017 compared to 2005.

The main drawbacks in the cultivation of sugar beet is:

rapid depletion of soils and a significant deterioration in their quality in short rotations;

high sensitivity to external factors: adverse climatic conditions, lack of moisture, pests, diseases;

high sensitivity to the shortcomings of technology and timing of work: for example, each additional day of delay in sowing from the optimal time reduces the yield of sugar beet by 0.2-0.5%. In some regions, this figure can reach up to 1.2-1.5%. That is, a week late with sowing-immediately lost up to 10% of the crop;

quite complex control of diseases that are especially "like" sugar beets. Moreover, in recent years, the fight against leaf diseases has become increasingly important;

high sensitivity to crop weeds: even minor weeds can lead to the loss of 20% of the crop, if there are more weeds in the field, then you can lose all 50%;

hypersensitivity to herbicides with active substances of the class of sulfonylureas and imidazolines. The after effect of such drugs on sugar beet manifests itself even in 1-2 years after their application and is detrimental to the culture;

"intolerance" in the crop rotation of potatoes: potatoes provoke the development of root rot even when grown in the field for 2-3 years before the sugar beet;

need for special "beet" technology and high-quality equipment. Outdated equipment and machinery is in this case not savings, but direct losses, since it is unlikely to be possible to get a profitable harvest.

Sugar beet is highly productive and highly profitable; it has great demand in the market and is a highly liquid product. From an agronomic point of view, it also has several significant advantages:

is an excellent precursor to most cultures. As a precursor can contribute to increasing the yield of the subsequent crop, for example, the yield of barley grown after sugar beet increases by about 30-40%;

compared with cereals and vegetables, it uses moisture 2-4 times more efficiently;

can give a high yield for the introduction of minimum standards of nitrogen fertilizers.

in addition, sugar beet absorbs carbon dioxide and releases oxygen 4-5 times more than 1 hectares of mixed forest. That is, this culture is quite important from an environmental point of view.

The decisive condition for increasing the volume of sugar beet and sugar and increasing the economic efficiency of the beet industry is a consistent intensification of the production process and on this basis, the growth of root yields and improving their quality.

The actual load of sugar plants with raw materials is influenced by annual fluctuations in sugar beet yields, redistribution of raw materials between sugar plants and reduction of acreage for crops in recent years. Therefore, the realization of potential opportunities for growth of yield and sugar content of roots will be real only if the components of intensive technology of their cultivation, timing and quality of work.

One of the main factors in increasing the yield of sugar beet is the system of providing fertilizers, which provides for the receipt of the main elements to the plants during the entire period of their cultivation. To obtain 350-450 C / hectares of root crops, it is necessary to make 300-500 kg of mineral fertilizers per 1 hectare of sowing. In addition, 30-40 tonnes/hectares of manure is applied under the predecessor or directly under the sugar beet.

In agriculture and farms it is necessary to take measures to restore soil fertility, to optimize the acreage of sugar beet in the main regions of beet sowing. To obtain the project level of productivity of root crops, yield programming based on the data of agroecological monitoring of soil quality in crop rotations should be widely implemented.

One of the important ways of increasing the yield of sugar beet is the development of breeding and seed production, in particular the breeding of varieties and hybrids, providing a high yield of sugar from 1 hectares of sowing, i.e., combine high root yield and sugar content in them.

It is necessary to completely switch to heterosis breeding with extensive use of biotechnology, to create highly productive sugar beet hybrids that would correspond to the best world analogues, focusing on increasing the sugar content of root crops and improving their technological qualities, increasing resistance to diseases and suitable for intensive technologies.

The system of measures to improve the economic efficiency of the sugar beet subcomplex should provide for the optimization of raw material zones of sugar plants in order to provide the plants with raw materials, reduce costs during transportation and storage and increase the yield of sugar during processing. To optimize the activity of the subcomplex it is necessary, on the one hand, to promote the concentration of sugar beet crops at a minimum distance from the plant, and on the other – sugar plants should be close to the producers of raw materials.

It is necessary to normalize and improve the relationship between the participants of the sugar beet subcomplex. Economic relations between sugar beet producers and processing enterprises should provide high motivation of agricultural producers to increase sugar beet production.

One of the effective ways to restore and develop sugar beet production can be to attract foreign investors, primarily through the creation of joint ventures. Thus there are conditions of application of effective technology or its separate effective elements (joint venture Agrofirm " Synivska" of the Rokitnyansky area of the Kiev region-the Ukrainian-German joint venture).

The revival of sugar beet production in Ukraine should include the development of an effective economic mechanism, the introduction of protectionism in the sale of sugar, its promotion to foreign markets. In 1999, the Law of Ukraine "on state regulation of production and sale of sugar" was adopted, which defines the legal, economic and organizational basis of state policy regarding the production, export, import, wholesale and retail trade in sugar. The minimum price for sugar beet roots is determined annually by the Cabinet of Ministers of Ukraine taking into account the sugar content and the price of sugar according to the relevant quotas for sale in the domestic and foreign markets.

In General, all agriculture as a whole is a high-risk production, so one problem crop hardened in the fight against the weather and nature of the agricultural producer does not scare. Experienced agronomists know that any risks of sugar beet cultivation can be minimized by properly planned technology:

optimal selection of seeds taking into account adaptation to the growing region and similarity.

crop rotation planning taking into account all the "whims" of culture.

if long crop rotations in the economy are not used as economically impractical, such methods of reducing the toxic load on the soil should be used: the introduction of organic matter, the use of micronutrients and biological products, in particular biofungicides and entomophages. Biological methods of protection, scientists say, not only increase yields, but also have a positive effect on the percentage of sugar beet.

sowing at the optimum time with a uniform placement of seeds and uniform distribution of it in the lines. It is also important to calculate the best density of standing plants.

reducing the risk of wind erosion, from which sugar beet crops are most affected at the initial stages of development (to the stage of closing the rows): agrotechnical measures to reduce polluted arable land, the presence of plant residues after harvesting the predecessor, moisture retention.

carrying out activities for accelerated decomposition of plant residues after precursors. The best precursors for sugar beets are winter wheat and rye, but straw left in the field can become a source of pathogens. Therefore, it is necessary to grind well (optimally-the length of the chopped straw should be 4-5 cm) and evenly distribute this straw over the field. It is also recommended to make 9-10 kg of nitrogen in the active substance per 1 tonne of straw to accelerate its decomposition.

the use of deep plowing as the primary cultivation of soil to move pathogens deeper into the arable layer, where they will pose a much smaller threat to the crop.

incrustation of seeds before sowing with fungicides and insecticides, as sugar beet seedlings are very sensitive to pests and microorganisms.

prevention of fungal and bacterial diseases. The greatest damage to beet crops is caused by root and CAG rot.

protection of culture from the main pests: wireworm, oatmeal, weevil, beet aphids. In addition to insecticidal protectants (experts recommend preparations with active substances of the pyrethroid class), insecticidal protection of crops with neonicotinoid-based agents should also be used.

timely and effective control of diseases and weeds. Here on means of protection it is impossible to save, after all economy on means of protection of plants can turn back loss of 40-50% of all crop. At least 8 weeks after sowing, sugar beet fields should remain clean of weeds.

optimal nutrition system with soil analysis and creation of individual fertilizer application scheme. In addition to macronutrients, beets also need trace elements. The most important among them for culture is boron, zinc, manganese, magnesium and molybdenum.

Growing sugar beets can be beneficial if you properly plan all operations and monitor their implementation.

So, the main problems of growing sugar beet are not in the culture itself, but in the neglect of crop rotations, the use of outdated equipment and the reluctant introduction of bioadaptive technologies.

With the introduction of resource-saving technology of growing sugar beets, you can not only get a lot of income, but also not to deplete the soil, and have excellent raw materials for the manufacture of feed and biofuels.

12.4. Economy of oilseeds production

Economic and social importance of growing oilseeds. The production of oilseeds for agricultural enterprises is one of the main sources of profitability, which allows them to ensure their effective operation. Oilseed production plays an important role in providing the population with valuable food, livestock feed and raw materials for industry.

In a market economy, oilseeds are a reliable source of cash. Their seeds and processing products are competitive and in demand both domestically and globally.

Oilseeds are grown in almost every country in the world, but each country has its own leading crop. In the US, soybeans are the crop, Canada is flaxseed, England and India are rapeseed, Asia and Africa are peanuts. Soybeans, peanuts, rapeseed, flaxseed, sunflower and sesame seeds occupy the largest acreage in the world. The world acreage of oilseeds, including soybeans, is over 100 million hectares, and the world production of oils is about 70 million tons.

Ukraine is the world leader in sunflower processing and oil production, and the domestic oil and fat industry demonstrates positive dynamics of production and development even in times of crisis. Therefore, the production and processing of oilseeds are strategically important for the development of the national economy of Ukraine.

Sunflower have a significant area under industrial crops (65.2% of all industrial crops in 2017). It is also the main oilseed crop of Ukraine. This group brings together crops whose seeds and fruits contain a lot of oil and are the main raw material for its production. That is, they are those crops in which seeds or fruits contain at least 15% oil. There are more than 340 such plants belonging to different botanical families.

A separate group consists of essential oil plants, in the seeds or vegetative organs of which volatile oils with a strong and pleasant smell accumulate. Among oilseeds, there are distinguished oilseeds that are grown solely for the production of oil, and crops of complex use, from which oil is obtained as a by-product. The first group includes sunflower, rapeseed, castor, mustard, red, etc.; to the second – flax, hemp. Oilseeds include soy.

Vegetable oils are of great nutritional and technical importance. They are used as a food product in kind, for making margarine, in the canning, food and confectionery industries. The value of edible vegetable oil is due to the content of biologically active fatty acids, which are not synthesized by the human body, but are absorbed only in the finished form. Vegetable oils of many oilseeds also include other valuable for the body biologically active substances - phosphatides, sterols, vitamins.

The oil is also used for the manufacture of oils, paints, stearin, linoleum, varnishes, in electrical, leather, metalworking, chemical, textile and other industries; essential oil - in the pharmaceutical, perfumery, confectionery industry.

By-products of oilseed crop processing are a valuable concentrated animal feed containing 35-40% protein. Protein crops contain arginine (twice as high as corn or wheat grain), histidine, lysine, and other essential amino acids.

A large number of oilseeds are grown as cultivated crops, so they have agro-technical value - they are good precursors for subsequent crop rotation, especially cereals.

The content of oil in seeds and its quality in different crops depend on the type, features of growth, fertilizers, water regime of soil, etc.

The key to increasing the oil content of the seeds is the introduction of high-oil varieties and hybrids and the use of a perfect seed system.

Due to the high level of agrotechnics and favorable water supply to the plants, the oil in the seed accumulates more intensively, the duration of this process is extended, which contributes to the increase of the oil content in the seed.

From agricultural measures, significantly influence the content and quality of oil in the seeds of fertilizers and their application rates, irrigation regime, sowing time, plant nutrition area, harvesting time. Positively affects the oilseed irrigation when applying phosphorus-potassium fertilizers. Oilseed grows even in early sowing periods. In sparse crops, the amount of oil in the seeds decreases.

Among the world producers, Ukraine ranks second to third in gross sunflower seed harvesting. In the last three years, 11.2-12.2 million tons of seeds have been produced in the country. The share of sunflower processing is about 98% of the oil. Sunflower protein is not only fodder, but also nutritional value and is used for food production. The content of a valuable amino acid - methionine, which is involved in fat metabolism, in sunflower is greater than in the fruits of peanuts, walnuts, hazelnuts.

Sunflower is a valuable honey plant. Among the field crops, sunflower is one of the most generous. From 1 hectare at seed yield of 25 c / ha it is possible to get 1200 kg of oil, 35-40 kg of honey and many others To produce 1 ton of sunflower oil requires 1 ha, and 1 ton of animal oil – 8-10 ha of arable land.

The favorable conditions for the cultivation of sunflower allow it actively grow in the black earth areas. Sunflowers are demanding for heat, light and soil. It is grown mainly in the steppe zone, partly in the forest-steppe. The largest areas of crops are concentrated in Dnipropetrovsk (625.1 thousand hectares in 2017), Zaporizhzhya (571.3 thousand hectares), Kirovograd (553.7 thousand hectares), Mykolaiv (532.6 thousand hectares) and Kharkiv areas (484.9 thousand hectares).

The total area of sunflower sowing in Ukraine has grown at a rather high rate in recent years (Table 12.11).

Table 12.11

Dynamics of sunflower seed production in Ukraine

Indicator	2005 y.	2010 y.	2013y.	2015y.	2016y.	2017y.	2017 y. to 2005 y., %
Area collected, thousand ha	3689,1	4525,8	5090,1	5166,2	6086,7	6060,7	by 1.64 times
Yield, c/ha	12,8	15,0	21,7	21,6	22,4	20,2	by 1.59 times
Gross production of seeds, thousand tons	4706,1	6771,5	11050,5	11181,1	13626,9	12235,5	by 2.6 times
Sunflower production per person, kg	100	148	243	261	319	288	by 3 times

An analysis of the dynamics of acreage, yield and gross production of sunflower seeds shows that the increase in production is due to the expansion of acreage of the crop. In the period from 2005 to 2017, the area of sowing increased 1.64 times and reached 6.06 million hectares. During the same period, the yield of sunflower seeds ranges from 12-22 c/ha. The gross production of sunflower seeds increased almost 3 times during this period due to the expansion of acreage.

Sunflower crops in Ukraine occupied 26.46% of the total crop area in 2017. Production of sunflower seeds (12.2 million tons) compared to 2016. Declined by 10.3% (1.4 million tonnes), mainly due to a decrease in its yield (by 9.82%) and, albeit a slight decrease in harvesting areas (by 0.43%).

Regarding the production of sunflower oil for the years 2005-2017, it increased by 4.36 times and amounted to 6277 thousand tons in 2017 year (table 12.12).

Table 12.12

Balance of oil (inc. the main oil-containing products counted as oil)

Indicator	2005 y.	2010 y.	2013 y.	2015 y.	2016 y.	2017 y.
Output vegetable oil, thousands tons	1437	3101	3712	4581	5409	6277
Change of stocks (at end of year)	114	-151	10	-71	2	8
Import	264	319	296	160	219	239
Total of resources	1587	3571	3998	4812	5626	6508
Export	900	2850	3353	4253	5104	5988
Loses and expenditures of non-food purposes	52	41	41	33	25	24
Fund of consumption	635	680	604	525	497	496
per capita, kg	13,5	14,8	13,3	12,3	11,7	11,7

Sunflower mainly grown in agricultural enterprises, but its production also remains stable in households (Table 12.13).

During 2005-2017 years agricultural enterprises produced 78.6-82.2% of sunflower seeds, while the population - 21.4 and 17.82% (respectively in 2005 and 2017 years), their share increased slightly, and amounted to over 10.6 million tonnes of seeds in 2017 year.

In 2017, agricultural enterprises collected 10.5 million tonnes of sunflower (86.6% of the total volume), which is 9.7% less than in 2016, with an average yield of 20.2 c/ha versus 22.4 c/ha in 2016 (yields in households of 15.2 c/ha in 2017 versus 17.2 c/ha in 2016)

Table 12.13

Production of sunflower seeds by category of farms

Indicator	2005 y.	2010 y.	2013 y.	2015 y.	2016 y.	2017 y.
All agricultural holdings, thousands tonnes	4706,1	6771,5	11050,5	11181,1	13626,9	12235,5
including: agricultural enterprises	3709,9	5585,6	9445,8	9549,2	11730,1	10596,7
share in total production, %	78,8	82,4	85,5	85,4	86,1	86,6
Households, thousands tonnes	996,2	1185,9	1604,7	1631,9	1896,8	1638,8
share in total production, %	21,2	17,6	14,5	14,6	13,9	13,4

Compared to 2016 year sunflower seed production increased in 8 regions, most significantly - in Volyn (more than 2.5 times), Ivano-Frankivsk (more than 1.4 times), Rivne (more than 1.8 times), Ternopil (more than 1.57 times), Khmelnitsky (more than 1.27 times), Zhytomyr, L'viv, Sumy (more than 1.1 times) regions.

Modern ecologically safe, resource- and energy-saving technology of sunflower cultivation provides comprehensive and current proper mechanized operations in a timely manner to create optimal conditions for the development and growth of plants during the growing season.

The best precursors for sunflower are those after which more water and nutrients left in the soil. In the Steppe, the most effective crop rotation units, where sunflower is sown after corn or winter wheat, in the forest-steppe - where there is more rainfall and crop rotation make enough fertilizers, high yields are obtained by placing sunflower not only after winter wheat, but also after barley. It is not advisable to sow sunflower after Sudanese grass, sugar beets, and in the Steppe also after barley and oats.

Sunflower are very demanding to the nutrient regime of soils compared to other field crops. He especially absorbs a lot of potassium from the soil. The sunflower is eco-friendly.

Soybean cultivation in Ukraine has only recently become a tradition. She has great food value. Soy protein and oil can be in over a thousand foods. Make sauces, milk, cheese, egg powder substitutes, confectionery, sausages, canned food and more with soybeans.

It holds the first place in the world production of vegetable oil, which is used for food purposes and for the production of industrial products: varnishes, paints, soaps, plastics, adhesives, artificial fibers. More than 60% of soybean grain is processed to 98% by the body. It contains a large amount of unsaturated fatty acids, which are not synthesized in the body, but must necessarily come with food. They reduce the cholesterol content in the blood, have a positive effect on the functioning of the brain, improve vision.

Soybean feed culture is used in feeding animals in the form of meal, soybean meal, dermis, milk, protein concentrates, green feed, hay, silage, straw.

Commercial soybeans must comply with the basic standards of technical requirements. The main criteria for determining soybean quality are protein and oil content. Thus, the mass fraction of protein in terms of dry matter should be at least 35%, in turn, the proportion of oil - more than 12%. Equally important are humidity and clogging. In particular, soybean seeds with moisture up to 12% consider dry, with humidity from 12,1 to 14% – average dryness, 14,1-16,05 – moist, and 16% or more – raw.

Soy contamination is affected by the presence of oil and debris impurities. Yes, the seed in which oil impurities do not exceed 6, and garbage – 2% is considered pure. Soybean seeds of medium purity - for oil impurity at the level of 6.1-10.0, garbage – 2.1-3.0%. Soybean seeds, in turn, are clogged for excess. Its infestation with soybean pests is unacceptable, except for tick infestation – not higher than 1st degree.

Soy is the one crop that successfully combines economic interest with agro-technology, as it is one of the best precursors for other crops, and thanks to its nitrogen-fixing properties, it provides soil enrichment with nitrogen.

The largest soybean acreage in 2017 among the regions in Poltava (221 thousand hectares), Khmelnitsky (190.4 thousand hectares), Kyiv (172.5 thousand hectares), Kirovograd (160.3 thousand hectares) and Sumy oblasts (152.3 thousand hectares). Together in these five regions, up to 45% of all acreage under this crop is concentrated (Fig. 12.4).

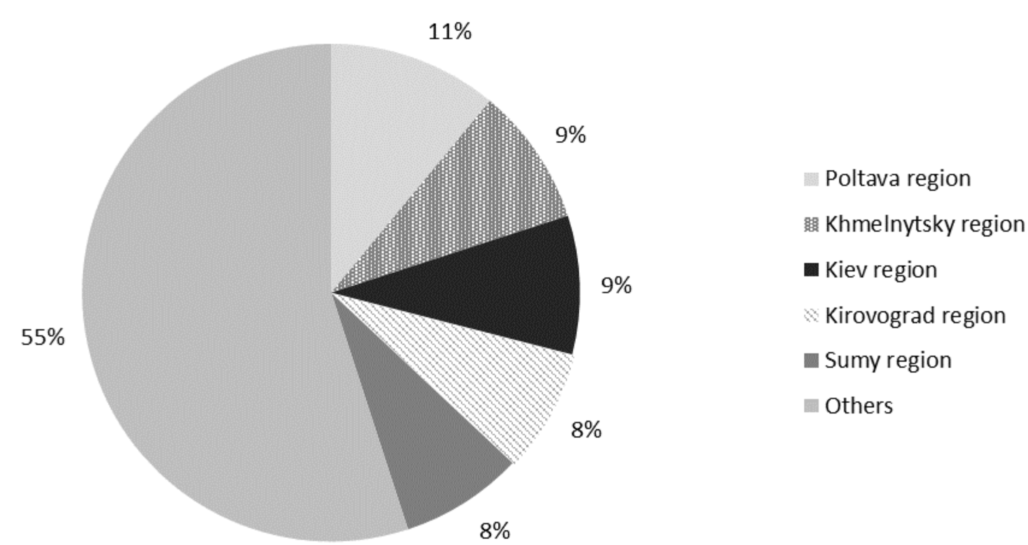


Fig. 12.4. Regions with the largest soybean acreage in Ukraine and their share in the overall structure in 2017 year

In fact, about 61% of all soybean acreage is concentrated in the forest-steppe zone, 23% – Polissya and 16% – steppe.

The main volumes of soybean production are concentrated in agricultural enterprises (Table 12.14).

Table 12.14

Soybean production by category of farms

Indicator	2005 y.	2010 y.	2013 y.	2015 y.	2016 y.	2017 y.
All agricultural holdings, thousands tonnes	612,6	1680,2	2740,7	3930,6	4277,0	3899,4
including: agricultural enterprises	571,5	1611,5	2572,6	3675,0	3999,5	3647,1
share in total production, %	93,3	95,9	93,9	93,5	93,5	93,5
Households, thousands tonnes	41,1	68,7	168,1	255,6	277,5	252,3
share in total production, %	6,7	4,1	6,1	6,593,5	6,5	6,5

Thus, according to the results of 2017, in agricultural enterprises, including farms, 93.5% of the total harvest was collected. The share of households in the total soybean production was up to 6.5%.

Significant growth of acreage and gross soybean yields testify to its extremely important role in the agrarian complex of Ukraine (Table 12.15).

Table 12.15

Dynamics of soybean production in Ukraine

Indicator	2005 y.	2010 y.	2013 y.	2015 y.	2016 y.	2017y.	2017 y. to 2005 y., %
Area collected, thousand ha	421,7	1036,6	1337,1	2135,6	1859,4	1981,9	by 4.7 times
Yield, c/ha	14,5	16,2	20,5	18,4	23,0	19,7	by 1.4

							times
Gross production of seeds, thousand tons	612,6	1680,2	2740,7	3930,6	4277,0	3899,4	by 6.4 times

Gross soybean harvest (3.9 million tonnes) increased 6.4 times in comparison with 2005, as a result of significant expansion of harvested areas (4.7 times). This situation is also explained by the fact that improved production technologies and increased productivity of soybeans (1.4 times). This, in turn, is caused by the appearance of new highly productive varieties of domestic and foreign breeding on the market.

However, in 2017, only 8,000 tonnes of soybean oil from 174,000 tonnes produced in Ukraine were sold on the domestic market. The prospect of growth of the soybean oil market in Ukraine is very low, as there is no proper culture of consumption of this product and it is not expected to grow in the short term in either food or industrial purposes. In Ukraine, under any circumstances, no more soy products will be consumed. These products are consumed only in Asian countries where livestock production is poorly developed, so locals need meat and milk substitutes as a source of protein. Ukraine has a well-developed meat and milk production, so Ukrainians are unlikely to need soy as a source of protein.

Although soybeans need a lot of attention, businesses do not plan to abandon their cultivation. Not only is it generally a profitable crop even under such conditions, soy is also a very good precursor since it accumulates nitrogen in the soil.

There is a tendency for foreign soybean varieties to prevail. First of all - Canadian and European. At the same time, soybean crops of Ukrainian breeding are quite common.

In total, there are currently up to 200 soybean varieties in the State Register of Plant Varieties Suitable for Distribution in Ukraine. However, varieties of domestic breeding are the most adapted to our growing conditions. Thanks to the creation and introduction of new high-yielding and drought-resistant varieties of Ukrainian breeding in recent years, it has been possible to increase the average yield of its cultivation and to ensure high economic efficiency, which in some periods did not yield to sunflower. In fact, the expansion of soybean acreage is a real alternative to the negative trends associated with the over-standard cultivation of sunflower.

Soybeans and their products are a source of significant foreign exchange exports for the country.

According to the analysis of customs statistics, in January-September 2017, about 1.678 million tons of soybeans, 131.5 thousand tons of soybean oil, 217.7 thousand tons of soybean meal and solid waste from soybean extraction were sent to the world markets of agricultural products and foodstuffs. oil worth almost 812 million USD. US, accounting for 6.2% of total agricultural exports.

At the same time, the share of direct soybeans in the export value of all products of the soybean industry reaches 78.3%, while the products of its processing account for only 21.7%.

Imports of these products are about $ 5 million, and mostly included soybean seeds for $ 4.4 million. This is evidenced, in particular, by the relatively high cost of importing soybeans, which is related to the fact that it is, as a rule, the seeds of highly productive varieties of its foreign breeding from leading world companies-producers. The weighted average import price of 1 ton of soy beans is $ 720.9 USA.

The average weighted price of 1 ton of total exports of soybean products is $ 400.6, including soybeans – $ 378.9, soybean oil - $ 751.0, canola and solid waste from soybean oil extraction – $ 355.5. The price of soybean processing products was more than twice as high.

Analysis of the geographical structure of soybean export-import and its processing products over the period indicated that about 27.9% of its volume was sent to Turkey, 17.9% to Iran and 14.8% to Egypt, while the rest fell to other countries world.

The main suppliers of soybeans to the domestic agrarian market, including mostly seeds, are traditionally Canada - almost 46% and EU countries, including France - 6.2%. The share of Belarus, which reaches 33.4%, is quite high.

Domestic soybean oil is in high demand in the foreign market, with about 39% of its value being exported to China over the specified period, almost 35% to Poland and 8% to India.

Important foreign markets for soybean meal and solid wastes from soybean oil extraction were countries such as Hungary, Belarus and Georgia.

Only in recent years the agro-economic resource of soybean cultivation in Ukraine began to be used to its full extent, but the current level of its yield does not correspond to the potential laid down in modern varieties of domestic breeding. In addition, it is not less than 3.5-4.0 t/ha. Only by reaching this figure, it is possible to double the country's export capacity and by raising the share of soybean oil processing for oil, not $ 800 million, but $ 2-3 billion. This is what should become a strategic target for the development of soybean production in Ukraine in the near future.

Rape is an important technical culture of agriculture, the value of which is determined by the great variety of its useful properties and the wide range of applications in many branches of the agro-industrial complex. The processing of seeds of this crop produces oil that can be used for consumption in kind or as raw material for the processing industry. Technical rapeseed oil is used in biodiesel production. The byproduct of processing - rapeseed meal (cake) - has very valuable fodder qualities. Therefore, the development of rapeseed farming is a strategically important area of the national economy both in terms of food security and in terms of addressing individual energy and environmental issues.

Rapeseed is an extremely valuable oilseed crop, an important source of vegetable oil. Winter rapeseed contains 45-50% oil, and spring - up to 35%, also 24-31% protein and 6-12% fiber. Rapeseed oil with a fatty acid composition and taste is quite similar to olive oil and is more beneficial to humans than sunflower and soy. The rapeseed oil of elite varieties includes a large amount of glycerides, which are unsaturated with fatty acids, which reduces the possibility of thrombosis and, accordingly, counteracts cardiovascular disease, lowers blood cholesterol, regulates blood pressure. Rapeseed oil also contains substances that are resistant to radiation. It belongs to the group of semi-dry vegetable oils and can be used for consumption in kind and for addition to culinary dishes. This oil is used in the manufacture of vegetables, fish, canned meat and marinades. Rapeseed oil is the best raw material in the production of margarines, sandwich oils, and various foods. Due to the aforementioned properties, rapeseed oil is popular with consumers and is the third largest in the world after olive and soybean. In terms of import-export, rapeseed oil is fourth after olive, soybean and sunflower.

Rapeseed is a water-loving culture. Optimal moisture content of rapeseed plants is 600-700 mm with annual rainfall, and at least 500-600 mm is satisfactory. With total rainfall less than 400 mm, as well as in dry years, rapeseed yields are significantly reduced. At least 20 mm of rainfall is required to obtain quality seedlings and intensive rapeseed development. The later the rapeseed goes down, the slower it develops.

Given its high protein content, winter and spring rapeseed is one of the main sources of protein supply for farm animals. There are 1.7… 2.1 feed units per 1 kg of rapeseed.

For the production of fodder and protein, rapeseed crops are used, which are used for green animal feed, in the preparation of silage, and in the manufacture of grass meal. The highest nutritional value of green rapeseed plants is in the budding period, when flowering plants. It is 0.08 feed units per kilogram of feed. One feed unit accounts for about 200 g of protein and about 240 g / kg for dry matter.

Rape is an effective precursor to growing cereals, namely winter wheat. This improves the phytosanitary condition of future crops of cereals, decreases contamination of these crops by rotting roots, various leaf spots and stems by 15-20%, as its root residues have a negative effect on pathogens found in the soil.

Increase in grain yield after winter rapeseed, as a precursor, is from 3 to 6 c / ha without additional costs for the purchase and application of fertilizers.

Rape is very important agronomically in the case of its cultivation on green fertilizer (siderata), which contributes to the increase of organic matter in the soil, which is equivalent to 10-15 t / ha of manure. Together with root and crop residues, when plowed it returns more than 15 kg of nitrogen to the soil; 70 kg of calcium; 15 kg of phosphorus and 12 kg of sulfur.

Significant benefits of rapeseed for beekeeping. During its flowering period 80-90 kg of honey per hectare is obtained.

Rape is not only a source of green forage and the restoration of soil fertility, but also a great raw material for biofuel production. It is much more environmentally friendly and more economical. The use of biofuels to some extent makes it possible to reduce the consumption of scarce natural oil reserves and to reduce CO_2 in the environment. With rapeseed yields of about 30 c / ha, production of about 1300 liters of biofuel can be ensured. In the European Union, 45% of rapeseed oil is now being converted to biodiesel.

In Ukraine, rapeseed as an industrial culture has been intensively introduced for the last 10-15 years. Despite the long agitation for this culture, rapeseed has not become widespread. The reason is that a number of issues remain unresolved. Rapeseed is a very fine-grained crop, so it requires special machinery or advanced traditional methods for sowing, harvesting and primary processing. The acquisition of such equipment or the conversion of existing equipment requires considerable time and labor costs, which are generally lacking in farms.

In the structure of arable land, winter rapeseed occupies about 0.2–0.3%, with an average yield of 10.7 c/ha. For comparison, in Germany rapeseed is 1.3 million hectares, almost 10% of arable land, and its average yield is about 30 c / ha. The producer receives more than € 230 per tonnes of rapeseed.

There are two alternative ways for Ukraine to use rapeseed: to set up its own biodiesel production or to grow rapeseed and export it to Western countries. Today, it is more profitable for farms to sell rapeseed on a foreign market than to produce biodiesel for their own use.

Today, Ukraine is capable of producing about 200,000 tonnes of rapeseed for industrial use. At the same time, there is every reason to hope that in the case of the introduction of new advanced technologies and technical means it will be possible to bring the gross harvest of rapeseed to 1.0-1.5 million tons, to process it at domestic plants, creating new jobs and increasing competitiveness. the ability of the Ukrainian manufacturer in the domestic and foreign markets. The backlog of agricultural enterprises is a major obstacle to increasing the production and development of the rapeseed market. Due to the breach of cultivation technology, including precision of sowing, insufficient application of fertilizers, failure to observe the sowing and harvesting time, farms lose almost 60% of the potential crop, which causes an increase in the cost of production of 1 ton of rapeseed. In addition, in most farms there is a low level of agrotechnical measures, which is why they have gross rape fees only due to the natural fertility of the soil.

In terms of production of oilseeds in Ukraine, rape is inferior to sunflower and soybeans. According to the State Statistics Committee of Ukraine, the harvested winter rape area increased 6.3 times from 2005 to 2017 and amounted to 739.5 thousand hectares in 2017 (Table 12.16).

Table 12.16

Dynamics of rapeseed production in Ukraine

Indicator	2005 y.	2010 y.	2013 y.	2015 y.	2016 y.	2017y.	2017 y. to 2005 y., %
Rape total							
Area collected, thousand ha	195,2	862,5	987,7	671,1	449,3	785,7	by 4 times
Yield, c/ha	14,6	17,0	23,6	25,9	25,7	27,9	by 1.9 times
Gross production of seeds, thousand tons	284,8	1469,7	2335,3	1737,6	1153,9	2194,8	by 7.7 times
Rape of which winter							
Area collected, thousand ha	116,5	760,9	942,3	651,2	410,2	739,5	by 6.3 times
Yield, c/ha	17,0	17,5	24,1	26,2	26,5	28,3	by 1.7

							times
Gross production of seeds, thousand tons	198,4	1331,2	2266,9	1705,9	1085,5	2093,7	by 11 times

The production of rapeseed increased by 1.9 times as compared to 2016, due to the expansion of the harvested areas (1.7 times), but at the same time its yield increased to 27.9 tonnes per 1 hectare (1.1 times more than in 2016).

Major rapeseed production is concentrated in agricultural enterprises. Thus, according to the results of 2017, almost 98.5% of the total crop was harvested in large and medium-sized farms. The share of households is 1.5%.

Thus, rapeseed is one of the leading oilseeds in Ukraine and in the world. Its seeds have a wide technical and food use, which is confirmed by stable demand. Therefore, in the domestic market it is formed by high purchase prices. At the same time, agrarians are constantly searching for the optimal ratio of production costs and product sales revenues.

Adherence to rapeseed farming causes additional costs. With intensive cultivation technology, the need for fuel and lubricants for winter rape per hectare will be 54.9 liters and 51.7 liters. Based on the estimated price of diesel fuel and lubricants of all kinds at the level of 29.7 UAH/l, their total cost will be 1.6 thousand UAH/ha during winter rape cultivation, and 1.5 UAH/ha in spring.

As the intensive cultivation technology of this crop requires the presence of powerful machinery, mostly foreign production, a significant share in the total costs will be due to depreciation, that is, a partial transfer of the value of fixed assets to finished products. For the same reason, the cost of repair work will increase

The correct location of rapeseed in crop rotation is of great importance for obtaining high and stable yields, as well as its economically profitable production. Therefore, both the precursor and the established pause during its cultivation, as well as the maximum permissible share of rapeseed in crop rotation, have a significant impact on the yield.

The alternation of this crop rotation culture is based on the need to constantly increase soil fertility, eliminate weeds, limit the harmful effects of potential, mainly specialized pests and diseases. Consistently high rapeseed yields are obtained subject to the introduction in rapeseed farms, where the proportion of rapeseed should occupy up to 20-25%, with maximum saturation of their crops.

Ukrainian processors have purchased only 0.1 million tonnes of the 2.2 million tonnes of rapeseed in 2017. Ukrainian rapeseed is only interested in biodiesel producers in the EU who have purchased most of the 2.1 million tonnes of rapeseed exported in 2017. At the same time, in 2017, 1.4 million tonnes of rapeseed biodiesel were produced in the EU, in Ukraine - only 8.4 thousand tonnes of bioethanol at Ukrspirt plants.

The requirement to add such a component to conventional fuel could be stimulated by the demand for biodiesel in Ukraine.

Thus, the economic feasibility of rapeseed cultivation is beyond doubt. According to the analysis of world and European prices, its cultivation provides high profitability. The selling price of rapeseed is 1.8-2.4 times higher than the price of cereals. High cost can be obtained by processing rapeseed for biofuels. In addition, when processing, we get meal - a valuable feed additive to animal feed. In addition to the economic cost, rape has a positive effect on the environmental status of the environment.

Ukraine ranks fourth in the world in terms of production of mustard oil. The largest seeds of this crop are harvested annually in Canada (200,000 tonnes), Nepal (150,000 tonnes), Russia (90,000 tonnes), Ukraine (40,000 tonnes) and Myanmar (40,000 tonnes). The sixth and seventh steps are shared by the Czech Republic and China, with an annual production of about 20,000 tons of mustard seeds.

The largest mustard markets for Ukraine are Germany (11.4 thousand tonnes in 2016), Poland (4.3 thousand tonnes), the Netherlands (3.3 thousand tonnes), and the United Kingdom (2.6 thousand tonnes).

To consider the mustard culture in Ukraine solely as raw material for the production of fatty oil would not be entirely true, because in the question of processing the culture is somewhat unique - today there are technologies of almost 100% use not only of seeds, products of its primary processing, but also non-grain part. harvest.

Mustard powder is a major component of table mustard and mayonnaise, various sauces and seasonings, marinades and preserves. Natural antiseptic properties, due to the specific chemical composition and the presence of essential oils, allow manufacturers to refuse additional introduction to the formulation of artificial preservatives, which simultaneously reduces the cost of production and entice the consumer.

Ukrainian mustard has a more attractive spicy taste due to the minimal use of plant protection products in the cultivation process. In our country, mustard growing ranks fifth in oil production, behind sunflower, soybean, rapeseed and flax.

In Ukraine, mainly two types of mustard are grown – Sarepta (Siza) and White. In recent years, owing to the extremely high demand in the foreign market, black (French) mustard has begun to appear in the acreage structure. Thus, in 2017, the harvested mustard area was 39.5 thousand hectares, and the gross harvest was 310 thousand cents at a yield of 7.9 c / ha. Compared to 2016, there is a decrease of 8.8% in the area collected.

Mustard is grown mainly in agricultural enterprises (89.4% share). However, in households we have 10.6% of the total mustard area collected in 2017. Despite the high margin of this oil crop exceeding 100%, in Ukrainian farms mustard is considered as a reserve crop. Agrarians try to minimize the costs of fertilizers and remedies, so the yield of this crop does not show high results.

The largest areas of mustard sowing are in Kherson (11.1 thousand hectares) and Mykolaiv (11.1 thousand hectares) regions. In 2017, the volume of mustard seed processing in Ukraine was the highest in the last 6 years.

The best precursors for mustard are pure steam, spiked cereals, row crops and legumes. Mustard crops are not placed after other cruciferous crops, flaxseed, beets, which have the same pests and diseases, as well as after sunflower, millet. It can only be returned to its previous place of cultivation for 4-5 years.

Mustard is a good precursor for cereals because the biologically active substances it releases inhibit root rot and soil pest propagation.

With proper and timely sowing mustard gives a sharp start in the development, able to accumulate 200-300 c green mass. Promotes the mobilization of nutrients, has a unique ability to absorb inaccessible forms and translate them into easily digestible. Among our farms, mostly small-scale farmers with 300-500 land, up to a maximum of one thousand hectares, are harvested for this crop, allocating small areas (from 10 to 50 ha) under mustard.

There are differences of mustard grown in different regions of Ukraine. The grain obtained in the Kherson and Mykolaiv regions is more pure, homogeneous. Mustard from the western regions is heterogeneous, but differs in specific taste parameters. The dosage of mustard cultivation is explained by an almost unpredictable market, surges in demand. Prices react very sharply to overproduction. Ukrainian mustard also has to overcome the traditional international market.

Adhering to the technology recommended by scientists for the cultivation of mustard and using certified seeds, you can get maximum yield of high quality.

The increase in acreage under such a promising crop as mustard is driven by low costs, high reproduction rates, which allows farms to earn significant profits at the expense of profitability.

A valuable poppy culture is poppy. Two types of poppy seeds are common in production: oil and opium, or medicinal.

In Asia, particularly in India, China, Turkey and Iran, poppies are grown mainly as an intoxicating crop. Opium poppy is also grown in Kyrgyzstan. In Europe, poppies are mostly grown as an oilseed crop. In large areas, poppies are sown in Poland, the Czech Republic, Slovakia and Hungary.

In Ukraine, poppy occupies a small area in the forest-steppe and steppe zones (2.2 thousand hectares in 2017 with a yield of 5.7 c/ha). High enough prices for poppy products make it highly profitable. The minimum need for poppy seeds in Ukraine is 3-4 thousand tons. In order to fully meet this demand with production of own production, it is necessary to sow poppy on the area of 10 thousand hectares.

The poppy seed is valuable for its seeds, which contain 50% or more of high-quality dry edible oil and up to 25% of protein. Cold pressed oil will not be bitter for a long time. It is used as a food product, as well as in the confectionery, canning and baking industries. Hot pressing oil is used for the production of oil, paint and soap. Oilcake is a valuable animal feed and contains up to 30% protein and 10% fat.

Just as poppy seeds are considered a technical crop in Ukraine, the import duty on them is cheap. That is why they bring to our country a poppy in which the content of heavy metals - zinc, magnesium, potassium, lead - is exceeded four times, which is confirmed by laboratory studies.

In almost every area, you can sow poppies, following the technology of its cultivation. Although the most optimal conditions for this are in Chernihiv, Cherkasy, Kyiv, Vinnytsia and Khmelnitsky regions, where there is good black soil. However, in order to grow poppy seeds in our country, businesses need to be licensed and receive a quota determined by the Cabinet of Ministers of Ukraine.

Thus, there is considerable demand for poppies in the domestic and foreign markets, and its cultivation is a highly profitable type of agricultural business. Poppy seed production is also one of the most effective areas for diversification of agricultural production in Ukraine. Poppy is a good precursor for many agricultural crops. Therefore, many agribusinesses have tried to start growing poppy seeds on their farms to balance profitability as a whole. However, there are some difficulties and problems related to the lack of scientific support, developed markets, modern agricultural technologies. Many growers are forced to cease production, and poppies have been imported from abroad.

Economic efficiency of production of industrial oilseeds and directions of its increase. Sunflower cultivation has always been a traditional sector of agricultural production and an important part of the country's economic development strategy. One of the directions of increasing the efficiency of sunflower production is the integration of the Ukrainian economy into the world economic space, which requires domestic companies to produce competitive highly liquid products, sell and buy goods at world prices.

The main direction of increasing the gross collection of sunflower is the introduction of intensive technology of its production by increasing the yield to the level of the leading European countries (2.5-3.0 t / ha). With the production of high-performance hybrids, it is possible to achieve an increase in the yield and content of oil, and, consequently, an increase in the share of this oil crop in world production.

Effective development of oil and fat subcomplex of Ukraine and increase of its competitiveness is possible provided that higher quality of sunflower, increase of its yield, decrease of costs for cultivation and processing by increasing the efficiency of production and attracting skilled personnel, as well as bringing the products to the requirements of international standards (ISO) and expansion sales channels.

In recent years, the interconnection of the Ukrainian and world markets for oilseeds and their products has become ever closer, which is connected with the deepening of the processes of international division of labor and Ukraine's entry into the number of world leaders in the production of sunflower seeds, sunflower oil and meal. Therefore, improving the efficiency of Ukraine's foreign economic activity in oil and fat products and ensuring its competitiveness in the internal and external markets in the context of integration processes is of utmost importance. The economic conditions in the field of production and processing of sunflower remain imperfect. Effective integrated system of interaction in the internal and external markets between agricultural producers and processing enterprises is needed.

To increase the efficiency of sunflower cultivation, it is necessary to take into account the following factors for producers:

• improving the regional distribution of crops of this crop, based on its botanical and biological features, cultivation technologies, selection of varieties, the use of appropriate protection means, etc.;

• steady adherence to the requirements of alternation of sunflower crops in crop rotation fields;

• the use of intensive cultivation and harvesting technologies to reduce the cost per unit of production, the introduction of high-yielding hybrids with high oil content;

• attracting the necessary funds and material resources (machinery, fertilizers, seeds) for the development of the industry by finding potential investors and creditors; • Integration into agro-industrial and cooperative formations in order to solve the problems of production and rational use of the crop.

Without the use of modern technologies of cultivation and processing of sunflower, scientific substantiation of directions of increasing the efficiency of its production, the mechanism of regulation of relationships in the regional subcomplex cannot be counted on obtaining high yields.

The main indicators that characterize the level of economic efficiency of production of oilseeds are: yield, cost per 1 cc, selling price, the mass of profit per 1 cc and per 1 ha of sowing, the level of profitability.

Note that sunflower seeds are a reasonably profitable crop (Table 12.17).

Table 12.17

Economic efficiency of sunflower seeds production in agricultural enterprises

Indicator	2005 y.	2010 y.	2013 y.	2015 y.	2016 y.	2017 y.
Yield, kg / ha	12,8	15,0	21,9	23,0	23,5	21,3
The cost of 1c, UAH.	78,6	183,9	232,1	362,1	451,2	411,1
Sales price 1ts, UAH.	97,7	302,8	298,2	763,1	964,6	870,9
Profitability level,%	24,3	64,7	28,5	80,5	63,0	41,3

Thus, in 2017 the level of profitability was 41.3%, which is 21.7 points less than in 2016. This was influenced, first of all, by extreme weather conditions throughout the growing season.

In general, the profitability of sunflower seed production is much lower than the profitability of traders and processing companies due to the long-term investment flow.

Because of the changing climate and the constant deterioration of the weather, growing sunflower is becoming increasingly difficult, farmers prefer high-quality seed from leading breeding companies that take into account all the current challenges of crop production, including climate, in breeding their hybrids. The most common hybrids are breeding Limagrain, DuPont Pioneer, Syngenta and others.

Costs for growing sunflower can range from 3-11 thousand UAH / ha. Therefore, much depends on the climatic conditions of the region and other regional features.

Soybeans' interest in soybeans is explained by its high profitability. The total cost per hectare of intensive medium-grown soybean technology will be UAH 13.6 thousand. Taking into account the yield at the level of 25 c / ha, the cost of 1 ton of production will be equal to UAH 5.5 thousand. For the price of selling products at the level of 9 thousand UAH / t, the income from one hectare will be from 22.5 thousand UAH and above, which will provide a profitability at the level of 65%. This, in turn, will allow you to return the money spent on growing soybeans and additionally receive 0.65 UAH for each hryvnia invested in the production of this crop.

The profitability level of soybeans in 2017 was 28.8% with a yield of 20 c / ha, which is 23 points less than in 2016 (51.8%). This decrease was mainly due to a decrease in yields of 14.5% and an increase in the cost of production by 2.6% (UAH 521.5 / c in 2017).

In the Forest-Steppe and Steppe of Ukraine, soybeans can provide a second crop in post-harvest crops after winter rape, winter barley, winter wheat, significantly improve the economy of farms after the spring-summer drought. By adhering to the growing technology, it is able to provide a second crop of 18-25 c / ha and more this year. Post-harvest crops can take up 500 thousand hectares in Ukraine.

Researchers note that the economic essence of high demand for soybeans is that during the processing of one ton of soybeans, 700 kg of soybean meal (containing 44-48% protein) and 190 kg of soybean oil are produced. Due to the sale of soybean oil, practically all the costs of cultivating crops are recouped, and soybean meal is the cheapest protein feed ingredient used in all developed countries to prevent protein deficiency in the feeding of dairy and beef, pigs, poultry, poultry.

The processing of dried soy beans into milk and tofu almost doubles the cost of the final product. Yes, one ton of dried soybeans gives 10-11 tonnes of milk and about 1.3-1.4 tonnes of tofu.

The price of soybeans has seasonal fluctuations and depends on supply and demand in the world. In Ukraine, the price of soy depends on world quotations, as 50-60% goes for export. In addition, prices for soybean (FOB, Ukraine – $ 379/t) are higher than corn for grain (FOB, Ukraine – $ 174/t), fodder wheat (FOB, Ukraine – $ 210/t), barley (FOB, Ukraine – $ 210/t).

Of particular importance for increasing the productivity of oilseeds is the system of soil cultivation and care of crops, fertilizers and plant protection. Oilseeds require a considerable amount of nutrients. Therefore, it is necessary to make large doses of both mineral and organic fertilizers.

Increasing the yield of oil per 1 ha of sowing is facilitated by the use of varieties with a high oil content in the seed. For example, thanks to the high-yielding hybrids that are sown - "Balkan", "Titanic", "Khortytsa", "Gene" (seeds of agro-firm "Gardens of Ukraine"), the farm "Progress" of the Baltic region of Odesa region has a stable 37-40c/ha sunflower seeds at an average in the region 12-15ts / ha.

The concept of development of the oil subcomplex of Ukraine envisages concentration of crops of oil crops in the areas with the most favorable conditions for their cultivation. The implementation of this program requires strengthening of the material and technical base of all its spheres: production, procurement and processing. Not only the production system, but also the harvesting and processing of oilseeds should be improved.

Economic regulation of the structure of the market for oilseeds and oilseeds should be conducted by the state through the introduction of targeted commodity programs, sales organization, investment policy and taxes.

QUESTIONS FOR SELF-CONTROL

1. What economic importance are the main technical cultures?
2. What indicators characterize the development of production of industrial crops?
3. What are the changes in the development of production of industrial crops?
4. What factors led to the rapid development of sunflower seed production?
5. What factors caused the crisis of the production of flax-liqueur?
6. What indicators characterize the economic efficiency of industrial crops production?
7. What is the level of economic efficiency of production of industrial crops?
8. What is the level of production intensity of the main industrial crops?
9. What are the tasks of increasing the yield and improving the quality of industrial crops?
10. What are the ways of increasing the efficiency of production of basic industrial crops?

TEST TASKS

1. The economic importance of sugar beet production for an agricultural enterprise:

1) raw materials for sugar production;

2) source of cash receipts;
3) source of foreign exchange earnings from sugar exports;
4) raw materials for biomethanol production.

2. Indicators of development of sugar beet production:
1) labor costs per 1 ha of sowing;
2) area of sowing;
3) profit per 1ha of sowing;
4) level of profitability.

3. Indicators of economic efficiency of sugar beet production:
1) labor costs per 1ha of sowing;
2) labor costs per 1c of roots;
3) costs per 1ha of sowing;
4) the cost of 1 ton of roots;
5) profit per 1 c of roots.

4. Factors that directly affect the profitability of sugar beet production:
1) implemented sugar beets;
2) level of marketability;
3) the cost of 1c roots;
4) the cost of 1 ha of sowing.

5. Indicators of development of flax growing:
1) yield of flax;
2) costs per 1 ha of sowing;
3) labor costs per 1 ha of sowing;
4) level of profitability.

6. Indicators of economic efficiency of flax products:
1) flax shakes were implemented;
2) flax seeds sold;
3) profit per 1 ha of sowing;
4) sales revenue.
5) the level of profitability of flax growing

7. What factors affect the cost of flax straw?
1) level of marketability;
2) gross collection of flax straw;
3) yield of straw per 1 ha of sowing;
4) the price of selling 1 c of flax straw.

8. Indicators of economic efficiency of sunflower seeds production:
1) sales revenue;
2) the cost of 1 ha of sowing;
3) marketing costs;
4) the price of selling 1c of sunflower seeds.

9. What factors directly affect the profitability of sunflower production?
1) yield of sunflower seeds;
2) gross collection of sunflower seeds;
3) the cost of 1 ha of sowing;
4) the cost of 1c of sunflower seeds.

10. Indicators of comparative economic efficiency of oilseeds production:
1) profit per 1c of industrial crops production;
2) profit per 1ha of sowing of separate industrial crops;
3) the cost of 1c of industrial crops;
4) the price of selling 1c of industrial crops.

THEME 13. ECONOMICS OF POTATO AND VEGETABLES PRODUCTION

13.1. Economics of potato production

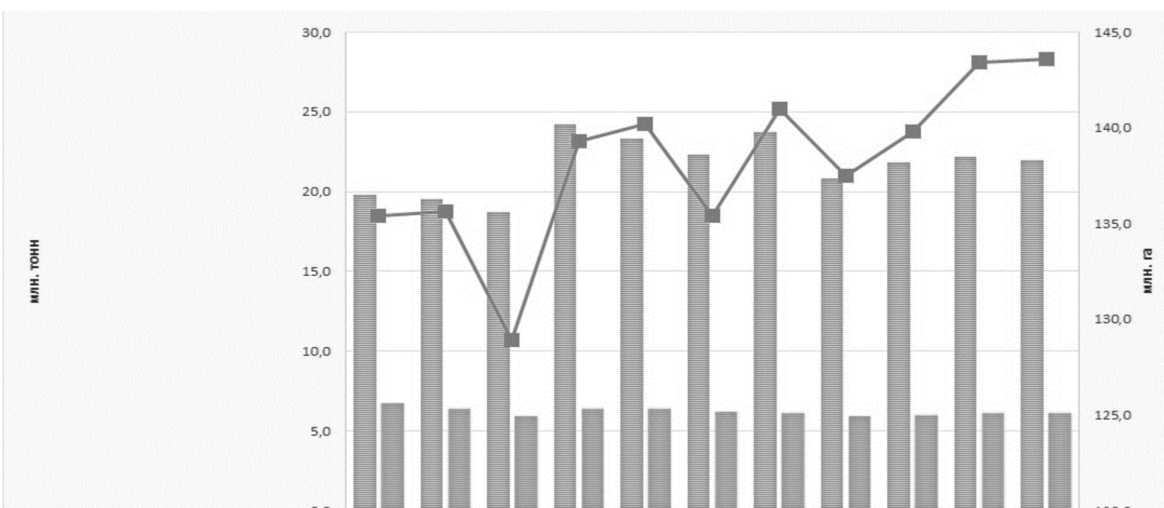
13.2. Economics of vegetable production

13.1. Economics of potato production

Potato growing is a branch of agricultural production, which is of great economic, economic and social importance. Potatoes are one of the most valuable and strategically important agricultural products in Ukraine after grain crops. It ensures the food security of the state and is the second "bread" for the entire population, regardless of their income level and consumer preferences.

Potatoes is an universal culture. It is a product that people use for food, as well as raw materials for the processing industry, high-quality feed for livestock and a source of cash for agricultural enterprises and households. In terms of consumption and geographical prevalence, potatoes occupy one of the leading places in the structure of food products in Ukraine.

70% of the areas are allocated under it on personal gardens of Ukrainians. Potato tubers contain a lot of carbohydrates, protein, vitamins and other nutrients necessary for human nutrition. Potato tubers, depending on the place of cultivation and variety, contain 11-25% starch, about 2-protein, 0.3% - fat. Potato protein is the most complete of all plant proteins. It is rich in amino acids and belongs to the full. From mineral substances potatoes the most rich on potassium (568 mg on 100 g crude masses) and phosphorus (50 mg). It contains salts of calcium, magnesium, iron, vitamins C and group B. The tubers contain up to 3 mg of solanine, so they are used raw - this can cause poisoning. In the light, the content of corned Beef increases to 20-40 mg, so you can not use green tubers in food. It is known that more than 500 delicious dishes can be prepared from potatoes. It is used in boiled, fried, stewed, baked form, as well as frozen and used in the processing industry. Due to the high content of potassium, potatoes contribute to the excretion of water and sodium chloride from the human body, thereby improving metabolism [1].



	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018 (оцінка ЕДК)
Валовий збір, млн. тонн (ліва вісь)	19,8	19,5	18,7	24,2	23,3	22,3	23,7	20,8	21,8	22,2	22,0
Фонд споживання, млн. тонн	6,7	6,4	5,9	6,4	6,4	6,2	6,1	5,9	6,0	6,1	6,1
Споживання на особу, кг/рік (ліва вісь)	135,4	135,6	128,9	139,3	140,2	135,4	141,0	137,5	139,8	143,4	143,6

Figure 13.1. Main indicators of the balance of the potatoes in Ukraine

Consumption of potatoes has traditionally remained fairly stable, since this food product is the most affordable for people with different income levels. Therefore, in 2017, compared to 2000, the increase in the level of potato consumption in Ukraine amounted to only 5.9%. In fact, the food consumption of potatoes in our country was 143.4 kg per capita in 2017 (Fig.13.1). The maximum increase over the past three years was observed in Lugansk (+14.6%), Kiev (+12.4%) and Khmelnytsky regions (+12.1%), and decreased consumption of tubers in Kherson (-5.2%), Transcarpathian (-2.5%), Odessa (-1.7%) and Donetsk (-1.4%) regions.

According to the norms of consumption per person per year, it is necessary to consume 110-120 kg of potatoes, depending on the zone. Over the past three years, the average consumption of potatoes per person is 140.2 kg per year. At the same time, based on the data of the State statistics service for 2017, it is the highest in Ivano-Frankivsk (190.8 kg), Zhytomyr (189.2 kg), Vinnytsia (186.9 kg), Volyn and Lviv (183.9 kg) regions. The lowest level of potato consumption in Donetsk (101.4 kg), Odessa (107.1 kg), and Zaporozhye (107.6 kg) regions.

Potatoes is valuable technical culture and raw materials for the manufacture of starch and alcohol. When processing 1 ton of potatoes with a starch content of 17.6%, 112 liters of alcohol, 55 kg of liquid carbon dioxide, 0.39 liters of fusel oil and 1500 liters of Barda can be obtained. Potato processing products are used in various industries and most of all in food, chemical, textile, leather and paint.

Potatoes are widely used for feeding almost all types of livestock and poultry in combination with other feeds. When growing potatoes for food, the yield of feed units from 1 ha can exceed 5.5-6 thousand. with a yield of 200 C / ha, 58 C of feed is obtained. from. Due to the yield of feed units from 1 ha, potatoes are superior to many other crops.

In the system of rational farming potatoes are of great importance. It is a good precursor for many crops, especially cereals. The increase in the yield of cereals that are sown after potatoes is 2-3 C / ha, which is the result of the aftereffect of organic and mineral fertilizers introduced under potatoes. In the structure of cultivated areas of households, it occupies a high proportion.

It should be borne in mind that potatoes have a high planting rate (30 kg or more per 1 hectare), and therefore, when calculating the economic efficiency of cultivation, this must be taken into account. Potatoes are high-tonnage and low-transportable culture, which should be taken into account when placing its crops. Storage of potatoes requires significant costs, accompanied by large losses, which negatively affects the level of cost and production efficiency.

In terms of gross production, Ukraine is consistently among the five countries-the world's largest producers of potatoes. And in recent years, potato exports have also been growing. In addition, the production of Bulba is one of the most promising areas of economic activity for small and medium-sized agribusiness, because it guarantees a high income from 1 hectare of land due to a fairly stable solvent domestic demand for products.

Table 13.1

The balance of potatoes, thousand tons

Indicator	2005	2010	2015	2016	2017
Production	19462	18705	20839	21751	22208
Changes in inventories at the end of year	-100	-410	-937	374	376
Import	5	30	17	27	24
Total resources	19567	19145	21793	21404	21856
Export	6	8	15	5	18
Spent on food	5985	5606	6538	6769	6821
Spent on landing	5128	4897	5416	5490	5565
Losses and processing for non-food purposes	2062	2720	3799	3174	3361
Consumption fund	6386	5914	5892	5966	6091

per 1 person, kg	135,6	128,9	137,5	139,8	143,4

The demand for potatoes is determined by the amount spent on food, processing, feed and seeds (table 13.1). In total production in 2017, the largest share is potatoes, spent on feed-30.7% and goes to the consumption of more than 27%, seeds is 25%, and losses and processing for non-food purposes is 15.1%.

In 2017, the potato market has a tendency to restore the growth rate of the domestic potato consumption fund, to decrease in imports and a significant increase in its exports. Since 2005, the volume of potato exports has increased in 3 times. Most of the exports are seeds. Elite varietal (seed) potatoes give reproduction from 1:10 to 1:15, and its price is several times higher than the price of conventional commodity. Exports of domestic seed potatoes were mainly to Azerbaijan and in small amounts to the Netherlands, while imports came from Belarus, great Britain, Germany, the Netherlands and France.

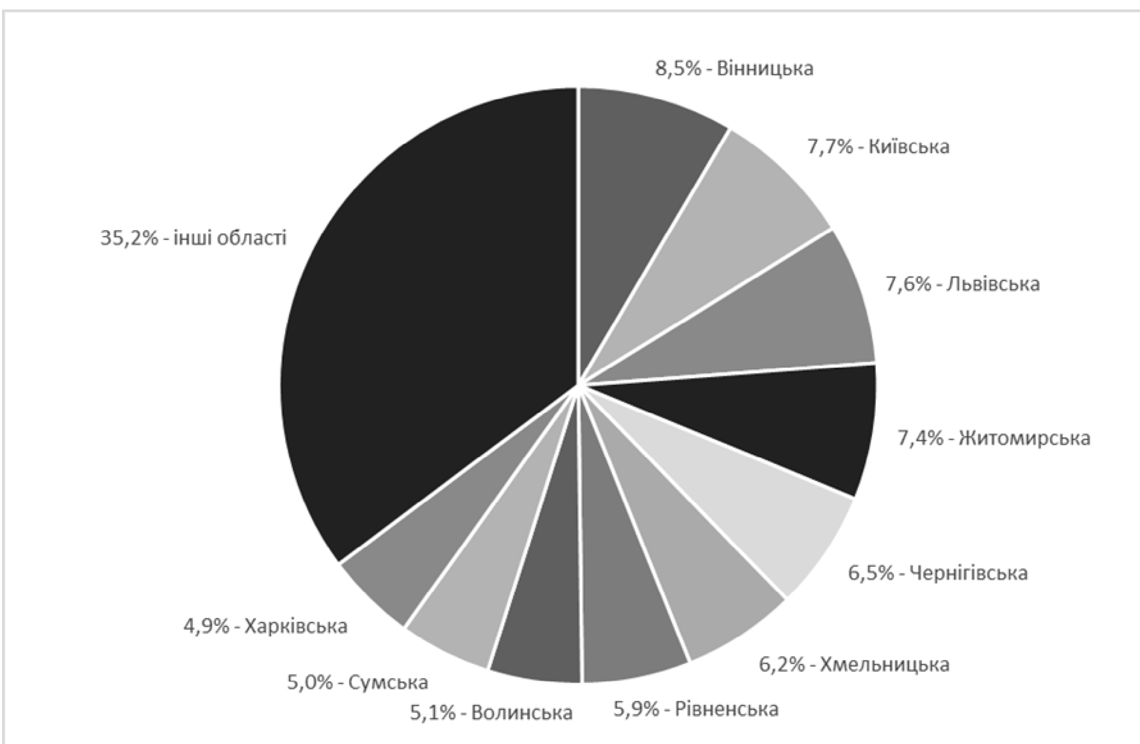


Fig. 13.2. Share of regions in total potato production in Ukraine in 2017, %

In recent years, there has been an increase in the volume of processing for non-food purposes. In particular, if in 2000 the volume under the article "Losses and processing for non-food purposes" reached 220 thousand tons, in 2017 this figure is 3361 thousand tons.

Table 13.2

The dynamics of potatoes production development in Ukraine

Indicators	2005	2010	2015	2016	2017
All categories of farms					
Collected area, thousand hectares	1516	1412	1291	1312	1323
Yield, C / ha	128	133	161	166	168
Gross harvest, mln t	19,5	18,7	20,8	21,8	22,2
Agricultural enterprise					
Collected area, thousand hectares	16	28	23	22	18
Yield, C / ha	148	171	199	212	238
Gross harvest, mln t	0,2	0,5	0,4	0,5	0,4
including farms					
Collected area, thousand hectares	5,6	10,1	7,7	6,4	5,8
Yield, C / ha	151	160	163	183	189
Gross harvest, mln t	0,08	0,1	0,1	0,1	0,1
Households					
Collected area, thousand hectares	1500	1384	1268	1290	1305
Yield, C / ha	128	132	161	165	167
Gross harvest, mln t	19,3	18,2	20,4	21,3	21,8
Share in the gross collection, %	98,8	97,4	98,1	97,7	98,2

Potatoes are one of the crops, the area of crops of which practically did not decrease during the economic crisis in Ukraine. Potato cultivation is carried out in all regions of the country. However, there have been significant changes in its placement. As a culture of Polesie, it spread to the South-East and South of Ukraine. If in 2000 the largest share of its production was concentrated in Chernihiv, Volyn and Zhytomyr regions, in 2017 it is Vinnytsia, Kiev and Lviv regions (Fig. 13.2).

In recent years, potato acreage has decreased slightly and in 2017 amounted to 1323 thousand hectares – this is 12.7% less than in 2005 (table 13.2). Among the main factors of reduction of cultivated areas under potatoes it is worth noting the low purchase prices on the market, because this product is socially significant, which along with a significant excess of supply over demand causes the formation of the existing economic situation of the industry. However, due to the increase in yield in 40C/ha, gross potato harvest increased by 13.8% and in 2017 amounted to 22.2 million tons.Урожайність картоплі коливається по областях. При середній врожайності по Україні в 2017 році 167,8 ц/га, в Чернігівській, Житомирській, Хмельницькій, Луганській, Сумській областях одержують по 186-209 ц/га, а в Миколаївській, Запорізькій, Херсонській та Одеській – по 97-111 ц/га.

The highest average yield of potato cultivation is in the United States-490,2 C / ha, New Zealand-489,9 C / ha, Germany-444,2 C / ha, Denmark-424,8 C / ha, the Netherlands-420 C / ha, Australia-404,1 C / ha, while the world average-198,5 C/ha. this yield is 30,5 C higher than the average Ukrainian, however, compared with other countries, the potential of its possible increase in the future is in Ukraine from 200 to 300%.

In conditions of economic instability, the population is forced to engage in self-sufficiency in food. It explains the saturation of potatoes in the total area of crops in households and changes in the location of production. Potato growing is the only branch of agriculture, the production of which is 98% concentrated in the households of the population. In the potato market in the total supply there is a steady tendency to increase the supply of potatoes by households and a rapid decrease in the share of agricultural enterprises. The growth of potato production by households, as a rule, is accompanied by a decrease in the level of mechanization of production and deterioration of plant protection from pests and diseases, and this leads to an increase in the cost of potato production.

The efficiency of production, which determines the level of management and the feasibility of development of the industry, depends on many components, including the placement of crops in natural and climatic zones, the organization of production and the concentration of crops.

Potato production is characterized by a certain concentration in suburban areas in order to better supply cities and industrial centers. This significantly reduces the cost of its delivery to consumers. Such territories, as a rule, are within the limits of the corresponding area, but for Kiev, Kharkov and other large cities they are expanded at the expense of farms of other areas. In suburban areas, potato cultivation has its own characteristics. In these areas, there are significant areas of early potato crops.

The volume of potato sales in the food market of Ukraine is formed under the influence of demographic and cost factors, among which, first of all, the total cash income and solvency of citizens. About 27% of the gross harvest is used for consumption in Ukraine. In the world, this figure is 50%, and in European countries – 75%. The use of potatoes in Ukraine is different in terms of consumption. Residents of Ukraine use potatoes for cooking at home a variety of dishes. In Europe, more use of ready-made products and semi-finished products made from potatoes.

Remaining one of the largest producers of potatoes in Europe, Ukraine further almost does not process it. The share of the processing industry in the structure of potato crop sales in Russia is not more than 3-5%, while in the EU countries, where the yield is 2-2. 5 times higher, the situation is the opposite: only 6-7% of products are sold fresh, the rest goes to processing. This imbalance, according to some experts, is one of the main reasons for the low efficiency of this business in our country [3].

World experience shows that the producer gets the greatest effect when he sells not raw materials, but products of its processing, final products of consumption. Therefore, highly developed countries never export raw materials, but have capacities for complex processing of raw materials and realize the final product of consumption. The realization of the final product allows to influence the realization price of food products, the equivalent exchange between the city and the village.

The main indicators characterizing the results and economic efficiency of potato production are yield, labor productivity, cost, profit per 1 cent of production and per 1 hectare of sowing, the level of profitability (table. 13.3).

Table 13.3

Economic efficiency of potato production in agricultural enterprises of Ukraine

Indicator	2005	2010	2015	2016	2017
Yield, C / ha	148	171	198,6	212,1	238,4
Cost price 1ts, UAH	56,87	138,97	202,52	269,35	299,66
Sale price 1ts, UAH	66,96	225,30	251,61	260,81	329,63
Profit per 1 cent of potatoes, UAH	10,09	86,33	49,09	-8,55	29,97
Level of profitability, %	17,8	62,1	24,2	-3,2	10,0

An important indicator of the economic efficiency of potato production is its cost. In recent years, due to the rapid growth in the cost of material resources, the increase in depreciation, despite the increase in productivity, for the period 2015-2017. cost increased by 11.2%. Thus, the cost price, which actually forms the final results of potato sales, can be reduced thanks to the rational and economical use, primarily of planting material, organic and mineral fertilizers, chemicals, fuel and lubricants.

The cost of growing this crop has significant zonal differences. The lowest cost of 1 TS tubers-in farms Polesie, slightly higher-in the Carpathian region and much higher-in the Steppe. To reduce it, in addition to reducing the cost of planting material and material intensity, it is important to increase the yield of potatoes and mechanization of production processes.

During the analyzed period, the price of potatoes in the domestic market grew at a faster rate than the cost of production-31%. This allowed to get out of unprofitability and increase the profitability of tubers production in agricultural enterprises up to 10%. The level of profitability of potato cultivation in agricultural enterprises is not stable enough.

The price situation in the markets of Ukrainian cities indicates a large variation in prices. The regions with the highest prices are-Kiev, Kharkiv, Dnipropetrovsk, Donetsk, Lugansk regions. Low sales prices in the Polesie regions-Rivne, Zhytomyr, Lviv, Sumy regions.

There is a seasonal cyclicality of prices-their growth with a decrease in stocks and decrease after the end of harvesting, when there is a mass sale of potatoes by producers who do not have the opportunity to store the grown crop, and consumers make stocks of food potatoes.

The decisive factor in increasing potato production and increasing its efficiency should be an increase in yields and improving the quality of tubers. One of the first conditions for obtaining high yields is the quality of planting material. This problem is especially important for households. The fact is that the potato variety has a certain duration of productive life, usually 8-10 years. Therefore, it is necessary to carry out variety replacement in 5-6 years. On zones terms of varietal renewal have the features: in farms of Polesie of updating of grades it is necessary to carry out in 5-6 years, in forest-Steppe-in 3 years, and in Steppe-annually.

Potato varieties are divided into 5 groups of ripeness. They are determined by the time that passes from planting to the time when you can dig ripe tubers:

* early varieties-40-50 days;
* average early varieties-55-65 days;
* mid-ripening varieties-65-80 days;
* mid-late varieties-80-100 days.

Usually early varieties give 2-3 times more yield than medium and late, but such potatoes are not stored for a long time. In Ukraine, about 100 varieties of potatoes of domestic and foreign selection are grown. The most widespread are Adretta, Gala, Zhukovsky early, Red Scarlet, Rosara, Santa, Temp, Svitanok Kiev, Lugovskaya, Borodyansky pink, Call, Polesskaya pink and others.

Great harm to potato farming is caused by late blight, Colorado beetle, tubers rot, and potato nematode. Due to the insufficient use of chemical means of control of diseases and pests, due to their high cost, agricultural enterprises annually receive less and lose 25-30% of the crop. Even greater losses are observed in the cultivation of potatoes in households. Therefore, scientists advise to select for cultivation only rakostiyki and nematodostiyki varieties of potatoes and grow on the site several varieties of potatoes of different groups of ripeness.

Market conditions change the demand and requirements for the taste of potatoes. Therefore, the Institute of potato UAAN recommends to have approximately the following structure of potato crops: early varieties-10%, mid-35%, mid-late and late-55%.

The factors that influence the formation of yields and increase the economic efficiency of potatoes include the development of specialization and concentration in potato production should be manifested in the formation of production volumes in suburban areas around large cities and industrial centers and raw material processing areas of enterprises. Of particular importance is the development of agro-industrial associations for the production, processing, storage and sale of potatoes.

In Ukraine, the level of integration of potato producers and processing enterprises remains low. In the United States, England, for example, 20-43% of potatoes are processed for food, while in Ukraine-only about 1%. Therefore, the formation of a powerful potato processing industry can contribute to increasing the profitability of the industry, creating cartoproduct clusters. However, in practice, a difficult situation arises: potato processing enterprises are practically not provided with raw materials. The dispersion of production in households does not stimulate the sale of potatoes to processing enterprises.

The main negative factors in the formation of the domestic potato market include the weakening of the economic role of specialized agricultural enterprises in growing tubers while expanding the number and proportion of households; the destruction of the system of state order of products of the industry; the emergence of a large number of unnecessary intermediary links in the channels of potato sales; difficulties in establishing balanced prices on the market for shadow intermediary structures that form prices; weak awareness of market participants regarding the economic situation; insecurity of domestic producers by the state; increased competition from potato producers in the far and near abroad.

In the future, potatoes will be of interest only to large farms that can afford to invest in the production of significant funds. Only commodity production on the basis of the latest technologies along with the development of the technology selection process involving biotechnological methods, will create adequate prerequisites for the development of Ukrainian potato.

13.2. Economics of vegetable production

Among food products a special and quite important role is played by vegetables-essential foods rich in mineral elements, vitamins, nutrients and the like. Consumption of vegetables contributes to the normal physiological development of the body, improves metabolism, regulates the nervous system and digestive organs, increases the body's resistance against infectious diseases.

Vegetable crops are quite demanding to the soil and require a sufficient amount of organic fertilizers, so vegetable growing is well developed in combination with animal husbandry.

Distinguish vegetable-growing of open and protected (closed) of the soil. In the first case, vegetables are grown directly in the field. The second requires special facilities-greenhouses, greenhouses, areas with insulated soil. The protected ground allows to grow vegetables all year round, and also seedlings of thermophilic vegetable cultures for an open ground. Both types of vegetable growing are closely related.

Production of vegetables belongs to strategically important directions of development of agricultural production that not only guarantees food safety of the state, but also provides with raw materials the food processing industry which lets out export-oriented production with high added value.

The need for vegetables and melons food crops is determined by their amount, which is spent on food, feed and sowing (table 13.4).

Table 13.4

Balance of vegetables and melons food crops (including canned and dried products in terms of fresh), thousand tons

	2005	2010	2015	2016	2017
Production	7606	8873	9792	9998	9721
Changes in inventories at year-end	196	-22	-213	73	-39
Import	100	311	95	136	129
Total resources	7510	9206	10100	10061	9889
Export	150	335	212	224	444
Spent on food	1214	1337	1564	1548	1503
Spent on sowing	90	118	110	110	109
Toll	393	835	1203	1195	1050
Consumption fund	5663	6581	6890	6984	6783
per 1 person, kg	*120,2*	*143,5*	*160,8*	*163,7*	*159,7*

In the total volume of production in 2017, the largest share is traditionally occupied by vegetables and melons, consumed consumption-more than 68.6%, for food-15.2%, seeds - only 1.1%, and losses are 10.6%.

The Fund of consumption of vegetables includes fresh, dried, salted, pickled and other products of processing of this agricultural production. Dried and processed vegetables and melons are included in the consumption Fund in terms of fresh.

Consumption of vegetables and melons food crops in the context of regions of Ukraine varies significantly. In 2017, less consumed these types of products in Lugansk (119,3 kg per person per year), Ivano-Frankivsk (143,9 kg) and Donetsk regions (144,2 kg). The highest level of consumption of vegetables and melons food crops was observed in Poltava (182,6 kg), Mykolaiv (176,4 kg) and Chernivtsi regions (175,2 kg). Despite the significant volumes of interregional exchange of products, a significant difference in the levels of vegetable supply of the population of Ukraine remains.

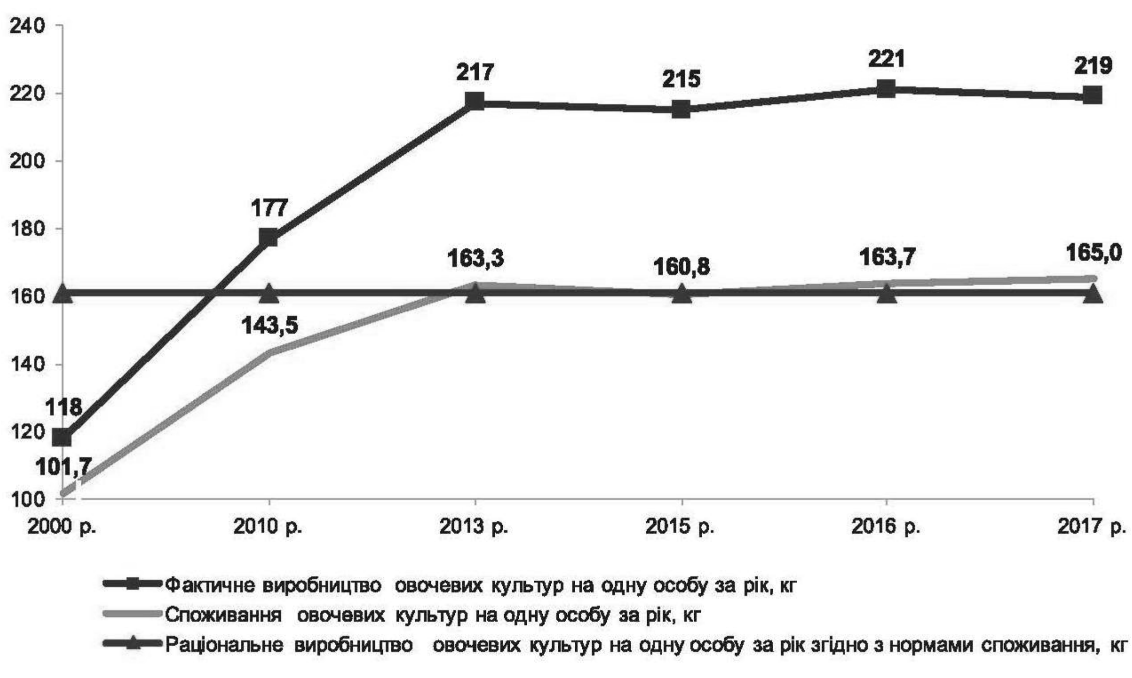


Figure 13.3. Production and consumption of vegetables in Ukraine in 2017

In the vegetable market in recent years, there was a situation when domestic production per person increased to 215-221 kg, while consumption slightly exceeded the rational norm (164 kg) and reached approximately 165 kg (Fig.13.3). However, this did not reduce the volume of their imports, especially in the winter-spring season, when domestic producers are not able to fully cover the growing demand for vegetables with their own production. The level of self-sufficiency in vegetables and melons food crops in Ukraine is 102.9%.

The rate of consumption of vegetables per year per capita in Ukraine is 164 kg at the actual level of the last three years, an average of 163.2 kg, of which about 67% are fresh vegetables and 33% are processed. Most Ukrainians consume tomatoes-about 40-42 kg and cabbage-30-31 kg.

Vegetables are consumed fresh, sauerkraut, salted or canned. Vegetables are a valuable raw material for the food and canning industry. On the basis of their cultivation and processing, agro-industrial enterprises and associations are formed. Compared to other agricultural crops, growing vegetables has its own characteristics. Their structure is largely determined by natural and economic conditions, and economic efficiency depends on the growing area.

The study of the state of vegetable production shows that this area of agribusiness remains one of the most stable and promising for development in all categories of farms.

Due to the characteristics of a rapidly deteriorating industry and production, its successful development depends on the availability of labor, transport routes and means of transportation to markets. This in turn implies the concentration and specialization of vegetable production in the suburban areas of large cities and industrial centers, as well as in the areas of processing industry.

The area of vegetable crops, from which the harvest was harvested, has not changed significantly over the past three years and in 2017 amounted to 446.3 thousand hectares (table 13.5).

Table 13.5

The area from which the crops are harvested in Ukraine

Indicators	Year		
	2015	2016	2017
The area from which the harvest is harvested, thousand hectares:	447,1	447,1	446,3
open ground vegetable crops	440,9	441,1	440,3
from them	70,2	67,9	67,0
cabbage	47,5	46,8	47,4
cucumbers and gherkins	73,0	71,8	71,9
tomatoes	39,4	39,3	38,4
beet dining room	42,8	43,1	42,7
carrots dining room	55,9	54,8	54,8
onions	20,8	21,0	21,5
garlic	25,9	28,3	27,8
table pumpkins	26,9	30,3	30,8
table zucchini	14,7	14,9	15,5
capsicum sweet and bitter	61797,1	59665,0	60269,0
vegetable crops of the closed ground, thousand m2	30842,3	30537,0	30075,0
from them	24123,7	23053,4	24069,0

The largest share in the structure of vegetable crops is traditionally occupied by tomatoes-17%, cabbage-16%, cucumbers-12%, onions-13%, 10% is occupied by carrots, 9% - beets, 23% - other vegetables (Fig. 13.4).

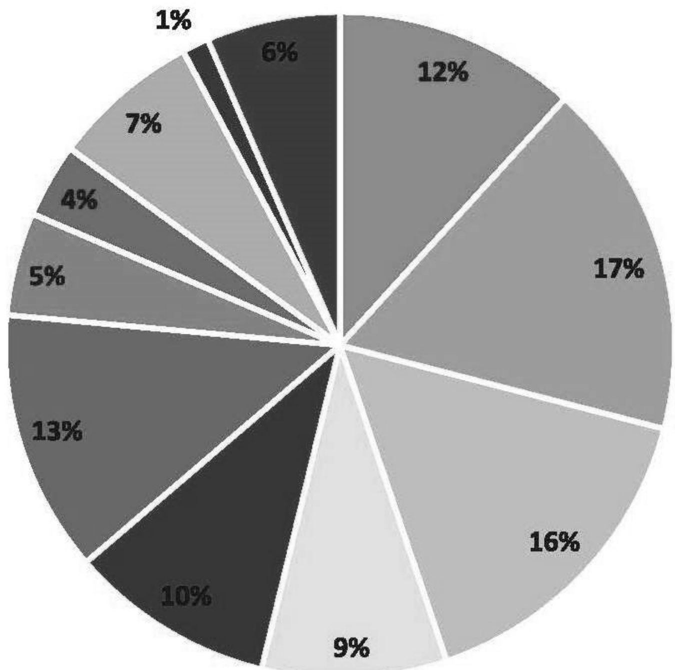


Figure 13.4. Structure of the harvested area of vegetable crops in Ukraine in 2017, %

A detailed analysis of the dynamics of changes in the areas under vegetable crops of open ground for the last three years showed that the highest growth rates were observed in the cultivation of table zucchini (+14.5%), table pumpkins (+7.3%), capsicum sweet and bitter (+5.4%) and garlic (+3.4%). At the same time, a noticeable decrease in areas occurred under cabbage (- 4.6%) and table beet (- 2.5%).

Indoor vegetable production is mainly focused on the cultivation of two main crops - tomatoes and cucumbers, the area of cultivation of which has decreased slightly in recent years.

In placing the production of vegetable crops on the territory of Ukraine there is a certain specialization. In the South of Ukraine, tomatoes, onions, green peas, peppers, eggplants are grown; in the forest – Steppe-green peas, cucumbers, cabbage; in Polesie-cabbage, table beets and carrots.

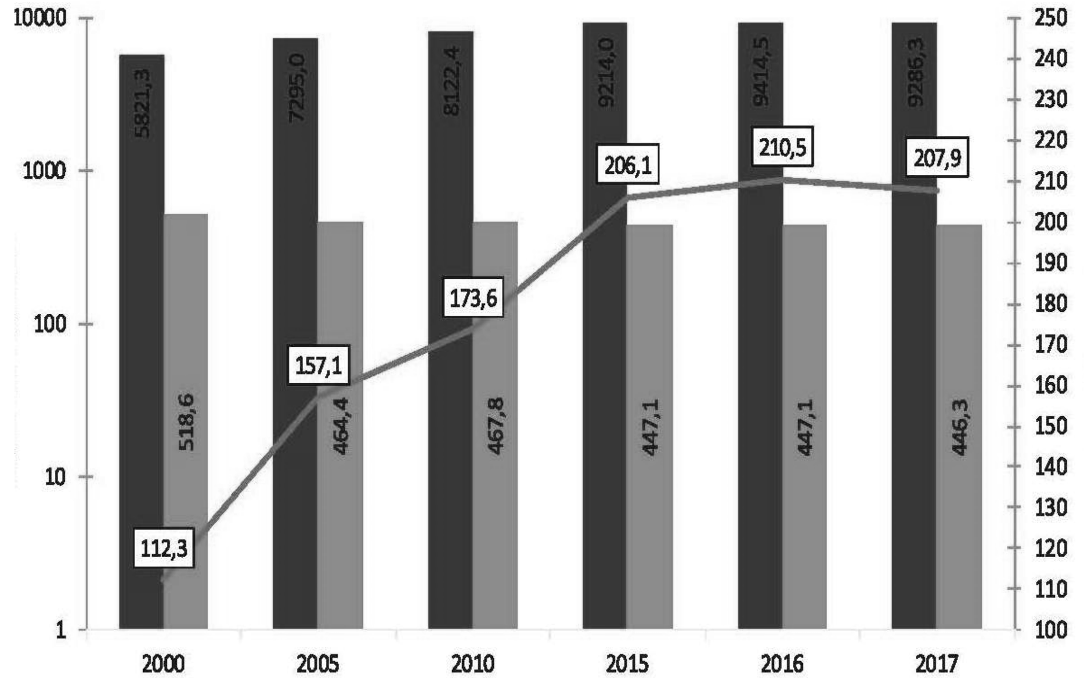


Figure 13.5. Production of vegetable crops in Ukraine

In General, in 2017, compared with 2000, the production of all vegetable crops increased by 1.6 times and this is due to a decrease in the area of their collection. This was achieved primarily due to a significant increase in the average yield of cultivation by 1.8 times (Fig. 13.5).

In the structure of filling the market with vegetable products, there are significant changes in the types of vegetables and especially by producers. About 85% of all vegetables are produced by households. Their smallest share in the production of tomatoes (67.5%), onions (84%) and carrots (88.2%), and the highest - garlic (99.1%), pumpkins (98.9%), zucchini (97.8%) and cucumbers (95.1%). Among the regions, the most vegetable crops are grown in Kherson (1268.9 thousand tons, or 13.7% of the total), Dnipropetrovsk (702.6 thousand tons and

7.6%), Kharkiv (687.7 thousand. tons and 7,4%), Kiev (581,1 thousand tons and 6,3%) and Nikolaev areas (554,5 thousand tons and 6%).

Growing vegetables in raw areas is carried out taking into account the requirements of the processing industry. Features of vegetable growing in these areas – a high level of concentration of crops near canneries and the presence of specialized enterprises with large areas of individual vegetable crops. For the canning industry, it is important to have a uniform supply of raw materials for processing. Therefore, it is advisable to provide a rational ratio of varieties with different maturation period, appropriate agricultural technology, the optimal ratio of seedling and non-seedling crops. The canning industry sets requirements for the quality of raw materials and its cost, since the cost of canned food depends on the cost of vegetables, and their share in the structure of costs for canned food reaches about 75%. As a rule, labor-intensive crops are grown in raw material zones and their concentration is limited by the availability of labor. Therefore, it is particularly advisable to introduce complex mechanization of production processes.

Vegetable growing as a branch of agricultural production is characterized by the cultivation of a large number of vegetable crops, the structure of which varies in different regions. The economic efficiency of vegetable production is determined both in General and in its individual types using natural and cost indicators: yield, cost, sales price, profit per 1 hectare of production and per 1 hectare of sowing, the level of profitability.

The indicators of economic efficiency of open-ground vegetables are indicated by the data of table 13.6.

The yield of vegetable crops of open ground for 2005-2017 years in Ukraine in agricultural enterprises increased by 2.7 times.

The cost of vegetables remains high and has been increasing in recent years. The analysis of the structure of production costs in open-ground vegetable production showed that the highest share is paid - about 36%, the cost of seeds and planting material-20.0%, fertilizer-14.0%.

Table 13.6

Economic efficiency of production of open ground vegetables in agricultural enterprises of Ukraine

Indicator	2005	2010	2015	2016	2017
Yield, C / ha	152	207	339	364	414
The cost of 1C, RS.	46,54	105,48	167,89	190,17	209,69
Sale price 1ts, UAH.	54,04	130,25	247,56	227,65	242,40
Profit per 1 cent of vegetables, UAH	7,50	24,77	79,67	37,48	32,71
Level of profitability, %	16,1	23,5	47,5	19,7	15,6

In the domestic market there is a tendency to increase prices for vegetable products. On vegetables there is a seasonal cyclicality of prices-their growth with a decrease in stocks of early vegetables and decrease with an increase in the arrival of a new crop on the market. The creation of wholesale fruit and vegetable markets and wholesale trade enterprises in Ukraine, the development of fairs, auctions and other wholesale turnover structures that are not subjects of trade activities form the necessary conditions for the organization of effective sales of vegetable products.

The level of profitability of open-ground vegetable growing in the period 2015-2017 varied significantly: from 47.5% in 2015 and 15.6 % in 2017.

Solving the problem of meeting the needs of the population in vegetables involves not only a certain amount of their production, but also their uniform receipt during the year. Therefore, the development of greenhouse technologies in recent years has been sharply popularized given its prospects and payback. Growing vegetables indoors is relevant, because they are in great demand among consumers, especially in the winter.

The leaders of the greenhouse business in innovation can be considered the Netherlands, which brought it to a qualitatively new level. Thanks to its own research center, whose work is devoted to the development of greenhouses, the Dutch were able to significantly reduce greenhouse gas emissions and save on energy consumption. Thus, Dutch producers have reached a leading position in the world in the production and export of vegetables of indoor soil.

The USA and Canada do not lag behind in the greenhouse business, growing a variety of high quality products, the origin of which can be easily traced. The secret of American success is the use of advanced technologies to control the cultivation of plants that do not require special human intervention. Moreover, Americans and Canadians in their choice of vegetables are not very diverse: about 50% of the market is occupied by the production of traditional cucumbers and tomatoes, for export-various herbs, salads and other vegetable

Greenhouse economy of Ukraine is concentrated mainly in suburban areas and specialized enterprises. Since the 60s of the XX century, large vegetable factories and greenhouse plants have been established around Kiev, Kharkiv, Dnipropetrovsk, Zaporozhye, Odessa and other cities of Ukraine. In Ukrainian greenhouses, cucumbers and tomatoes are grown in total-50% and 44%, respectively.

Today in Ukraine there are 48 powerful industrial greenhouses. The largest Ukrainian greenhouse complex can be considered a plant "Greenhouse", which occupies 48.5 hectares in the Kiev region. The plant's greenhouse system has been inherited since the Soviet Union, but a large-scale modernization began in 1994. Today, the complex has equipment for humidification and drip irrigation of plants with simultaneous fertilizing, equipment for heating greenhouses, computer control of the microclimate. The introduction of advanced technologies allows to achieve yields no worse than the Dutch-up to 61 kg per 1 m2.

Indoor vegetable growing is one of the most complex and labor-intensive branches of agricultural production (table 13.7).

Table 13.7

Economic efficiency of production of vegetables of the closed ground in the agricultural enterprises of Ukraine

Indicator	2015	2016	2017
Yield, C / ha	2487	2233	2377
Cost of 1 cent of vegetables, UAH.	1385,05	1539,97	2092,46
Sales price of 1 centner, UAH.	1580,56	1658,72	2128,03
Profit per 1 cent of vegetables, UAH.	195,52	118,75	35,57
Level of profitability, %	14,1	7,7	1,7

Production of vegetables in the closed ground is characterized by high labor intensity and energy consumption. The level of profitability of vegetables in the closed ground in agricultural enterprises and plants in 2015-2016 was about 10 %. It should be noted that in 2017, through a sharp increase in tariffs for heating and water supply, and these items of expenditure constitute the highest share in the structure of the cost of production of vegetables of indoor soil, the profitability of this business fell to 1.7% in agricultural enterprises of Ukraine.

Ensuring the demand of the population for vegetables throughout the year and in a wide range requires the development and rational ratio of vegetable production of open and closed ground. The basis for the supply of fresh vegetables to the population in winter is their production in a protected ground, as well as the rational use of storage facilities for vegetable production. To solve these problems, it is necessary to build storage facilities with automatic climate control and full mechanization of technological processes.

Now the supply of fresh vegetables in the domestic market of Ukraine is formed mainly by domestic production, which provides 98% of turnover. Thus, the bulk of tomatoes and onions comes to the market from farms of various forms of ownership of Dnipropetrovsk, Mykolaiv, Kherson, Zaporizhia regions and Crimea; cucumbers - from Poltava, Dnipropetrovsk, Cherkasy and Kherson regions; cabbage-from Lviv, Kiev, Zhytomyr, Kharkiv regions.

However, the trend of formation of the market of vegetables in Ukraine for imports in recent years has increased slightly. The main suppliers of tomatoes to Ukraine are Moldova (42.7%), cabbage – Poland (42.6%), onions – China (30.2%) and Azerbaijan (17.8%).

The increase in production and competitiveness of domestic vegetable products led to the expansion of vegetable exports. Prices on the foreign market and the possibility of foreign exchange earnings remain attractive for domestic producers.

The expansion of agricultural exports at the expense of vegetables is an important step towards the development of the export potential of the state. But Ukrainian producers should remember that the increase in export revenues is possible due to the supply of not only vegetables, but also products of their processing.

The main types of vegetables that are exported from Ukraine are peas (48% share in exports), fresh or chilled tomatoes (22.8%), fresh or chilled gherkins cucumbers (7.2%), potatoes (6.2%), onions (5.3%). The greatest dynamics of growth for 9 months of 2017 was observed relative to peas, which were practically not supplied to foreign markets in 2016, potato supplies also increased significantly-113% and cucumbers-53%. One of the promising niche crops for export is garlic, the volume of supplies of which abroad increased by 48% in 2017. The key partners of Ukraine in the export of vegetables during the 9 months of 2017 are India (35.7%), Belarus (34.2%), Turkey (12.3%), Poland (8.6%). Among the specific positions in the main countries of fruit exports, the largest share is occupied by: India-peas (100%); Belarus-tomatoes (55%) and potatoes (17%); Turkey-peas (100%); Poland-cucumbers (43%) and tomatoes (38%).

The problem of promoting vegetable products to the foreign market is related to the orientation to the world quality standards and food safety standards. The basis for the formation of high-quality vegetable products and products of its processing is standardization and certification, development and implementation of a comprehensive quality management system.

Among the most important levers of increasing the competitiveness of vegetable products is the reduction of costs for its production due to the economy and rational use of the latter, the introduction of resource-saving technologies for growing vegetables, new high-yielding varieties and hybrids.

The volume of production of commodity vegetables and products of its processing should be determined by the demand for them both in Ukraine and in the foreign market. That is, the criterion for the development of this sphere of production should be effective demand. At the same time, the products must be cost-effective for the manufacturer, and affordable for the consumer.

Competitive production of vegetables and improve its economic efficiency depend heavily on the development of expertise through enhanced inter linkages with regard to natural-economic conditions. The expansion of vegetable crops in suburban areas of large cities and industrial centers, raw areas of sheep canneries is a significant reserve for increasing the economic efficiency of their cultivation, since the possibility of mechanization is manifested only in the conditions of concentration of production.

To increase the yield of vegetable crops and the economic efficiency of the industry contributes to the provision of open ground with high-quality seedlings, for the cultivation of which special facilities are required-greenhouses, hotbeds. In southern areas, it is advisable to combine seedling and seedless methods of growing vegetables.

In Ukraine, to solve the food problem, it is necessary to increase the production of vegetables, expand their range, as well as increase sales in winter and spring. In the southern regions of the country expedient development of specialized agricultural enterprises and households, the creation of agricultural associations on production and processing of vegetable products that will transform the southern areas to the main supply base of the population vegetables.

Factors that have a positive impact on the development of vegetable production in Ukraine include: a good geographical location of the country; the absence of state intervention in the formation of prices for vegetables; a reasonable price for labor and natural resources. But changes in the global market environment caused a decline in business activity in the agricultural sector of Ukraine. The stratification of the population in terms of income has led to the fact that a significant part of the population is forced to abandon the consumption of fresh vegetables in the off-season period. The way out of this situation is the export of vegetables to the markets of neighboring countries. Ukraine has the opportunity to be the main exporter of fresh vegetables and vegetable products to Western Europe. But there are still many obstacles along the way: lack of access to large wholesale markets, complete post-harvest refinement cycles, cooperation for logistics and many other structured production and marketing. Agriculture of Ukraine now bears unbearable costs under pressure from the fiscal system, which constrains the development of production, due to irrational credit policy, suffers from price parity, inflation, reduction of savings and many other related crises phenomena.

QUESTIONS FOR SELF-CONTROL

1. What is the national economic and economic importance of potato and vegetable production?
2. What changes have occurred in the development of potato and vegetable production in farms of different categories?
3. What is the peculiarity of the development of potato production in comparison with other branches of crop production?

4. What is the peculiarity of vegetable growing as a branch of crop production?

5. In what natural and economic zones and regions of Ukraine is the production of marketable potatoes located?

6. What indicators characterize the economic efficiency of production of potatoes and vegetables of open and closed ground?

7. Level of economic efficiency of production of potatoes, vegetables of the open and closed ground?

8. Level of intensity of production of potatoes and vegetables of the open ground?

9. What is the economic efficiency of intensive potato and vegetable production technologies?

10. Key measures to further develop and improve the efficiency of potato and vegetable production?

TEST TASKS

1. The main volumes of potato production are concentrated in:

1) farms;
2) the state farms;
3) personal farms;
4) agricultural enterprises.

2. Production of marketable potatoes is located in:

1) Polesie;
2) Steppes;
3) Forest-steppe;
4) Carpathian.

3. Economic efficiency of potato production is characterized by:

1) sales proceeds;
2) the level of marketability of potatoes;
3) cost of 1ts potatoes;
4) volume of potatoes sold;
5) level of profitability.

4. Material costs included in the cost of potatoes:

1) contributions to social events;
2) rent;
3) mineral and organic fertilizers;
4) the cost of labor.

5. What indicators characterize the economic efficiency of potato intensification?

1) cost of fertilizers per 1 hectare of sowing;
2) the sales of potatoes;
3) recoupment of additional costs;
4) gross harvest of potatoes.

6. What factors directly affect the level of profitability of potato production?

1) sales proceeds;
2) the level of marketability ;
3) yield;
4) sale price 1ts potatoes.

7. What indicators characterize the economic efficiency of vegetable production?

1) volume of sales;
2) revenue from sales of vegetables;
3) profit per 1 ha of sowing;
4) level of marketability.

8. The factors of competitiveness of vegetables include:

1) cost of products sold;
2) product quality;
3) technology of growing vegetables;
4) level of profitability;
5) sale price of 1 quintal of vegetables.

9. What factors directly affect the yield of vegetables?

1) terms of realization of vegetables;
2) labour productivity;
3) sown area;
4) the cost of 1C of vegetables.

10. Which of the factors affect the efficiency of vegetable cultivation of the closed ground?

1) vegetable production volume;
2) vegetable yield per 1 m2;
3) the capital-labour ratio labour;
4) expansion of greenhouse areas.

THEME 14. ECONOMY OF PRODUCTION OF FRUITS, BERRIES AND GRAPES

14.1. Economics of horticulture
14.2. Economics of grape production

14.1. Economics of horticulture

Development and placement of horticulture. Horticulture plays an important role in the agricultural economy. Fruits and berries are valuable food. They are rich in vitamins, sugar, microelements, carbohydrates and organic acids. Particularly important are monosaccharides - fructose (levulose) and glucose (dextrose) which are completely absorbed by the human body and perform very important functions. Fructose is one of the main sources of energy, and for nervous tissue - the only one. High fructose content in apples, pears, black currants and strawberries (up to 60% of total sugar).

Horticulture and berry products are used for fresh consumption, as well as raw materials for the production of confiture, jam, compotes, juices, dried fruits, etc. By scientifically sound standards of nutrition, the consumption of fruit and berries by person per year should be 84 kg. However, in 2005, 36 kg of fruits and berries were consumed per person, in 2010 and 2015 48 kg and 51 kg respectively, and in 2016 - 50 kg, or only 60% of the scientifically substantiated standard. The level of consumption of horticultural products varies depending on the region. Thus, in the Sumy region it is 36 kg, in the Khmelnytsky and Chernivtsi regions - 55 - 60 kg, in the Kiev region - 73 kg of fruit and berries per capita. Therefore, increasing their production is one of the important national economic problems, the solution of which will directly contribute to the improvement of the structure of population nutrition.

Horticulture as an agricultural sector increases productivity and establish the economy of enterprises. Low-yielding rocky and sandy soils, slopes of hills and beams are used to expand the area of fruit and berry plantations, which allows for increased use of farmland.

All orchard (fruit trees) and berries are good honey plants, therefore horticulture contributes the development of beekeeping.

The area of fruit and berry plantations in the country in 2017 amounted to 105 thousand hectares. The average yield of fruits and berries is 103.1 c/ha, and the gross harvest is 2048 thousand tons. In recent years the area of gardens and berries has been steadily declining. In 2017, compared to 2005, it decreased by 60.5% (Table 14.1). The gross harvest of fruits and berries in all categories of farms has increased by 358 thousand tonnes or by 21.2% since 2005.

Table 14.1

Development of horticulture in Ukraine
(all farm categories)

Indicator	2005 p.	2010 p.	2015 p.	2016 p.	2017 p.
Area of fruit and berry plantations in fruiting age, thousand ha	266	120	111	105	105
Yield, kg / ha	63,7	78,2	104,5	101,9	103,1
Gross harvest of fruits and berries, thousand tons	1690	1747	2153	2007	2048
Production of fruits and berries per person, kg	36	48	51	50	50

Areas of fruit and berry plantations are concentrated in the foothills and mountainous regions of Crimea and the Carpathians, the least of them in Polissya. The structure of the rock composition is dominated by cereals, which accounted for 84.7% of the total area. Bone occupy 12%, berries 2.4% and walnut 0.9% of the area of fruit plantations. The most economic and industrial importance are the breeds, more resistant to adverse climatic conditions (apple, cherry, plum). The share of bone breeds and berries significantly increases in fruit and berry plantations of areas adjacent to canneries.

The area of fruit and berry plantations in the fruiting age - about 85% of the total. The bulk of fruit and berry products of Ukraine is provided by grain breeds (apple, pear, quince), whose share in the gross harvest is 76.6%. Bone breeds (cherry, cherry, plum, apricot, etc.) make up 18.3% of the total harvest of fruits and berries, berries (strawberries, raspberries, currants, gooseberries, etc.) - 4% and nuts - 1.1%.

Increased production of fruits and berries will occur on the basis of further intensification of production, due to the creation of large gardens on an industrial basis. For a more even supply of fresh fruit to the population during the year it is necessary to improve the varietal composition of the plantations, first of all, to increase the proportion of winter varieties suitable for long-term storage. Experts' calculations show that in order to meet the needs of the population for fruits and berries in accordance with the scientific norms of their consumption, the yield of gardens should be increased to 80-90 c/ha, including intensive ones - to 180-200 c/ha.

Fruits and berries - products are low-transportable and perishable. Therefore, further development and improvement of horticulture efficiency can occur in conditions of complete provision of agro-industrial complex with refrigerators, storage facilities, processing plants and specialized transport.

Gardening is characterized by a rather high capital and labor intensiveness. The carrying value of 1 ha of fruit plantations depends on the natural and economic zone, the type of plantation, the method of planting, the period of reaching the fruiting age and other factors. The depreciation rate in horticulture depends on the type of plantations and the period of fruiting, it is calculated on the use of cereals for an average of 25 years, cherries - 13, plums and merry - 20, currants and gooseberries - 10, raspberries - 8, strawberries - 3 years. The payback period of capital investments for laying intensive gardens - 6-18, and berries - 4-5 years.

The cost of labor in gardening is quite considerable, in the crop years per hectare of fruitful gardens they make 350 - 400, and berries - more than 500 man-hours. The most time consuming types of work in the orchards are harvesting, caring for fruit trees, conducting pest and disease control measures, selling products.

Economic efficiency of fruit and berry production. To characterize the level of economic efficiency of production of fruits and berries use a system of the following indicators: yield, labor costs per 1 centner (man - hour), the cost of 1 centne of production, the actual selling prices of 1 centne of fruit and berries, profit per 1 centne of production and per hectare of fruitful garden, the level of profitability.

In gardening of many farms there is a period of fruiting, so the economic efficiency of production of horticulture products is determined on average by 3-5 years. Its level depends on the volume of production costs per 1 ha of the garden, the yield of fruits and berries, the quality of production and the prices of its sale. The production of fruits and berries in the farms of Ukraine is developing on the basis of consistent intensification.

Cereal and drupe yields in agricultural enterprises of the country in 2015 amounted to 104.5 c/ha, in 2016 - 101.9 c/ha, and in 2017 - an average of 103.1 c/ha (Table 14.2).

Table 14.2

Economic efficiency of fruit production (cereal and stone fruit) in agricultural enterprises

Indicators	2015 p.	2016 p.	2017 p.
Fruit yield, c/ha	104,5	101,9	103,1
The cost of 1 centner, fruits UAH .:	352,04	439,53	589,32
The selling price of 1 centner, fruits UAH.	537,14	492,36	750,20
Profit, loss (-) per 1 centner of fruit, UAH.	185,11	52,83	160,88
The level of profitability, loss, %	52,6	12,0	27,3

The cost of horticulture products in the farms of Ukraine increased significantly in 2017 and amounted to UAH 589.32. Compared to 2015, it increased 1.7 times. In the cost structure of fruits and berries, the largest share is accounted for by the cost of labor with charges, maintenance of fixed assets and general production costs.

In 2015 - 2017, significantly increased prices for fruit products. In these conditions, the production of industry products in 2017 was profitable, the amount of profit per 1 ton of fruit was 160.88 UAH. at the level of profitability - 27,3%.

The economic efficiency of horticulture, especially the level of profitability of fruit and berry production, depends on selling prices. The price situation at this stage is unfavorable for the development of horticulture retail prices are high enough and purchasing prices are too low for commodity producers. Their current level, on the one hand, does not ensure the availability of products for the population, and on the other - does not contribute to extended reproduction of production, and in individual farms does not provide reimbursement.

In order to increase the material interest of the farms in the fruit harvesting in winter, the purchase prices for apples and pears are increased depending on the duration of their storage. This makes it possible to better meet the population's needs for fruit and increase their consumption.

Ways to increase the economic efficiency of horticulture. In order to fully provide the population with the fruits of Ukraine, it is necessary to have about 850 thousand hectares of gardens and berries, of which 670 thousand hectares are of fruiting age. With an average yield of fruits and berries of 70 c/ha (in intensive gardens - 100 c/ha), their gross harvest can be increased to 4.5 million tons.

Further development of horticulture and increase its efficiency will occur on the basis of intensification of production of fruit and berry products, which involves the replacement of liquefied and morally outdated gardens with new intensive type, expanding the area of irrigated plantations, introducing organic and mineral fertilizers, improving the varietal composition, the composition of the complex composition and composition processes.

The level of intensity of gardening depends on many factors - the precocity and yield of varieties, the density of plantations, ways of forming the crown, the use of fertilizers, protection of gardens, irrigation, the use of mechanization of production. New rational types of plantations and progressive ways of forming crowns of fruit trees need to be introduced more widely, which significantly changes the production technology.

Intensive gardens include gardens on dwarf and semi-dwarf rootstocks, which involve thickening of plantings and reducing the height of the crown. The creation of intensive types of plantations is facilitated by the industrial crop of spurs (natural dwarfs), which greatly increases the productivity and efficiency of gardening. Apples and pears, when grown on weakly rooted rootstocks under favorable conditions, begin to bear fruit at 3-4 years after planting.

In intensive orchards, with the flat formation of crowns of fruit trees, much more fruit trees are placed per 1 ha of land area: apple trees on foliage rootstocks - more than 800, cherries - 600-800, plums - more than 500. In these gardens, better conditions for mechanization of production are provided. processes, the productivity of labor on harvesting grows considerably, the quality of fruits improves and the yield of high-quality products increases.

According to the Institute of Horticulture of the UAAS, further intensification of gardening through the introduction of new ways of forming the crown, increasing plantings on dwarf and semi-dwarf rootstocks and thickened plantings will contribute to increased productivity of horticulture, and therefore increase the economic efficiency of the industry.

An important factor in the intensification of gardening is the irrigation of the gardens, which provides a significant increase in their productivity compared to rainfed. Irrigation efficiency depends on the method of irrigation (the most promising - supercrown, drip, drip-impulsive).

Improving the efficiency of gardening contributes to the improvement of the varietal composition of fruit plantations. In the vast majority of Ukrainian farms, the most effective are winter varieties of apple, which exceed the summer and autumn varieties of this breed in terms of productivity and profitability of production. In the Polissya regions, autumn varieties are preferred, but in the whole country winter varieties are the most profitable.

Increasing the production of apples in winter and autumn varieties extends the period of fresh fruit consumption by the population until almost the next harvest, allowing more efficient use of vehicles during heavy work. Capital investments for the construction of storage facilities pay off in 1-2 years with additional income from the storage of fruits and their sale in the winter.

The complex mechanization of production processes plays an important role in solving the problems of further intensification of gardening. Particularly significant cost savings are provided by the introduction of a system for harvesting and post-harvesting.

Further development of horticulture is connected with deepening of specialization and increase of concentration of production on the basis of inter-economic cooperation and agro-industrial integration. The optimal size of the orchard in specialized horticultural farms in the forest-steppe regions is 600-800, the steppe - 800-1000 ha, and in agro-industrial enterprises - respectively 1000 - 1200 ha. The rational garden area of the inter-economic agro-industrial association, taking into account specific conditions, is 3-5 thousand hectares.

In farms where gardening is an additional industry, the garden area may be 200-250 ha in the Polissia districts, 250-300 forest-steppe areas, and 300-350 ha steppe areas. In all horticultural farms, specialized crews should be formed, workshops for processing of products, and storage facilities should be established. This will ensure a high level of intensity and economic efficiency of fruit and berry production.

Increasing the production of fruit and berry products is of great importance for the industry through extensive use of innovation. In the research institutes of horticulture, promising varieties of apples and pears have been created that are adapted to local conditions and provide yields of 350-500-800 c/ha and 250-700 c/ha respectively. For intensive gardens advanced technologies of fruit production

production are developed on the basis of innovative activity, which significantly increases the efficiency of gardening.

Orchards with tapering crown plums a year earlier begin to bear fruit and give twice as much yield than plantings with a rounded crown. Compressed cherry orchards with mechanical cropping of 3-4 times increase the yield compared to conventional ones. Merry with a flat crown in the first years gives a crop twice or three times higher than in "normal crown formation".

For the mechanization of gardening machines for pruning fruit trees, conveyor method for collecting grain breeds, harvesting merry, as well as a system of machines for aerosol, in-ground and drip irrigation of gardens. The intensification of horticulture based on the widespread introduction of science and excellence is a crucial condition for a significant increase in planting productivity, improving the quality of fruits and berries, reducing production costs.

14. 2. Economics of grape production

Development and location of production. Grapes are a valuable food with high quality and healing properties. It is rich in sugar (glucose), organic acids and vitamins. Much of the grape harvest is used as a raw material for the production of juices, marmalades, jams, concentrates, wines and cognacs. Ethanol, vinegar, tartaric acid, tartar and many other products are made from winemaking waste. With grape yields of 70-80 c / ha, more than 3 c of alcohol and 0.5 c of tartaric acid are calculated from waste per hectare of plantations. Up to 10% of the gross grape harvest is used in fresh and dried form, the rest is processed mainly for wines and juices. In Ukraine, highly developed winemaking from the technical grape varieties.

Grapes are a perennial crop that requires a lot of warmth, light and moisture. The most favorable conditions for the development of viticulture in the southern and western regions of Ukraine.

The main area of the vineyards is located on rainfed lands in the farms of the Autonomous Republic of Crimea, Odessa, Kherson, Mykolaiv and Transcarpathian regions. In these regions, more than 95% of the gross grapes are harvested.

In 2017, compared to 2005, the area of vineyards decreased by 40 thousand hectares or 49.4% and amounted to 41 thousand hectares (Table 14. 3).

Viticulture is largely concentrated in agricultural enterprises (about 70.0% of grape plantations and over 58.5% of gross grape harvest). Almost 60% of the vineyard area is located in non-vineyard areas, which greatly improves the efficiency of the industry.

The level of development of viticulture is determined primarily by the volume of production, which in turn depends on the size of the area and the yield.

Table 14. 3

Development of viticulture in Ukraine

Indicators	2005 p.	2010 p.	2015 p.	2016 p.	2017 p.
all categories of households					
Area of vineyards, in fruiting age, thousand ha	80,6	67,6	41,8	42,7	41,3
Yield, c/ha	54,9	60,3	92,3	88,4	99,3
Gross collection, thousand tons	443	408	386	378	410
Grapes production per person, kg	9,4	8,9	9,0	8,8	9,6
including agricultural enterprise					
Area of vineyards, in fruiting age, thousand ha	68,4	54,8	29,2	30,1	28,6
Yield, c/ha	37,7	47,4	70,7	73,3	84
Gross collection, thousand tons	258	260	206	221	240
households					
Area of vineyards, in fruiting age, thousand ha	12,2	12,8	12,6	12,6	12,7
Yield, c/ha	150,9	115,6	142,4	124,4	134
Gross collection, thousand	185	148	180	157	170

tons					

Vineyards in Ukraine have been steadily declining since 1961. In the period from 2010 to 2017 alone, they decreased by 27 thousand hectares or by 39.7%. The yield level fluctuated over the years. Gross harvest decreased from 443 thousand tonnes to 410 thousand tonnes, or 7.5%. At the same time, the decisive factor in the significant decrease in the gross production of grapes is the reduction of the area of vineyards.

Viticulture is the most intensive sector of agricultural production. It requires considerable capital investment for planting, high costs of labor and labor for the care of vineyards and harvesting.

After the entry of vineyards into the fruitful period, their productive use begins. The cost of production for the respective year includes depreciation. The depreciation rate is calculated for 40 years of their operation. The payback period for regulatory investments for planting and growing them to fruiting age in irrigated vineyards at a yield of 50 c/ha - 3 years, at 100 c/ha - one and a half years after the beginning of fruiting or 7.5 - 6 years from the time of planting.

Economic efficiency of production. The economic efficiency of viticulture depends on the level of yield, production costs per 1 ha of the vineyard, the quality of the grapes and the prices of their sale (table 14.4). Grape yield in agricultural enterprises in 2017 was 84.0 c/ha.

Table 11.4

Economic efficiency of grape production in agricultural enterprises of Ukraine

Indicators	2015 р.	2016 р.	2017 р.
Yield, c/ha	70,7	73,3	84,0
The cost of 1 ton of grapes, UAH.	321,87	361,05	410,26
The selling price of 1 ton, UAH.	651,30	630,39	621,95
Profit per 1c of grapes, UAH	329,42	269,34	211,69

Profitability level,%	102,3	74,6	51,6

The cost of 1c of grapes in agricultural enterprises of Ukraine increased almost 1.3 times in 2015 - 2017 and in 2017 amounted to 410.26 UAH. In the structure of the cost of grapes, a considerable part is occupied by the cost of wages, which indicates the high complexity of its production.

The economic efficiency of grape production depends largely on the price of its sale. The price of selling grapes depends on its quality. For 1 ton of table grapes of the first commercial grade is paid for 20% more than the second grade. Price of sale of industrial grapes is determined depending on its sugar content. Thus, with the increase of sugar content of grapes from 17 - 18% to 21 - 22% the price for 1 ton of production can double. The level of selling prices of 1 quintal of grapes in 2015 - 2017 indicates their decrease from UAH 651.30. to 621,95 UAH.

The process of selling grapes to agricultural enterprises is characterized by the fact that during the period from 2005 to 2017, their sales to harvesting organizations and processing enterprises have significantly decreased and increased in the market, commercial structures, as well as in the expense of wages.

Ways to increase economic efficiency. The increase in grape production in Ukraine will be done in two ways: extensive due to the expansion of vineyard areas and intensive based on increased yields due to additional investment of production facilities per hectare of plantation area. Grape yield in specialized farms can reach 70 - 90 c/ha due to the elimination of liquefied plantations, selection of varietal composition of plantations, optimal fertilization, application of irrigation, implementation of measures to improve the quality of grapes, especially its sugar content.

Due to the high complexity of the industry, the introduction of integrated mechanization and advanced technology is of great importance. Mechanization of production processes is one of the main ways to increase labor productivity and reduce the cost of production in viticulture. The use of machines to cover and open the vine increases productivity by 2.5 - 3 times, for the harvest - 10 times. The farms are increasingly introducing the mechanization of such labor-intensive work as pruning bushes, tying green shoots, harvesting grapes of technical varieties. Means of mechanization can also be used in the formation of vines. When planting plantations on the wallpaper increases the yield of grapes (12 - 15%) and its sugar content.

Vineyard irrigation is highly effective, which ensures a steady increase in grape yields. The experience of advanced farms shows that in the conditions of irrigation, on the basis of a high level of agricultural technology, it is possible to obtain 150 – 250c of grapes per hectare. In agricultural enterprises, the yield of irrigated vineyards increases by an average of 1.5 - 2 times, and the profit per 1 ha increases by 2 - 3 times.

The economic efficiency of viticulture increases significantly with the deepening of specialization and concentration of production. It is established that with the increase of the area of fruitful vineyards in the farms from 210 to 730 hectares their yield increases 1.6 times, labor productivity - twice, and the cost of 1c of grapes decreases by almost 70%. The scientific studies and practices of advanced farms show that the rational use of the area of a fruitful vineyard makes the most efficient use of production resources.

Specific features of grape growing and processing condition the development of agro-industrial integration through the creation of agro-industrial enterprises and industrial associations. The products of the industry are low-transportable and perishable, so the grapes as raw materials for the production of wine and juices should be processed immediately. The processing of grapes in enterprises and the long-term storage of them in industrial refrigerators of farms significantly increases the economic efficiency of viticulture. Grapes in agribusinesses and associations increase by 25-30%, and productivity increases by 40-60%. Therefore, an important area of increasing the economic efficiency of viticulture is to concentrate the basic production of grapes, their processing and storage in specialized farms or in agro-industrial associations.

SELF-CONTROL QUESTIONS

1. What is the economic significance of the production of fruit and berry products and grapes?
2. Placement and development of production of fruits, berries and grapes?
3. What are the features of horticulture and viticulture as a branch of agriculture?
4. What indicators determine the competitiveness of grapes?
5. What factors affect the selling price of fruits, berries and grapes?
6. What factors affect the profitability of horticulture and viticulture?
7. What is the effectiveness of innovations in horticulture and viticulture?
8. Efficiency of intensive industrial technologies in horticulture and viticulture?
9. Efficiency of development of agro-industrial integration in horticulture and viticulture?
10. What are the ways to increase production of horticulture and viticulture products and increase its economic efficiency?

TEST TASKS

1. Features of horticulture and viticulture as branches of agriculture are:

1) plantings are classified as current assets;
2) require large investments;
3) require small investments;
4) require highly productive arable land.

2. Which of the following indicators characterize the economic efficiency of fruit and berry production?

1) the level of profitability;
2) volume of sales;
3) the cost of 1c products;
4) the level of marketability;
5) profit per 1 ha of plantations.

3. Which of these processes are areas of horticulture intensification?

1) renting a garden;
2) pruning fruit trees;
3) sorting updates;
4) expansion of garden areas.

4. The price of fruits and berries on the market is influenced by:

1) the cost of fruits and berries;

2) supply and demand;
3) level of marketability;
4) state regulation of prices;
5) gross collection.

5. Factors that directly affect the profitability of fruit and berry production?
1) labor costs per 1c;
2) level of marketability;
3) crop capacity;
4) selling price of 1c products;
5) gross collection.

6. In the cost structure of 1c grapes, the highest share is the cost item?
1) the cost of seeds;
2) amortization of fixed assets;
3) fertilizers;
4) salary with accruals;
5) rent.

7. The indicator of economic efficiency of grapes is:
1) gross production;
2) volume of realization;
3) profit per 1c of production;
4) terms of implementation.

8. The competitiveness of grapes on the market is characterized by:
1) production volume;
2) varietal composition;
3) the cost of 1c products;
4) cultivation technology;
5) the level of marketability.

9. The cost of 1c of grapes depends directly on:
1) the area of plantations;
2) grape varieties;
3) yields;
4) profit per 1 hectare;
5) the level of profitability.

10. Factors that directly affect the profitability of grape production?
1) volume of sales;
2) the level of marketability;
3) specialization and concentration of grapes;
4) the price of selling 1c products.

THEME 15. ECONOMY OF PRODUCTION AND FEED USE

15.1 Feed base and its importance in the development of animal husbandry
15.2 Sources of fodder resources and their economic characteristics
15.3 Economic evaluation of fodder crops, feeds and diets
15.4 Production and use of compound feeds
15.5 Ways to create a solid feed base and reduce the cost of feed

15.1. Feed base and its importance in the development of animal husbandry

The most important condition for accelerated livestock development in the country is the establishment of a solid feed base in each farm. This directly depends on the possibility of increasing the number of livestock and improving its productivity, which, in turn, determines the growth rate and level of production of livestock products. The development and strengthening of the forage base is now receiving much attention as a factor in significantly improving livestock productivity.

Forage base means the volume and structure of feed, the system of their production and use in animal husbandry. Creating a solid feed base in each farm provides for such a system and structure of feed production that would fully provide the livestock and poultry livestock with a variety of high quality, nutritious feeds throughout the year. The organization of the forage base includes a certain system of production and use of forage, characterized by the appropriate structure of acreage of forage crops, technology of their production, harvesting, storage and preparation of forage for feeding..

In animal husbandry are used a variety of feeds - vegetable, animal and mineral. Feed of vegetable origin, in its own. the turns include concentrated (forage, compound feed, bran, bran, meal, etc.), juicy (silo, root and tubers, forage crops), coarse (hay, hay, straw, hay), green (sown grass, grass meadows and pastures).

Feed base is formed from different types of feed depending on the livestock industry and taking into account the natural and economic conditions of the economy. The total number of feeds and individual groups is calculated in feed units. In our country, per unit of total feed nutrition, a nutrition of 1 kg of oats of average quality is accepted. The ratio of all types of feed to their total nutrition characterizes the structure of the forage base of the farm. The main task of improving and strengthening the feed base is to ensure the rational feeding of farm animals with feeds balanced across all nutrients. In this case, the diets of animals have an optimal ratio of feed units, digestible protein, minerals, trace elements and vitamins.

The ratio of certain types of feed to their nutrition determines the structure of the diet of cattle and poultry. The integrity and balance of forage rations provide the most important condition for improving the efficiency of feeding - improving the productivity of farm animals.

According to the biological characteristics of certain species of livestock and poultry, livestock industries differ significantly in the ratio of feed in the diet. For example, in pig and poultry diets, concentrated feeds predominate. In poultry farming, specialized feeds account for 97% of all feed costs, and pig breeding for more than 80%. Concentrated feeds in the feeding rations of cattle breeding make up 25-27%. In the feeding rations of cattle 19-20% of the forage is silo, 18% - for hay, hay and straw, up to 30% - for green forage of sown grasses, natural meadows and pastures. Shepherding is dominated by pasture and roughage. Pasture forage in agricultural enterprises is more than 23%, rough - more than 33% of feed rations of sheep.

The development of livestock industries and the level of their economic efficiency in farms depend on the degree of use of all production resources, determined primarily by the conditions of livestock, the number and quality of feed. Fodder production is extremely important for the development of animal husbandry, since animal productivity is 50-80% dependent on environmental factors, of which the most important is feeding. As academician MF noted. Ivanov, feed and feeding have a greater impact on the body of animals than breed and origin.

Therefore, the development of the feed base largely determines the productivity of livestock and poultry and the volume of production of livestock products. The level of development of the forage base is determined by the following indicators: the volume of feed production per 1 hectare of agricultural land, 1 hectare of forage area, one conventional head of livestock (c Feed units).

The forage area is part of the farmland used for the production of various types of animal feed. The feed area of the farm Sk (ha) is calculated by the formula:

$$Sk = So + Sn + \frac{B_1}{Y_1} + \frac{B_2}{Y_2} + \frac{B_3}{Y_3} \ ;$$

where So is the area of forage crops on arable land, ha; Sn - area of natural forage, ha; B_1, B_2, B_3 - part of the gross harvest of individual crops allocated for feed, q; Y_1; Y_2, Y_3 - crop yields, part of the gross collection of which is allocated for feed, c / ha.

Feed production indicators per hectare of forage area (c feed, units) are used to compare the status of the forage base in different farms, as well as to justify the possibilities of further development of livestock industries.

Table 15.1

Cost dynamics of livestock and poultry feed in Ukraine (all categories of farms, million tons of feed, units)

Indicator	Year					
	2005	2010	2015	2016	2017	2017 in% up to 2005.
Total feed	37,5	33,9	31,0	30,4	29,7	79,2
including concentrated	12,9	14,8	14,7	14,4	14,1	109,3
Costs of feed per one conventional head of cattle, c	32,4	31,0	30,8	31,2	31,1	95,9

The dynamics of feed consumption of livestock and poultry in Ukraine indicates that certain quantitative and qualitative changes have occurred in the feed base (Table 15.1). In 2005, in Ukraine, 37.5 million tonnes of feed, units, or 32.4 tonnes per conventional unit was spent on feeding cattle and poultry.

In 2017 compared to 2010, the amount of feed consumed in livestock decreased to 29.7 million tonnes of feed, units, or 12.4%. However, the cost of feed on one contingent head remained at one level - almost 31 c. The level of development of the forage base of agricultural enterprises is insufficient and impedes the intensive development of livestock industries. Ukraine's livestock will be provided with feed when annual feed costs per contingent head will be 35-40 cf feed. units This requires a 20-25% increase in feed production. Each farm should as far as possible meet the livestock needs of high quality juicy and coarse feeds through its own production.

The farms of individual districts and regions of Ukraine have different levels of forage production. In advanced farms, where intensive technologies of cultivation of forage and fodder crops are widely used, they make a fundamental improvement of natural hayfields and create perennial cultural pastures, the output of fodder reaches 45-55 kg of fodder. units of 1 ha of agricultural land.

The great importance for the development of animal husbandry is also the quality of feed. Feed efficiency depends on providing animals with a certain ratio of feed units, digestible protein and minerals in their diets. Each feed unit should account for 100-110 g of digestible protein, for young cattle - 110-120 g and poultry - up to 150 g. This ratio ensures the full and rational use of feed. However, the feed base of the vast majority of farms does not provide such a ratio; feed rations tend to have a significant deficiency of digestible protein, carotene, trace elements and other nutrients.

The state of the forage base is also characterized by the payment of feed products, which indicates the efficiency of feed use and is determined by the output of products per 1 kg of feed. units The effectiveness of animal feed of different species and sex-age groups is not uniform. Significant factors for increasing the payment of feed are the level of feeding and the productivity of animals. The higher the productive potential of animals, the greater the proportion of feed that is converted into produce, and the more produce is produced per 1 kg of feed. units fed feeds.

Feed efficiency is also determined by the cost of feed units per 1 cc of livestock products, which characterize the feed capacity of its production. Feed costs per unit of livestock production are volatile. It depends on the level of animal productivity, feed quality, balance and nutritional value. Mineral fodder, trace elements and vitamins play an important role in reducing feed costs and increasing their digestibility.

On average, in agricultural enterprises of Ukraine in 2017, about 1.34 c of feed was used per 1 cc of milk, units, 15.53 cages per 1 cc growth of cattle, 8.12 c feeds per 1 c of pig growth, units that exceed scientifically sound standards. However, feed efficiency increased from 2005 to 2017, indicating a decrease in the feed capacity of livestock production.

Therefore, the development of the feed base of the farm should be evaluated both by the output of feed from 1 ha of farmland, the level of animal feeding achieved, and by the indicators that characterize the final results: payment of feed production and feed capacity of its production.

The condition and development of the forage base largely depends on the efficiency of production of livestock products, the level of which is influenced by the cost of feed per unit of production and their cost. In the total cost of production of various types of livestock products the cost of feed is from 35 to 75%.

Due to the inferiority of feed rations for nutrients, the actual cost of feed for the production of livestock products is much higher than scientifically justified standards. In addition, farms. there is a significant rise in prices of all types of feed. This, in turn, is an important factor in raising the cost of livestock production.

15.2. Sources of fodder resources and their economic characteristics

Sources of forage resources are quite diverse. The rational use of them is one of the most important tasks of forage production. The main sources of forage are: field fodder production, natural hayfields and pastures and waste from the processing industry. The main source of fodder is field fodder production, whose share in the structure of the forage base in the whole country is more than 85%.

With the development of agriculture, field fodder production has become a large specialized industry. The main forage crops are perennial and annual grasses, corn for silage and green forage, and forage roots. The area under fodder crops in 2017, compared to 2005, decreased by almost 2.1 times to 1.8 million hectares. (Table 15.2).

Table 15.2.

Dynamics of acreage of forage crops in Ukraine
(all categories of farms), thousand ha

Indicator	Year					
	2005	2010	2015	2016	2017	2017 in% up to 2005
Area of forage crops	3738	2537	1942	1861	1802	48,2
including: perennial herbs	1702	1238	1027	995	955	56,1
One-year herbs	891	583	393	374	353	39,6
corn on silage and green fodder	774	470	308	284	288	37,2
fodder root crops	295	246	214	208	206	69,8

From 2005 to 2017, certain structural changes occurred in the field feed industry. Thus, the share of sowing of perennial grasses increased from 45.5% to 53.0%, fodder root crops - from 7.9% to 11.4%, and corn for silage and green fodder - from 7.9% to 11.4% . At the same time, the share of annual grass crops decreased from 23.8% to 19.6%.

It should be noted that increasing the share of fodder crops in the structure of acreage is not always desirable, since it leads to a decrease in crops of other crops. Under these conditions, it is advisable to use high-yield fodder crops, and to increase the production of forage from arable land by increasing their yield.

Forage crops are just one source of forage forage. Many feeds provide cereals and legumes. The major cereal crops - barley, oats, corn for grain and peas - in 2017 occupied 54.8% of crops.

The structure of field fodder production requires improvement, first of all, significant expansion of corn crops for grain. In the structure of crops of cereals there is not enough leguminous crops, which contain a lot of germination (20-40%) and ensure the value of feed rations. Growing soybeans, which contain 36-44% protein, 18-27% oil, as well as carbohydrates, minerals and vitamins, are also important in solving the protein problem.

In Polissya conditions, for the replenishment of feed protein resources, white sweet lupine is grown, which is not inferior to soybean in its value. Grains of white lupine zoned varieties contain 38-44% of protein, as well as amino acids necessary for animals.

A significant source of feed is the by-products of the crop industries. Many of these feedstuffs provide cereals and industrial crops, and livestock feed also uses vegetable waste and some of the gross collection of substandard potatoes. In farms that grow sugar beets, feed is used for feeding livestock.

In different areas of Ukraine, large post-harvest and post-harvest crops are grown in large areas. Widespread introduction of re-sowing enables more intensive use of land, increased feed production.

An important source of forage is natural forage. They give the cheapest coarse and green fodder. In Ukraine, the area of natural forage of agricultural enterprises and citizens is now 4.9 million hectares. In the structure of agricultural land, natural hayfields and pastures occupy only 13.4%, which indicates a relatively low availability of farms. Natural hayfields receive a significant amount of roughage. However, the hay yield is still low (8-12 c / ha), while with a radical improvement of hay it increases to 40-60 c / ha. The organization of cultural perennial pastures has a significant economic effect, especially in areas of sufficient moisture and on irrigated lands..

For feeding animals use the waste of the processing industry - flour, oilseed, sugar, brewery and others. In sugar beet farms for industrial processing, sugar production residues (pulp and molasses) are a significant source of animal feed. Oilcake as a product of oilseeds processing is a valuable concentrated feed containing 25-35% digestive germination. Sunflower and linseed cake is widely used for feeding cattle, especially real cows. Pig feed resources, especially in suburban areas, replenish catering waste.

Sources of forage resources in each farm are quite diverse, so their economic importance in strengthening the forage base and development of animal husbandry varies. Improving the structure of fodder production and increasing its efficiency require mandatory economic evaluation of fodder crops.

15.3. Economic evaluation of fodder crops, feeds and diets

To strengthen the fodder base it is necessary to identify the most effective fodder crops in specific natural and economic conditions of the economy. This involves the economic assessment of fodder crops, certain types of feed and diets. The level of land use, the cost and the profitability of livestock products depend to a large extent on the choice of the most economically advantageous fodder crops.

In each farm, many crops are grown and processed into forages, which differ significantly in yield and production cost. The efficiency of growing individual fodder crops can be characterized by the level of their yield. However, 1 cent feed of different cultures contains unequal amounts of nutrients and digestible protein. Therefore, a more objective economic evaluation of fodder crops is the yield of fodder units and digestible protein per 1 ha of sown area.

For the economic evaluation of fodder crops, the following indicators are used: yield per 1 ha of sowing of fodder units, digestible protein and fodder protein units (c); the cost of 1 c of fodder and fodder units; direct labor costs (man-hours) per 1 c of fodder and fodder units.

Fodder crops differ significantly in the ratio of fodder units and digestible protein. Some crops provide a large yield of feed units per hectare, but feed from them is poor in protein, while others feed. The diets of animals must have a certain ratio of feed units and digestible protein for the most efficient use of feed. For the aggregate assessment of forage crops, they use an indicator such as the yield of kormoprotein units per hectare. The number of conventional kormoprotein units per 1 ha of individual feed crop is determined by the formula

$$KPO = \frac{Y(K_0 + 10P_p}{2};$$

where KPO is the output of kormoprotein units per 1 ha of sowing, c; B - yield of fodder crop, kg / ha; K0 - the content of feed units in 1 c of feed, kg P_P- content of digestible protein in 1 c feed, c; 10 and 2 are the coefficients.

The cormoprotein unit is a conditional indicator and is not used in zootechnical practice since there is 1 feed in the feeding of animals. units and 100 g of digestible protein are not equivalent. However, the yield of kormoprotein units per hectare of sowing characterizes the nutritional quality of the feed, taking into account the energy-protein ratio, and allows for a more objective evaluation and comparison of the efficiency of forage crops. The feed centner, which provides the optimal ratio of feed units and digestible protein, contains 1 c of feed protein units.

For economic evaluation of forage crops, they use a system of indicators that are not directly comparable. Each of the indicators characterizes on different sides the level of production efficiency of the same culture. Therefore, for a comprehensive assessment of the individual forage and forage crops for each of them calculate the sum of the coefficients. Forage crops that have a higher sum of coefficients are characterized by a correspondingly higher level of economic efficiency and contribute to the strengthening of the forage base.

The economic valuation of fodder crops for greater certainty is determined over an average of three years. Comparison of indicators of evaluation of different forages makes it possible to identify the most economically advantageous, as well as to justify the rational structure of the sown areas of forage crops.

The economic evaluation of fodder crops is also carried out in terms of production efficiency of certain livestock products. To compare forage crops by efficiency of use, it is necessary to determine the amount of livestock production (milk, cattle gain, etc.) that can be obtained from feeding these feeds with 1 ha of sowing. Then, taking into account the monetary valuation of livestock production, the cost of its production and the cultivation and harvesting of feed, they determine the contingent net income per 1 ha of forage crops. The amount of contingent net income for the cultivation of forage crops is calculated by the formula:

$$NI = \frac{KPO}{B_K}(P - C) - B_B \ ;$$

where NI is the net income from 1 ha of forage crop, UAH; KPO - output of kormoprotein units from 1 ha of sowing, c; Bk - feed costs per 1 c of relevant livestock products by standard, c feed units; P - selling price of 1 c of livestock products, UAH; C - the cost of 1 t of livestock products without the cost of feed, UAH; Bв - production costs per 1 ha of forage crop, UAH.

According to the calculations, they receive a conditional amount of net income per 1 ha of sowing of a separate forage crop. In the production of certain types of livestock products in diets use feed not from one culture, but their corresponding set. However, forage crops are not commodity. Feeds are spent on the production of livestock products, and their value is realized through these products. Therefore, the amount of net income from the possible production and sale of certain livestock products can give the most objective and comprehensive assessment of forage crops.

The economic evaluation of a particular type of feed shall be made on the basis of the estimates of the forage crops constituting it, taking into account the costs of its preparation, storage and distribution, as well as the yield and storage of nutrients in the feed over the period of use. Yes, the production of hay and grass meal from green mass of annual and perennial grasses requires additional costs. However, medium-quality hay nutrition equals high-quality hay, and nutrient losses are much lower than in hay and silage. Grass meal is close to concentrated feed in terms of feed units, and is second only to leguminous crops in terms of digestive germ content. It also takes into account that the use of hay and grass meal reduces the cost of storage and distribution of feed, and the process of feeding them can be fully mechanized.

Data on the economic evaluation of forage crops and individual types of feed are used to determine the most effective feed rations and types of animal feeding. Depending on the conditions of fodder production in different farms and areas of the diet of feed have a different structure.

Types of feeding animals are characterized by the norms and structure of feed in diets. In animal husbandry distinguish the following types of feeding: silage root crops, silage beet pulp, silage concentrate, hay and root crops and others. In pig production concentrate, concentrate-root and single and concentrate-root tubers predominate.

According to the level of feeding of young cattle, the following types are distinguished: intensive (average annual feed costs per head of 25-30 c feed), medium intensive (20 - 25 c feed), and low intensity (up to 20 c feed.). The economic efficiency of feed rations and types of animal feeding is characterized by the following indicators: cattle and poultry productivity, feed costs per unit of livestock production, the cost of 1 kg of feed. units in the diet, the cost of 1 c of livestock products and the level of profitability of their production.

The economic assessment of feed rations and types of feeding of cattle and poultry is determined on the basis of a comparison of indicators of experimental and control groups of animals. A rational type of feeding involves the complete provision of animals with nutrients, taking into account their productivity, reducing the cost of feed units and improving the efficiency of production of livestock products. The economic assessment of fodder resources determines the optimal forage area and the rational structure of crops for fodder crops according to the type of animal feeding. Optimization of the forage structure based on the application of economic and mathematical methods provides significant economic effect.

15.4. Production and use of compound feeds

Compound feeds play an important role in improving the quality of feed resources and improving the efficiency of their use. These are homogeneous mixtures of different feeds that are made using scientifically sound recipes to best meet the nutritional requirements of certain species and groups of animals.

For the feed industry, the bulk of raw materials (about 85%) are supplied by agriculture. Combined feeds are composed of 60-80% of feed grain, 8-10% of the oilcake, meal, molasses and dried pulp, as well as animal protein (meat and bone meal and fish meal), minerals and vitamins. For the production of compound feeds grain of different cereals and legumes is used. Particularly valuable components of compound feeds are corn and legumes. On average, they should be 41 and 18% of the grain part, respectively.

Compound feeds have the optimum ratio of feed units and digestible protein, minerals, amino acids and vitamins. They significantly increase the efficiency of using not only concentrated but also all types of feed. The use of 1 ton of compound feed for feeding cattle and poultry compared to conventional concentrated feed provides an additional 2.5-3 c of milk, 35-40 kg live weight gain, 750-900 eggs. At the same time, they reduce by 20% the consumption of feed per unit of production, reduce its cost and increase the profitability of production.

The feed industry of our country produces quite complex compound feeds that can provide full feeding of animals of different species and sex-age groups.

About a third of the compound feed is produced in pellets and briquettes, which increases their efficiency. The use of compound feeds can radically change the technology of feeding animals and significantly improve the mechanization of feed distribution on farms. Without this transfer of livestock to industrial technologies would not be possible.

Protein-vitamin supplements, premixes and protein feed microbiological are also made in the feed industry. Protein-vitamin supplements (meat and bone meal, fish meal, cake, etc.) have a high protein content, as well as minerals, vitamins and antibiotics. Premixes are used to fortify compound feeds and improve their nutritional qualities.

In farms the share of compound feeds in the total number of livestock and poultry concentrated feed decreased significantly. The vast majority of concentrated feed is now used in the form of ground grain or simple mixtures thereof. Feed is not fed enough, especially pigs and poultry.

Further development of the feed industry implies the creation of an appropriate raw material base, an increase in the production of high protein feed. To solve this problem in the farms it is necessary to expand the crops, increase the yield of legumes (peas, soybeans, lupins, etc.), to increase the production of high-protein waste of the processing industry (cake, meal, meat and bone meal and fish meal), expand production of feed yeast, synthetic amino acids and nitrogen-containing substances (urea, ammonium salts). It is necessary to restore the capacity of the existing ones and build new feed mills to meet the needs of large specialized farms and other agricultural enterprises. Placement, feed businesses, taking into account the need for feed and supply of raw materials reduces the cost of transportation and contributes to cheaper production of livestock products.

15.5. Ways to create a strong fodder production and reduce the cost of feed

The basis of high productivity and efficiency of animal husbandry is the complete feeding of cattle and birds with cheap feed. Scientific studies and experience of advanced farms show that by realizing the genetic potential of livestock kept in Ukrainian farms, it is possible to increase the production of milk, meat and other livestock products 1.5-2 times. To do this, it is necessary to significantly improve feed production and turn it into a specialized branch of agriculture.

In Ukraine, field feed is the main source of feed. Only a small proportion of fodder resources come from the use of natural forage. Therefore, intensification of field and in some regions grassland forage production is now preferred. The intensification of forage production means an increase in the output of feed per hectare of forage area, improvement of their quality on the basis of additional investments of means of production, introduction of advanced technologies and new forms of organization and remuneration.

The various natural and economic conditions of Ukraine determine the zonal features of the intensification of forage production. The most important factors are those that provide for the increase in the yield of fodder crops, reduce the complexity and the cost of production of fodder.

One of the main directions of intensification of forage production is the introduction of organic and mineral fertilizers, which directly affects the level of productivity of fodder crops. As shown by long-term scientific researches, 1 c of mineral fertilizers provides an average yield increase of grain crops of 1.1 c, corn on silo - 10, fodder root crops - 8-10, hay of perennial grasses - 4,5, hay of natural hay-crops - 5,3 c.

Fertilizers also improve the quality of feed, increasing the content of digestible protein, minerals and vitamins. Thus, in Polesie the application of complete mineral fertilizer in combination with organic fertilizer can increase the protein content in forage crops by 30-50%.

Great opportunities for increasing feed production are created by the cultivation of forage crops on reclaimed land, which greatly improves the efficiency of the use of mineral and organic fertilizers. In irrigated lands of southern Ukraine, advanced farms receive 60-80 cc of corn grain and 600-800 cc of its green mass, 80-100 cc of hay and 350-400 cc of green alfalfa. On the dried up lands of Polesie 600-800 cc of forage roots are grown with appropriate agrotechnics: 40-50 cc of clover hay with 1 ha.

Significant growth of the crop is provided by chemical amelioration of acidic soils of their liming yield of corn yield on silage on very acidic medium-acidic soils of 42 c, on slightly acidic - 20 c of green mass of perennial grasses - 15 and 7 c of hay respectively.

In the further intensification of livestock industries, the quantity and quality of concentrated feed in diets are important. Their share in total feed expenditure in 2017 was 36.0%. Energy and protein value of grain fodder can be increased by increasing the production of corn, peas, soybeans based on increasing their yield and expanding crops in the group of cereals.

Also of great importance is the introduction of a scientifically sound structure of crops of forage and forage crops. The Institute of Agriculture of the UAAS recommends the following structure of crops of forage crops: perennial grasses - 49,2%, silage crops - 29,6, annual grasses - 13,7, fodder root crops and melons - 7,0, other crops - 0,5%. Crops of perennial grasses in the group of fodder crops should occupy 55-60% in the Polesie area, 60-65 with sufficient moisture, and in conditions of unstable moistening - 45-50, Steppe on the bog - 42-45 and on irrigated lands - 55- 60%.

One of the ways to increase feed production in field feed production is to expand post-harvest and post-harvest crops, as well as to introduce crops of multi-component mixtures of grasses. The following mixtures are sown in the farms of

Polissya: early spring - oats, peas, lupines, rapeseed, sunflowers; late spring - corn, sunflower, rapeseed, lupine; harvesters are oats, oats, sunflowers, rapeseed.

The intensification of fodder production is a fundamental improvement of natural forage and the creation of cultivated hayfields and pastures. Depending on the specific conditions, the wetlands are drained, irrigated hayfields, pastures are created, mineral fertilizers, perennial grasses, and other measures are applied. Particularly valuable are perennial cultivated irrigated pastures that guarantee the provision of livestock with green fodder. As experience of many farms in Ukraine shows, the yield of irrigated cultural pastures is on average 70-80 cent of forage. units per hectare. Pasture forage is relatively cheap. In advanced farms, the cost of creating a cultural irrigated pasture is bought in 1-2 years.

The intensification of forage production involves the introduction of advanced technologies for the collection, storage and preparation of feed. This makes it possible to improve the quality of feed rations and significantly reduce nutrient losses. For the further development of animal husbandry it is necessary to significantly increase the production of roughage, especially hay. In the traditional method of harvesting hay perennial grasses, almost 50% of the nutrients contained in the green mass are lost. Significantly reduced nutrient losses during hay harvesting by active ventilation.

Increasingly, a cost-effective type of roughage such as haying is being used. It is a canned food made from green mass of perennial and annual herbs. Its production retains more nutrients compared to grass or silage harvesting. More than 80% of the nutrients of the green crop are used in the hay.

Important in strengthening the feed base and improving the quality of harvested roughage is the production of grass flour. It is made by artificial dehydration at high temperature of green mass of perennial and annual grasses, sugar beet sprouts and green mass of post-harvest crops. Herbal flour is a high-quality protein-vitamin feed that is classified as a nutrient in concentrated feeds. A kilo of herbal flour contains 0.7-0.75 feed, units, 100-140 g of digestible protein and 200-250 kg of carotene. With long-term storage of herbal flour, carotene is lost, so such feeds are economically advantageous to produce in the form of pellets and briquettes. This method of feed preparation ensures that 90-95% of the nutrients contained in the green mass are stored in the grass meal, granules and briquettes.

The quality of forage rations will be enhanced by full-fledged granulated and briquetted feeds, produced from green corn and cereal crops by mixing with crushed straw, milled grain waste, minerals and other substances. Such feeds in diets of cows can make 50%, and in diets of young cattle and sheep - up to 80%. The use of full-fledged granulated and briquetted feeds provides complex mechanization and automation both in feed production and in the organization of animal feeding.

One of the reserves of replenishment of fodder resources is the use of waste from the processing industry. Food processing companies receive a significant amount of waste (pulp, molasses, meal, meal, meat and bone meal, etc.), which is an important source of valuable feed, processing agricultural raw materials.

The development of a forage base provides a high level of feeding and productivity of animals. At the same time specialized fodder production is the basis of cheaper production of feed, which causes a decrease in the cost of livestock production and increase its profitability.

SELF-CONTROL QUESTIONS

1. Expand the concept of aft base.
2. The value of feed base in the development of animal husbandry.
3. The current state of development of the feed base.
4. What are the sources of feed resources in Ukraine?
5. What is the state of production and efficiency of use of compound feeds?
6. What are the main areas of intensification of feed production?
7. What are the main steps to improve feed production and utilization efficiency?

8. What are the main directions of increase and decrease in production of feed in the zones of Ukraine?
9. What indicators determine the economic evaluation of fodder crops, feeds and diets?
10. What is the effectiveness of the use of compound feed at the current stage of animal husbandry development?

TEST TASKS

1. What indicators characterize the level of feed base development?
1) yield of fodder crops;
2) production of fodder (c. feed units) per 1 ha of agricultural land;
3) output of forage (c. feed units) from ha sowing forage crops;
4) production of livestock products per 1 c. of feed units.

2. What indicators characterize the level of feed base development?
1) feed costs per 1 c. of livestock production;;
2) feed costs per conditional head;
3) feed costs per cow;
4) feed costs for one main sow.

3. What indicators characterize the condition of the feed base?
1) cattle and poultry productivity;
2) feed costs per cow;
3) feed costs per 1 c. of livestock production;
4) feed costs per conditional head.

4. Forage area of agricultural land enterprise includes:
1) arable land;
2) forage crops;
3) potato crops;
4) crops of vegetables.

5. Indicators of economic evaluation of fodder crops:
1) output of livestock products per 1 c. of feed;
2) output of livestock products per 1 ha of agricultural land;
3) output of feed units from 1 ha of forage crops;
4) forage crops yield.

6. Indicators of economic evaluation of fodder crops:
1) output of livestock products per 1 ha of forage area;

2) output of livestock products per 1 c. of feed;
3) forage crops yield;
4) output of protein units per 1 ha of forage crops.

7. Indicators of economic evaluation of fodder crops:
1) the cost of 1 kg of different types of feed;
2) the cost of 1 cent feed units fodder crops;
3) cost of 1 c. of livestock products;
4) feed costs (c. feed units) per 1 cc of livestock products.

8. The main directions of intensification of forage production:
1) increase in forage production by 1 ha of agricultural land;
2) increase in forage crops;
3) increasing feed costs per head;
4) introduction of complex mechanization.

9. The main directions of intensification of forage production:
1) increase in feed production;
2) ncrease in forage crops;
3) introduction of advanced feed preparation and storage technologies;
4) increase in forage production per 1 ha of forage area.

10. The development of the forage base provides:
1) improving the productivity of animals;
2) high level of feeding;
3) increased feed production;
4) increase in forage crops.

SECTION 3. ECONOMICS OF LIVESTOCK INDUSTRIES

THEME 16. ECONOMICS OF CATTLE BREEDING

16.1. Significance, types and development of cattle breeding

16.2. Efficiency of milk and cattle's meat production

16.1. Significance, types and development of cattle breeding

The most important branch of productive animal husbandry of Ukraine is cattle breeding. Cattle breeding is of great economic interest, primarily because it produces the most valuable high-calorie foods. As a result of economic use of cattle, milk and meat are obtained, which are characterized by high nutritional qualities and are raw materials for the processing industry.

Depending on the volume of sales, location of the farm and production conditions, livestock farms, inter-farm enterprises, associations and other agricultural formations can be of different production types. Most agricultural formations have a dairy-meat or meat-dairy direction.

Dairy farming is developing in the suburban area, where the population density is high and there is a great need for a continuous supply of whole milk throughout the year. Beef cattle breeding in Ukraine is widespread on a smaller scale. It develops in a closed production cycle mainly in areas where it is possible to keep animals for a long period on natural feeding grounds. These conditions are more consistent Polesskaya soil and climate zone. It should be noted that this division and placement of the industry in the main directions is conditional.

Depending on the specific conditions of farms and their production activities in one administrative region, they may have different directions. It is proved that both in the process of inter-farm cooperation and in specific enterprises specialized farms for milk production, fattening of young animals are more effective compared to mixed farms.

In connection with the deepening of specialization, the transfer of production on an industrial basis in cattle breeding, there are such production types of enterprises:

1. Suburban dairy. The expediency of their organization is the need for a constant supply of whole milk to the population of cities and industrial centers. Production here is carried out on an intensive basis and, as a rule, in special complexes or farms with a high level of mechanization and automation of production processes and progressive ways of keeping animals and caring for them. This is facilitated by the use of a system of uniform receipt of offspring during the year. In such farms nadremontniy and repair young growth realize in 20-day age in other specialized farms for further doraschivaniya. Cows in the herd more than 60%. Repairs and expansion of the herd are carried out at the expense of heifers and cows-first-calves, grown in other specialized farms.

2. Dairy-meat (meat-milk) direction. Placed in more remote areas. Their development is combined with the dairy and canning industry of the zone. Since these farms are mainly engaged in the cultivation of repair, and often fattening over-repair young cattle, the proportion of cows in the herd is not more than 50-60%.

3. Specialized on cultivation and fattening of cattle of meat breeds. It is advisable to establish such enterprises in areas with large areas of natural forage lands. Rearing and fattening of young animals are carried out directly on the farm. It is proved that the highest efficiency is achieved with the live weight of young animals 18 months of age 450-500 kg. during this period, the animals grow most intensively, a greater yield of products of good quality, high feed yield. In such farms, cattle breeding is conducted in a closed cycle, that is, the reproduction of the herd is carried out at the expense of repair young animals grown directly on the farm.

4. Specialized on cultivation of repair young growth. Pedigree young growth is grown from 20-day (or 3–month) age, and in 6-7 months. activities implemented in agriculture for the repair and replenishment of the herd. It is more expedient to realize cows-the firstborn after 4 months. lactations. A complex assessment of each head on the developed tests is carried out by a special Commission. The main attention is paid to the level of productivity of animals. Daily milk yield from a cow should be at least 15 kg, or 4500 kg per year.

5. Specialized in the rearing of over-repair young. Until these enterprises, typically, comes livestock pislamolozivnogo (20-day) period (just until 6 monthly age) on cultivating and doraschivanie until 7-8 and 12 mo. For the final fattening, these young are transferred to specialized enterprises. It is carried out here on an intensive basis. The term of realization of animals is determined by their physiological characteristics.

According to scientific research, confirmed by practice, the period of final fattening should be 4-6 months, and the age of fattening young animals for the period of implementation-14-18 months. During this period, there is the most intensive growth of animals, the build-up of valuable fleshy tissue, a high increase in live weight per unit of feed, that is, a high payback. In the subsequent phases of growth and development, there is an accumulation in the body of adipose tissue necessary for reproduction, and bone mass, but the quality of products deteriorates, feed yield decreases. Implementation the weight of one head of cattle aged from 14 to 18 months. it should be 450-500 kg, that is, it is necessary to ensure its daily increments of 900-1200 g. such specialized farms should provide livestock with their own feed. Practice shows that it is expedient to create specialized enterprises for the cultivation and fattening of cattle of meat breeds with the use of natural forage lands and by-products of cereals and other crops. As already noted, the production process in these farms is advisable to organize a closed cycle.

In addition to these specialized enterprises, breeding plants and breeding farms-reproducers also play an important role in the development of animal husbandry. At breeding plants, work is underway to breed new breeds of animals, the reproduction of which is then engaged in breeding farms-reproducers, from where the animals are transferred to commodity enterprises for the production of appropriate types of livestock products.

Cattle breeding as an industry is rationally combined with crop production, since it is effectively used for food by-products of field production. Organizationally and technologically it is also connected with other branches of animal husbandry, for example, with pig breeding, since this industry is not a competitor, it is dominated by concentrate type of feeding, and in cattle breeding-silage-haylage.

In addition, cattle breeding provides a large amount of by-products (leather, hooves, horns) for the processing industry.

Cattle consume the cheapest plant feed, waste sugar and other types of food industry, and therefore its diet has a lower cost than for other species of animals. In addition, cattle breeding has the highest return on feed. The cattle industry is of great importance for the development of other sectors of agriculture. For crop production, it supplies valuable organic fertilizer-manure - for pig farming-milk needed for young pigs.

Due to the consumption of a large volume of coarse and succulent feed, cattle are kept mainly where there are forage lands, especially natural ones, which provides a sufficient economic effect.

Cattle breeding is a fairly capital-intensive industry. Therefore, the construction of large livestock complexes for the production of milk and meat requires significant investment. Such highly effective complexes, but their functioning is associated with the deterioration of the natural environment. This predetermines the need for a comprehensive technical, economic and environmental justification of the rational placement of livestock complexes.

In recent years, under the influence of a significant number of negative factors, the share of cattle in the total volume of cultivation of farm animals in Ukraine has decreased significantly (table 16.1).

Table 16.1

The structure of the livestock and poultry growing in Ukraine, %

Species of farm animals	2005	2010	2015	2016	2017
cattle	36,9	22,3	18,8	18,9	17,7
pigs	30,9	31,2	32,0	31,4	30,7
sheep and goats	1,4	1,4	0,9	0,9	0,9
horses	1,1	0,7	0,4	0,4	0,4
rabbits	1,1	0,9	0,8	0,8	0,8
poultry	28,6	43,5	47,1	47,6	49,5

In 2005, the share of cattle in the structure of growing agricultural animals was 36.9%, in 2010 – 22.3%, and in 2017-17.7%. The reasons for this are: low purchasing power of Ukrainians, the growth of the cost of production of milk and meat of cattle and the irrational policy of state financial support for representatives of the poultry industry, which received from the state unreasonable competitive advantages.

The increase in several times the volume of poultry meat production and the decrease in the production of cattle meat is a manifestation of the presence of sectoral imbalance in the structure of the livestock segment of the agricultural sector of the Ukrainian economy. As a result, there was an effect of "substitution of production" between the volumes of production of meat morde and meat of beef and veal, which produced all categories of farms.

Characterizing the structure of the cattle herd, it should be noted that in 2017 the share of cows was 57.1% (table 16.2).

Beef and veal in the meat balance of Ukraine should be about 35%. The scientifically-based rate of meat consumption as a necessary food product is 80 kg per person per year, including 36 kg of beef and veal.

Table 16.2

Number of cattle in Ukraine, thousand heads

Type of cattle	Year				
	2005	2010	2015	2016	2017
Cattle	6514,1	4494,4	3750,3	3682,3	3530,8
including cows	3635,1	2631,2	2166,6	2108,9	2017,8
heifers from 1 year to 2 years	359,1	288,9	252,6	337,3	338,4
heifers from 2 years and older	276,1	177,5	139,8	124,3	119,4
sires	21,6	14,4	9,3	8,9	8,3

Milk and dairy products according to scientifically sound food standards, a person should consume an average of 380 kg (in terms of milk), including 120 kg of milk in fresh form.

Table 16.3

Development of cattle breeding in Ukraine (all categories of farms)

Year	Number of cattle		Production of milk		Production of cattle meat (in slaughter weight)	
	total, million heads	Including cows	total, million tonn	per capita, kg	total, tsd tonn	per capita, kg
2005	6,5	3,6	13,7	291	562	11,9
2010	4,5	2,6	11,2	245	428	9,3
2015	3,6	2,2	10,6	248	384	9,0
2016	3,7	2,1	10,4	243	376	8,9

2017	3,5	2,0	10,3	242	364	8,6

Now, under the influence of negative processes in agriculture, the production and consumption of these products has decreased significantly and in 2017 the consumption was 200 kg of milk and dairy products and 51.7 kg of meat and meat products, including beef and veal 7.5 kg.

The main producers of milk in Ukraine are households: their share in 2017 amounted to 73.1 % of the total volume of milk produced by all categories of farms (table 16.4).

Table 16.4

Dynamics of milk production in Ukraine

Indicator	2005	2010	2015	2016	2017
All categories of farms					
Number of cows, thousand head.	3635	2631	2167	2109	2018
Milk production, thousand tons	13714	11249	10615	10382	10281
Milk yield from one cow, kg	3487	4082	4898	4923	5095
Agricultural enterprise					
Number of cows, thousand head.	866	589	505	485	467
Milk production, thousand tons	2582	2217	2669	2706	2766
Milk yield from one cow, kg	2981	3975	5352	5643	6025
Share of agricultural enterprises in gross milk production,%	18,8	19,7	25,1	26,1	26,9
Households					
Number of cows, thousand head.	2769	2042	1662	1624	1551
Milk production, thousand tons	11132	9032	7946	7676	7515
Milk yield from one cow, kg	3643	4110	4437	4473	4480
Share of households in gross milk production, %	81,2	80,3	74,9	73,9	73,1

The decrease in the number of cows in the period 2005-2017 by 44.5% contributed to the improvement of the qualitative composition of the milking herd. This is evidenced by the tendency to increase the average annual milk yield from one cow. Thus, in 2017, the average productivity of cows in farms of all categories increased by 46.1% compared to 2005. At the same time, the productivity of cows in agricultural enterprises was higher by 1545 kg, or 25.6%, compared to agricultural enterprises. Although in 2005 there was a reverse situation.

It should be noted that a significant proportion of milk and meat produced in households remains with producers and is used for their own consumption or sold on the consumer market. Therefore, the level of self-sufficiency in milk and dairy products in 2017 amounted to 107.7%, and meat and meat products-105.1%.

The reasons for the low marketability in the private sector are explained by the lack of material interest of private producers to sell it to processing enterprises, since the purchase prices for these types of agricultural products are lower than prices on consumer markets.

Imperfect also remains the organization of procurement of milk produced in households. In addition, according to the Association Agreement with the EU and its regulations on sanitary and hygienic standards that relate to dairy raw materials, all "dangerous" milk, which today accounts for about 75% of all milk produced in the country, should disappear from the Ukrainian market. This means that private households will suffer from innovations, because they produce low-quality raw materials. But the order banning the purchase has a transitional implementation period until 2022.

The largest number of cows and milk production is concentrated in Vinnytsia, Khmelnytsky, Zhytomyr and Poltava regions of Ukraine. Least cows contain in Lugansk, Donetsk, Kirovograd and Chernivtsi regions.

In Ukraine, more than 30 breeds of cattle are bred. Cows of dairy breed are more in demand in agriculture, thanks to such breeds regular deliveries of milk are carried out. The quality of such products depends on several factors, one of which is the breed of dairy cows. In farms of the country the main breeds of the dairy direction of productivity are the Ukrainian black-pockmarked dairy, red steppe, Ukrainian red-pockmarked dairy, Red Polish, Holstein, Jersey and others.

Animals of meat breeds in comparison with dairy, have higher intensity of growth, good adaptation to pasture conditions of the contents. Unlike dairy and combined breeds, they finish their growth 3-4 months earlier. Their slaughter yield is 5-10 % higher, the best ratio of tissues in the carcass is less than bones, their muscle tissue is thinly fibrous, the meat is evenly permeated with fat and juicy.

Domestic meat breeds include Ukrainian, Volyn and Polesie meat. The most common breeds of foreign selection in Ukraine are Hereford, Aberdeen-Angus, Charolais, Kiana, Santa Gertrude. Animals of these breeds are used for breeding new breeds, improving existing ones and industrial crossing with cows of dairy and dairy-meat directions of productivity, the offspring of which are grown for meat.

One of the features of the dairy cattle industry is the seasonality of production, or uneven production of milk and dairy products during the year (Fig. 16.1). The seasonality of milk production mainly depends on two factors - the distribution of calving and the organization of feeding cows. The majority of cattle in Ukraine calves in the autumn-winter period, respectively, in the spring-summer period, the volume of milk production increases. In addition, it is in the spring and summer period that the amount of green mass as the main source of food increases. As a result of transition of cows to pastures milk yields increase. However, to a greater extent this applies to households, in contrast to industrial, most of which have switched to the same type of feeding cows during the year.

Seasonality determines the specificity of planning costs for production. The formation of milk prices largely depends on the ratio of supply and demand, taking into account seasonal factors. The decline in milk prices in Ukraine, as usual, falls in the summer months. It is during this period that the largest volumes of milk are produced and sold. In the autumn-winter period, when milk yields are relatively low, sales prices increase. Their gradual growth begins in August and lasts until March of the next year inclusive.

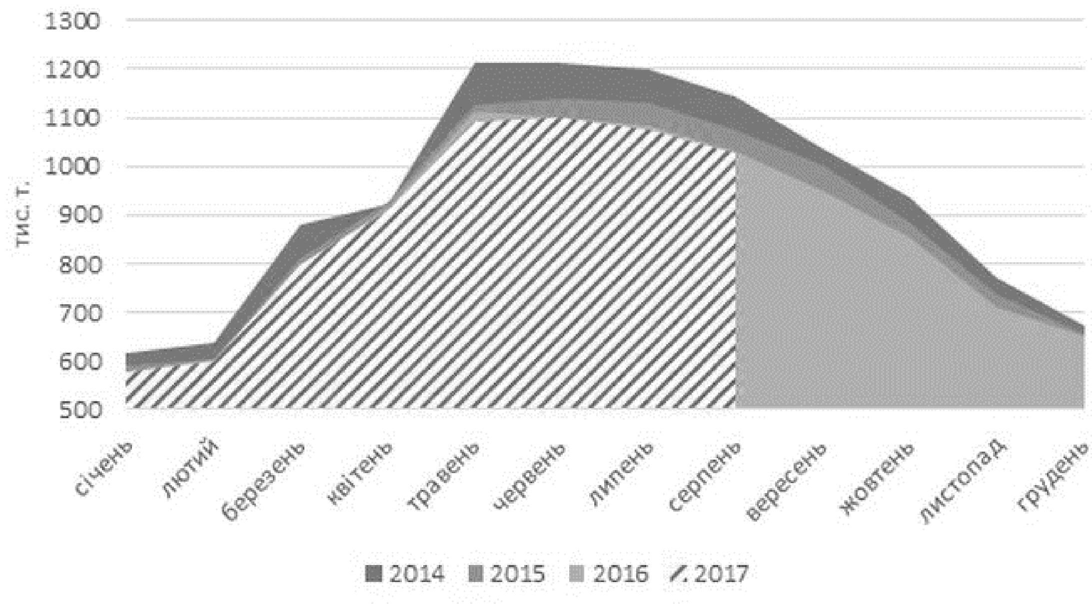


Figure 16.1. Seasonality of milk production in Ukraine, thousand tons

In recent years, seasonal fluctuations in milk production and dairy products tend to decrease. The main factor in reducing seasonal fluctuations is the increase in the share of specialized farms in the volume of milk production. Such agricultural enterprises, as a rule, use the same type of feeding of cows during the year, as a result of which fluctuations in the production and sale of milk are determined by the timing of obtaining offspring and the ability of the farm to provide favorable conditions for keeping cows in the hot months of the year. As the proportion of farms using the same type of feeding cows increases, seasonal fluctuations in milk sales and prices will continue to decrease.

16.2. Efficiency of production of milk and meat of cattle

Further development of cattle breeding is aimed at fuller satisfaction of needs of the population of the country in milk, dairy products, beef and veal on the basis of rational use of available natural and production resources.

Over the period 2005-2017, the balance of supply and demand in the market of milk and dairy products in Ukraine deteriorated significantly (table 16.5).

The overall demand for milk and dairy products in Ukraine has been decreasing in recent years, due to a decrease in the consumption of milk and dairy products by the population (table 16.5).

Table 16.5

Balance of milk and dairy products, thousand tons

	2005	2010	2015	2016	2017
Production	13714	11249	10615	10382	10281
Changes in inventories at year-end	27	-11	-41	28	33
Import	112	273	78	105	132
Total resources	13799	11533	10734	10459	10380
Export	1901	956	464	434	835
Spent on food	1270	1099	1097	1069	1036
Toll	3	8	15	14	13
Consumption fund	10625	9470	8995	8942	8496
per 1 person, kg	225,6	206,4	209,9	209,5	200

The Fund of consumption of milk and dairy products by the population has decreased by 20% since 2005. The main reason, as noted earlier, is the low purchasing power of consumers.

Exports since 2005 decreased by 2.3 times, due to the ban on exports to Russia and the difficulty of delivering dairy products to Central Asia. However, by comparing the estimates with 2017 year 2016 (Fig.16.2), we are seeing strong growth in dairy exports. This was facilitated by high prices for oil in the world, which allowed three and a half times to increase its exports from Ukraine and become the second largest supplier of oil to Europe, and this is already a certain reputation in the world trade arena. Morocco (20.9% of all exports) and Turkey (18,7%) also bought our oil. In addition, Ukrainian exporters have secured stable cooperation with China, to which 46% of all exports of whey were delivered. The new partner country was Qatar - the largest buyer of milk and cream-32% of all exports in 2017. Ukraine has actively started to enter the markets that belong to the African, Asian regions and the European Union.

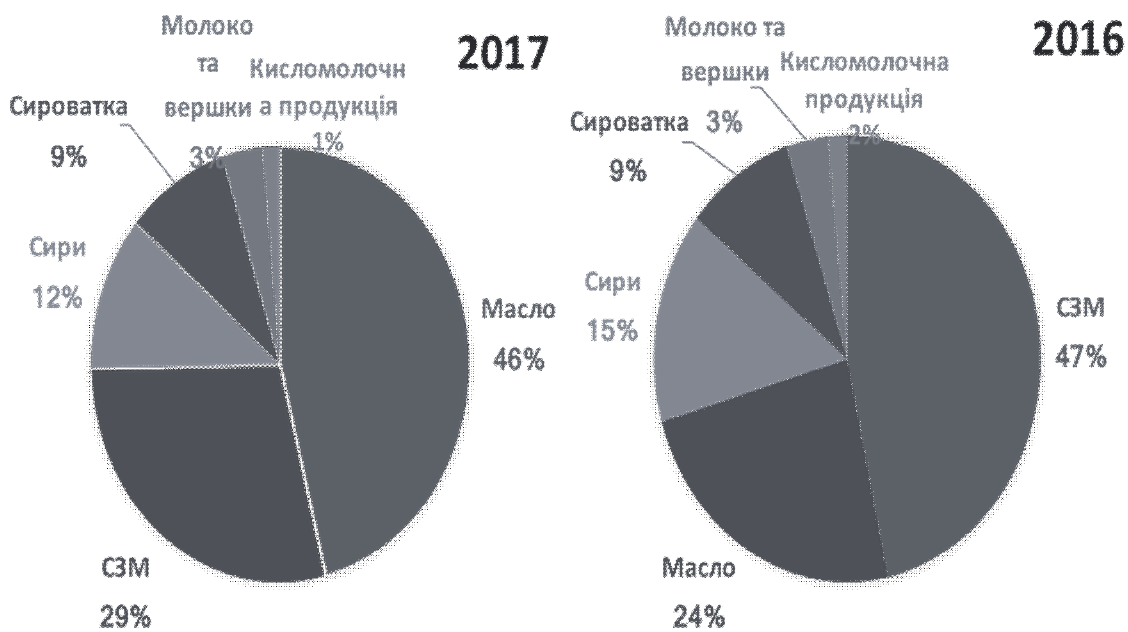


Figure 16.2. Structure of export of milk and dairy products in Ukraine, %

The amount of milk used for livestock and poultry feed decreased by 18% in 2005-2017 and amounts to 1036 thousand tons. This is due to the reduction of the total number of young animals.

The increase in losses of milk and dairy products more than 4 times since 2005 is of concern. For the period 2015-2017 years, they accounted for an average of 14 thousand tons.

Reducing the demand reduces the supply. In the period 2005-2017, the total supply decreased by almost 25%, mainly due to a reduction in milk production.

The economic efficiency of dairy cattle breeding is characterized by a system of such indicators: cow productivity, feed consumption per 1 kg of milk, its cost and sales price, profit per 1 kg of milk and per average annual cow, the level of profitability of milk production.

One of the most important problems of development of dairy cattle breeding in agricultural enterprises is a significant increase in productivity of cows. Domestic and world experience shows that the minimum limit of effective management of the dairy industry is the level of annual productivity of cows 3000 kg. for 2005-2017. the average annual milk yield from cows in agricultural enterprises has doubled and in 2017 amounted to 6025 kg (table 16.6). This growth was achieved by reducing the number of cows, improving breeding and breeding work and optimizing feeding diets. As a result, feed costs per 1C of milk decreased from 1.3 C of feed. units in 2005 to 0.94 C feed. units in 2017. Improving the quality of feed and breeding of highly productive cattle helps to reduce feed costs per unit of production.

Table 16.6

Economic efficiency of milk production in agricultural enterprises of Ukraine

Indicator	2005	2010	2015	2016	2017
Milk yield from one cow, kg	2981	3975	5352	5643	6025
Feed costs for 1C of milk, kg feed. from.	1,3	1,2	1,00	0,97	0,94
The cost of 1C of milk, RS.	92,08	228,85	394,8	475,7	570,1
Sale price 1ts milk, UAH.	103,34	269,55	444,7	562,4	723,4
Profit per 1 cent of milk, UAH.	11,26	40,70	49,9	86,6	153,3

Level of profitability, %	12,2	17,8	12,6	18,2	26,9

The economic efficiency of dairy cattle largely depends on the level of material and monetary costs for the production of a unit of production in the industry. On average, the cost of production of 1C of milk annually increases, so in 2016 compared to 2017, it increased by almost 20%, and in comparison with 2005. - six times.

The cost of milk production depends on many factors and, in particular, on the level of productivity of livestock, labor costs and its payment per unit of production, the cost of feed and the cost of 1C of milk, and the like. Therefore, the identification of the reasons for the increase and implementation of appropriate measures to optimize the material and monetary costs for the production of a unit of production will allow farms to increase the efficiency of milk production.

The increase in the price of milk sales seven times in 2017 compared to 2005 had a positive impact on the improvement of the financial performance of farms from the sale of milk. If in 2005 agricultural enterprises from sale of milk had 11,26 UAH. profits on 1ts milk, in 2017 - 153,3 UAH. profits. This allowed to increase the profitability of milk production in 2017 to 26.9%.

Table 16.7

Balance of beef and veal in Ukraine, thousand tons

	2005	2010	2015	2016	2017
Production	562	428	384	376	364
Changes in inventories at year-end	-9	-8	0	-1	-1
Import	41	25	16	16	13
Total resources	612	461	400	393	378
Export	58	13	40	46	59
Spent on non-food purposes (for food, losses, etc.)	1	1	1	1	1
Consumption fund	553	447	347	346	318
per 1 person, kg	11,7	9,8	8,1	8,1	7,5

Consequently, the economic efficiency of milk production and profitability of dairy cattle breeding are achieved by conducting proven breeding and genetic measures, technologies of animal exploitation and the efficiency of the use of material, human and intellectual resources. Ukraine's accession to the WTO outlined clear prospects for the domestic dairy industry. Agricultural enterprises that use efficient technologies of keeping, milking and feeding will develop, and small households will be deprived of the opportunity to exist in the future.

A comprehensive analysis of the main indicators of the dynamics of economic efficiency of beef production indicates the preservation of negative trends in the industry.

Beef exports in 2017 increased to 59 thousand tons and reached the level of 2005 Roki after the recession and the rupture of trade ties with the Russian Federation. This is due to the fact that in the world market beef is always in demand and the prices there offer quite attractive.

Beef and veal are one of the promising areas of diversification of domestic agricultural exports. If all conditions and permits for the export of this type of meat to the countries of the Middle East and North Africa are agreed, the cattle industry will receive a new impetus to development, as well as an additional incentive for revival.

However, now the possibility of expanding beef exports from Ukraine is objectively limited by a significant decrease in its production due to a long decline in the number of cattle.

So, on January 1, 2017 in all categories of farms there were only 3682,3 thousand heads of cattle, including 1573,4 thousand animals on fattening. About 67% of the total number of cattle is concentrated in the farms of the population.

The main producer of beef and veal in 2017 is the economy of the population. They account for 74% of its total volume in the slaughter weight-456.7 thousand tons. At the same time, the share of cattle meat produced in households in the structure of production of all types of meat in Ukraine has not changed: in 2000 – 36.7%, in 2010-34.9%, in 2017-32.2%.

The share of cattle meat produced in agricultural enterprises in the structure of production of all types of meat in Ukraine has decreased significantly: in 2000 – 45.4%, in 2010-9.3%, in 2017-6.4%.

The main reason for the decline in the number of cattle and beef and veal production is its unprofitability due to the high cost of keeping livestock and low purchase prices for products. However, this year the price of beef has increased significantly, which can significantly affect the profitability of its production and stabilize the situation in the industry.

The way out of the crisis is possible only if the transition to the use of modern resource-saving technologies. In particular, the problem of providing the population with beef in most countries of the world is solved by increasing the specific weight of animals in the meat direction of productivity in the structure of the cattle herd.

In countries with high levels of meat consumption-Australia, Argentina, Brazil, Uruguay and Canada retain more than 75% of meat cattle from the total number of cattle in France, Spain, Ireland and the United States - from 25 to 75% in Germany, the Czech Republic and Hungary - up to 25%. In Ukraine, the share of beef cattle is less than 5% of the total available livestock. Factors affecting the meat productivity of cattle are:

- level of feeding and balanced diets;
- the breed of cattle and level of utilization of genetic potential;
- conditions and technology of cattle keeping;
- state of health of animals and timeliness of carrying out a complex of veterinary actions;
- intensity of fattening of young cattle.

Traditionally, the low economic efficiency of beef production is explained by a sufficiently long period of capital turnover in the industry, which is significantly inferior to the time spent on its processing and further promotion in trade.

At the same time, the increase in the cost of production is directly related to the insufficient level of organization of animal feeding with quality feed and unsatisfactory material, technical and resource support of the industry. The cost of beef production in most agricultural enterprises is too high because of the high feed costs per 1 ton of live weight gain, which are more than twice the normative value. And all this also affects the level of profitability of beef production.

The main reason for the increase in costs is the low average daily growth rates of young and adult cattle on cultivation and fattening, the level of which directly affects the formation of the cost of sales. In recent years, they have grown to 500-560 g, while in countries of the world with a competitive cattle industry, this figure exceeds 1000 g.

Production efficiency of beef and veal is characterized by a system of such indicators: animal productivity - average daily and annual growth of young animals, live weight of one head of feeding livestock during the implementation; the cost of labor and feed for 1 kg increase of live weight; the cost of 1 kg of gain and 1 kg live weight of young animals; sale price of 1 kg live weight; profit per 1 centner of live weight; the level of profitability of beef production.

The level of economic efficiency of growing and fattening young cattle for the period from 2000 to 2017 increased slightly (table 16.8).

Table 16.8

Economic efficiency of cattle meat production in agricultural enterprises of Ukraine

Indicator	2005	2010	2015	2016	2017
Average daily growth of young animals on cultivation and fattening, g	392	461	508	550	560
Average live weight of 1 head at realization, kg	381	345	371	365	367
Feed costs per 1ts gain, TS feed.from.	15,9	15,69	14,80	14,74	14,34
Cost of 1ts of live weight, UAH.	721,04	1397,24	2520,09	2799,57	3514,82
Sale price 1ts live weight, UAH.	540,61	896,08	2069,41	2104,74	3634,32

Profit, loss (-) per 1C of live weight, UAH.	-180,43	-501,24	-450,68	-694,83	119,50
Level of profitability, unprofitability (-), %	-25,0	-35,9	-17,9	-24,8	3,4

The average daily increase in live weight of one head in agricultural enterprises increased by 42.9% and amounted to 560g, respectively. the Average live weight of one head of cattle sold to processing enterprises, on the contrary, decreased by 3.7% and in 2017 amounted to 367 kg.

Increased productivity of young cattle contributed to increased productivity and more efficient use of feed. Thus, feed costs per 1C of body weight gain decreased by 9.8%. However, the high cost of 1C of live weight, and even more so its increase over the study period by more than 4.8 times led to unprofitable production of beef. The level of loss of beef cattle in 2016 amounted to 24.8%. The level of profitability of beef production in the absolute majority of agricultural enterprises of Ukraine is characterized by extremely low cost recovery and high level of unprofitability, which does not provide a simple and expanded reproduction of the production potential of the cattle industry.

In 2017, for the first time since the independence of Ukraine, the production of cattle meat became profitable. This was due to a sharp increase in prices in the domestic market for these products-by 73% compared to the price of 2016.

The economic efficiency of beef production is significantly affected by the timing of fattening and the age of the young, implemented when optimal conditions are reached. Intensification of beef cattle breeding, and first of all increase of level of feeding of young growth provide achievement of the corresponding delivery weight in more short terms and considerable increase of fatness of cattle. So, on cultivation of one head of young growth of a live weight of 400 kg for 2,5 years 40 TS forage, units or on 10 TS forage is spent. from. on 1 kg of increase.

The introduction of intensive methods of growing young allows to achieve this mass in 18 months. under spending 30 TS fodder, ed., and for 15 mo. - only under 24 TS fodder, units or respectively on 7.5 and 6 TS fodder. from. on 1 kg of increase. So, by intensive rearing of young animals, using the same amount of feed, you can get one and a half times more beef compared to conventional technology.

Deepening the division of labor in animal husbandry contributes to the development of beef cattle as a specialized industry. However, the increase in beef production in the future will be due to intensive cultivation and fattening of over-repair young cattle in the areas of dairy cattle breeding.

The reserves for increasing beef production should be improving herd reproduction in cattle breeding, reducing the number of yawl cows and the death of animals, bringing the level of providing animals with quality feed to a standard-based indicator, using the competitive advantages of complex mechanization and automation of production processes in the industry, optimizing the size of the retained herd of young cattle to rational scientifically justified parameters.

The experience of the organization of production of meat of cattle testifies that the basis of effective conducting of branch is a combination of the following complex of factors:

- a zonal approach to the development of this industry, since the market competition is formed not so much by the price as by the cost of production of the resulting products;
- priority development of specialized beef cattle breeding;
- the use of balanced in all nutrients and trace elements of feed together with grazing cattle on pastures;
- effective public financial support for the production of cattle meat;
- selection and breeding work.

QUESTIONS FOR SELF-CONTROL

1. What is the economic importance of cattle breeding in solving the problem of providing the population with food?

2. What economic importance does cattle breeding have for the development of agricultural enterprises and rural regions?

3. What indicators characterize the development of cattle breeding?

4. What structural changes have occurred in the development of cattle breeding in Ukraine over the last period?

5. What are the features of the development of cattle breeding in farms of different types and forms of management?

6. What forms of management provide the main volumes of milk and beef production?

7. What areas of specialization of cattle breeding have been formed in Ukraine?

8. What indicators characterize the economic efficiency of cattle production?

9. The level of economic efficiency of milk and beef production in agricultural enterprises?

10. Tasks and ways of cattle breeding development in Ukraine.

TESTS

1. What are the indicators to characterize the development of dairy cattle breeding?

1) herd structure;
2) price for milk;
3) dynamics of the number of cows;
4) duration of use of cows;
5) gross and marketable production of milk.

2. Which of the indicators characterizes the development of beef cattle?

1) remuneration of labor in cattle breeding;
2) availability of hayfields and pastures;
3) productivity of young cattle;
4) prices for young cattle.

3. What forms of management provide the main volumes of milk production?

1) state breeding farms;
2) farm;
3) personal farms;
4) agricultural enterprises of various types.

4. What indicators characterize the economic efficiency of milk production?

1) revenue from milk sales;
2) feed consumption per 1 cow;
3) level of profitability;
4) qualitative breed composition of cows;
5) profit per 1 cow.

5. Indicators of economic efficiency of beef production:

1) cost of 1ts of live weight;
2) gross gain output;
3) volume of sales of live weight;
4) the structure of the herd.

6. Which of the indicators affect the competitiveness of milk?

1) feed costs per 1ts of milk;
2) sale price 1ts milk;
3) the level of marketability;
4) method of milking cows;
5) product quality.

7. Which of the indicators characterizes the results of intensification of dairy cattle breeding?

1) sale price 1ts milk;
2) milk yield from one cow;
3) feed consumption per 1 cow;
4) production costs per cow.

8. Which of the indicators characterizes the economic efficiency of intensification of dairy cattle breeding?

1) milk production per 100ga of agricultural land;
2) volume of sales;
3) recoupment of additional costs;
4) labor costs per 1 cow.

9. To increase the economic efficiency of beef production affects:

1) growth of average daily growth;
2) increase in livestock;
3) labor costs per cow;
4) availability of cattle on 100 hectares of agricultural land.

10. The amount of profit in the sale of live weight of cattle directly affects:

1) average daily increase of cattle;
2) sales volume;
3) sale price 1ts live weight;
4) the quality of the feed.

THEME 17. ECONOMY OF PIG FARMING

17.1. Industry development and placement
17.2. Cost effectiveness of pig farming
17.3. Ways to increase the economic efficiency of pig farming

17.1. Industry development and placement

Pig production is extremely important in solving the problems of increasing meat production. The main pig production is meat and fat. Fresh pork is used as a high-calorie food for the population, as well as raw materials for the production of bacon, ham, sausages and various canned food. Hides, bristles and other pig slaughter residues are used as raw material for the light industry. The yield of meat and fat in slaughtering pigs is quite high and is 70-80% of live weight.

Pork ranks second after beef (about 34%) in the meat balance of Ukraine, and its share in the world meat production is almost 40%. In most European countries, the proportion of pork reaches 50%, and in Denmark, Hungary and China - 80%, indicating the important role of pigs in the organization of rational nutrition of the population..

Such biological features of pigs as high fertility, short embryonic period of development, precocity, omnivorousness, good return on forages, lead to significant economic benefits of pig production. Pigs are able to give birth to 10-12 piglets per farrowing, to reach a live weight of 100kg in six to seven months with a consumption of 1kg gain to 4kg feed. From a sow, 2.0-2.5 tonnes of pork can be obtained for slaughter weight up to 70% live weight (up to 60% cattle).

The analysis shows that for a long time the industry is in crisis and has undergone the most destructive, destructive changes. Due to the lack of sufficient support for national programs, production as a whole is not yet result-oriented, has no defined areas of resource concentration, investment utilization, and a prudent protectionist foreign policy on imports of animal products. Thus, during the analyzed period 2005-2017, the number of pigs in all categories of farms decreased by 1.1 times, and in agricultural enterprises increased by 1.4 times (table 17.1)..

The volume of pork production (in slaughter weight) in the period from 2005 to 2017 increased 1.5 times and amounted to 736 thousand tons..

The provision of food to the public depends directly on the level of production of food, especially of animal origin. There is considerable differentiation in the world in terms of production volumes and trends, which is due, first of all, to the development of productive forces. While in 2005 pork produced 10.5 kg per capita in Ukraine, in 2017 it was already 19.2 kg, or 1.8 times more. In the most developed foreign countries, there is a similar tendency to produce meat per person. The highest level of meat production per capita reached in Denmark, the Netherlands, Belgium, Canada.

Table 17.1

Development of pig farming in Ukraine (all categories of farms)

Year	The number of pigs		Pork production (in slaughter weight)		
	All, million heads	including in agricultural enterprises	All, thousand tons	at 100 ha arable land, tones	per capita, kg
2005	7,1	2,6	494	16,0	10,5
2010	7,6	3,3	631	20,1	18,0
2015	7,4	3,7	760	23,4	18,1
2016	7,1	3,7	748	23,0	19,0

2017	6,7	3,6	736	22,6	19,2

In general, the current state of pig production is characterized by the fact that a large number of farms have sharply reduced and some have even stopped producing pork. At the same time, the share of households in the total production and sale of pork in the slaughter mass accounts for almost 60%. This was not so much because they improved the level of management and the production of these products, but because of the sharp decline in livestock and a 1.5-2 fold decrease in pig productivity in agricultural enterprises. Practically not engaged in pork production and farms.

Pig farming in peasant farms remains at a primitive level with predominantly 1-2 piglets kept for fattening. This sector is demanding to form a market for young pigs and feed for final fattening. The advantage here is the rational use of household waste, including potatoes and other food.

Based on scientifically sound standards, the consumption of meat per capita should be 80kg, including 32kg of pork. For this purpose it is advisable to keep in all categories of farms 1 million main and 1.5 million pigs to be tested, to receive from each of them an average of 14.4 and 7 pigs, respectively, to raise and feed young animals up to 100-110 kg, to receive 400-500 g daily average increments. In the coming years, due to the intensive use of the available livestock, improvement of the forage base and the improvement of technological processes, to predict the increase of pork production up to 2.2-2.3 million tons in slaughter weight. For this purpose it is necessary to have highly skilled personnel, to breed high-productive breeds with rational use of methods of pure-bred breeding, crossing and hybridization..

Compared to other animals, pigs are better paid for their feed. At full and balanced feeding on one kilogram of increase of live weight of pigs 4-5 feeds are used, units, young cattle - 8-9 and sheep - 8 feeds. units.

The location of pig production in the territory of Ukraine has no regional restrictions and is focused only on sources of fodder formation. Most pigs are kept in the farms of Dnipropetrovsk, Zaporizhia, Kyiv, Kharkiv and Cherkasy regions. The level of pig breeding in the regions is also characterized by livestock density per 100 ha of arable land. In 2017, the pig population in the country's agricultural enterprises was 205 heads.

The farms of Ukraine are actively engaged in improving the breed composition of pigs. Currently in Ukraine breeding and selection of 15 breeds and specialized types of pigs of different directions of productivity are engaged. Among them are numerous breeds, for example, large white. Along with them, some breeds, such as the Ukrainian steppe ripples, large black and others, have several times less livestock. These are local and endangered species, which have recently received much attention.

The areas of pig specialization are determined by the type of pig fattening. The main ones are meat, bacon and sebaceous. In agricultural enterprises meat predominates the type of fattening, 85% of the fattening livestock are pigs of meat direction. At meat feeding put youngsters at the age of 3-4 months, and at intensive fattening earlier. Feeding is completed at the age of 7-8 months. upon reaching the animal weight of 100-110 kg. With intensive meat fattening per day, 600-700 g of live weight gain is obtained, and feed costs per 1 kg of growth are 4.5-5.5 feed. units.

In the case of bacon fattening, young mature breeds are used - big white, landras, Estonian bacon and their mixtures. For feeding put young at the age of 3 months. live weight 25-30kg. The feeding at the age of 6-7 months ends. upon reaching the live weight of 90-100 kg and the thickness of the pelvis is not more than 4 cm. Normal feeding of young animals with high-grade rations is required to obtain high quality bacon.

As a rule, put sows and boars are put on fattening. Feeding lasts 100 days at high average daily increments (up to 800-1000g). A high level of live weight gain in fatty fattening can be achieved by using bulky and relatively inexpensive feeds: combined silage, root crops, green fodder, food waste, etc. At fattening of pigs to sebaceous conditions on 1 kg of growth 7-8 forages are spent. units.

Pig farming is located in agricultural enterprises of different production types. The most intensive and effective pig breeding is developed in specialized farms. By nature of intra-industry specialization pig farms are divided into breeding and commodity. Breeding pig farms raise high-quality animals for sale to breeding farms to restore and maintain at an appropriate level breeding qualities of pigs.

Commodity pig farms by their specialization are divided into the following main types: reproductive farms that breed pigs up to 3-4 months of age for sale by fattening enterprises; fattening plants that produce young animals purchased from reproductive farms; farms with a complete production cycle, where pigs are reared and fattened.

In all types of farms, specialization in pig production leads to an increase in the economic efficiency of the industry. However, the most common form of pig farm specialization is farms with a complete pork production cycle.

In pig production, specialization and concentration of production, which promotes the introduction of industrial technology and the construction of large pig complexes, have a significant impact. The construction of such specialized establishments of industrial type for fattening pigs with a complete herd turnover, with full mechanization and automation of production will allow to increase the production of pork and turn it into a highly profitable branch of agriculture.

17.2. Cost-effectiveness of pig production

Pig farming is one of the intensive industries of productive animal husbandry. Efficiency of pig production, like other branches of agriculture, depends on the saving of lively and efficient work on the production of a unit of production.

The economic efficiency of pig production is characterized by a system of natural and cost indicators: the productivity of animals - the average daily weight gain of one head of young animals or pigs for fattening, the output of piglets (at 2 months of age) and the increase of live weight per one sow for the beginning of the year and fattening young pigs to a certain live weight; feed consumption per 1 cent gain of live weight; labor productivity; at a cost of 1 quintal of growth and live weight; the average selling price of 1 kg live weight of pigs; profit per 1 kg of live weight; level of profitability of pork production.

Pig farming is one of the intensive industries of productive animal husbandry. Efficiency of pig production, like other branches of agriculture, depends on the saving of lively and efficient work on the production of a unit of production.

Agricultural enterprises are significantly different in terms of economic efficiency of pork production. In most farms, pig farming is conducted at low levels, and often on an extensive basis. As a result, pig productivity and feed efficiency remain low.

The level of pork production efficiency in Ukrainian agricultural enterprises is low-cost (Table 17.2). In 2017, the level of profitability of pork production in agricultural enterprises was - 3.5%.

The cost of production in agricultural enterprises is quite high and continues to grow. Yes, it increased from UAH 2189,54 only for the period 2015 - 2017. up to 3227,99 UAH, or 1.5 times.

Table 17.2

Economic efficiency of pork production in Ukrainian agricultural enterprises

Indicator	2015р.	2016р.	2017р.
Average daily growth of pigs for growing and fattening, g	460	482	477
The average live weight of farm animals sold for slaughter	108	107	106
Average live weight of 1gol. sold to processing enterprises, kg	112	111	109
The cost of feed per 1c of pig growth, this feed. units	4,46	4,41	4,31
The cost of 1c live weight of pigs, UAH.	2189,54	2519,36	3227,99
Sales price of 1c live weight, UAH.	2468,10	2405,01	3340,97

Profit, loss (-) per 1c of live weight, UAH.	278,56	-114,35	112,98
Profitability, loss ratio (-),%	12,7	-4,5	3,5

The cost of feed and the cost of 1 c of feed units have a decisive influence on the cost of pig production.

The level of profitability of pig farming depends on the cost of live weight of pigs and the cost of its sale. Prices are differentiated by product quality, so the decisive factor in raising them is improving the quality of the livestock population.

17.3. Ways to increase the economic efficiency of pig farming

The main direction of increasing the economic efficiency of pig production is a consistent intensification based on strengthening the feed base and ensuring a balanced feeding of pigs, improving the breeding and productive quality of livestock, increasing the use of sows and production of young animals for fattening, deepening the specialization and concentration of industry, introducing special technologies and technologies. forms of organization and remuneration.

In many farms, pig productivity remains extremely low, with young animals rearing half and two times the regulatory deadline, resulting in the genetic potential of animals being used by only 50-60%. The main reason for this is the defective and unbalanced content of pigs' amino acids, vitamins and trace elements. Therefore, to increase the economic efficiency of pigs in the farms of Ukraine requires uninterrupted supply of pig farms with high-grade feed, which will increase the productivity of pigs and cost recovery. Feeding pigs with balanced diets of up to 50% of the nutrients of the fed feed is spent on production. Under these conditions, the average daily weight gain of young animals can be 550 g at the expense of feed per 1 cent 4.5-5.0 cent feed, units. Feeding over the whole period of rearing and fattening pigs should ensure programmed livestock productivity and high feed costs.

The experience of advanced enterprises and research institutions shows that the feed resources of the industry are most effectively used at the optimal ratio of forage in the following proportions: barley - 30-35%, corn - 25-30, wheat - 25-30, peas - 10-15, oats - 3-5%. All grain forage should be fed in the form of complete compound feeds enriched with herbal and meat and bone meal, vitamins, trace elements, etc..

Improving pig breeding performance is an important way to improve the breeding and production performance of pigs. In most Ukrainian farms, the most productive are pigs of large white breed and their mixes. Significant increase in pig production is achieved through the industrial crossing of specialized lines and breeds, which enables the use of heterosis in the breeding of pigs. As a result, sows fertility increases by more than 10%, increases livelihoods and accelerates piglet growth. Up to 3 months old domestic pigs have a live weight of 15-20% more than purebreds while reducing feed costs per 1 kg of increase by 10%. In the process of fattening, the productivity of the local young increases by 20-30%.

The gene pool of the main breeds and lines of pigs available on the farms of Ukraine is able to provide an average daily weight gain of 650-700 g with intensive fattening.

It is also possible to increase pork production and industry efficiency through the intensive use of sows. The quantity and quality of piglets received from one sow depends on the volume of pork production and the level of its cost. With balanced feeding of pigs, the yield of one pig on one main sow per year can be at least 18-20 goals, which at the final stage of production provides 20-22 c live weight.

Increasing pork production and reducing its cost is influenced by such an important factor of intensification as improving the reproduction of the herd of pigs and enhancing the reproductive capacity of basic and single sows. This is due to the fact that the whole process of production and its final results depend on the uniformity of the receipt of the required amount of repair young, its physiological condition, inherited productivity. According to experts, the increase in the yield of pigs from one sow from 16 to 18-24 goals. Increases feed efficiency by 6-18%.

Increasing the specialization and concentration of pork production is an important factor in increasing the economic efficiency of pig production. In many farms of Ukraine, due to the existing differences in technology and mechanization of production processes, optimal sizes of pig farms are not ensured, which results in low level of pork production efficiency.

Deepening the specialization of pig farms contributes to improving the economic efficiency of pork production. Especially high-efficiency pig complexes that produce pork by industrial technology. Industrial technology requires the standardization of breeding, feeding and keeping animals, the use of heterosis young animals, feeding livestock with complete feed mixtures, group holding of pigs of the same age, guild production and narrow specialization of labor.

An important factor in the efficiency of industrial technology in pig production is the necessary veterinary (preventive and curative) measures on the farm. In conditions of high concentration of livestock, the role of veterinary services is increasing and it becomes an integral part of the normal functioning of the complex and the intensification of pork production.

The expansion of pork production and its efficiency depends on the formation of the meat market in Ukraine. The meat market is a system of economic relations between producers of raw materials and a final product for consumption, through which the right to property specific to a particular market is realized through the sale and purchase. This means that the meat market, in which the exchange processes are fundamental, equally covers production, distribution and consumption and has not only a direct but also a counterproductive effect on the reproduction process, that is, has the ability to regulate itself.

The most general features on which market relations are formed are the high interest of enterprises in the markets, since in their absence there is no proper market, but there is a simple division. Therefore, the presence of market relations in the meat subcomplex can be said only when there is a balanced system of production and consumption of meat products, when the growth rate of production will outstrip the rate of increase in consumption. In addition, a high degree of business autonomy based on legal and business law is an essential condition for forming market relations.

Consequently, the development of pig production and the provision of affordable meat products to the population is possible only if all units of the meat subcomplex of Ukraine are reformed, their technical and technological re-equipment based on the achievements of scientific and technological progress..

QUESTIONS FOR SELF-CONTROL

1. What is the economic value of pig farming?
2. What indicators characterize the development of pig production?
3. What have been the changes in pig production in recent years?
4. What is the place of pig production in Ukraine's meat balance?
5. Describe pig breeding specializations that are determined by the type of pig fattening.
6. What indicators characterize the economic efficiency of pig production?
7. What is the current level of labor productivity, cost and profitability of pork production?
8. What indicators characterize the level of intensity and economic efficiency of an intensification of pig production?
9. What are the channels of sale of pigs nowadays?
10. What are the main areas of increasing pig breeding efficiency?

TEST TASKS

1. Indicators of economic efficiency of pork production:

1) the cost of one head of young pigs;
2) the cost of one main sow;
3) feed costs for one main sow;
4) the cost of 1t pig growth;

5) level of marketability.

2. Indicators of economic efficiency of pork production:

1) realized live weight of pigs;
2) level of marketability;
3) level of profitability;
4) pork production per 100 ha of arable land.

3. Performance indicators of pig production:

1) level of marketability;
2) profit per 100 hectares of arable land;
3) profit for one main sow;
4) proceeds from the sale of products per one main sow.

4. Indicators of pig production intensity:

1) production costs per 1c of pig growth;
2) production costs for one main sow;
3) feed costs per 1 h of pig growth;
4) labor costs per 1c of pig growth.

5. Indicators of pig production intensification:

1) volume of pork production in the farm;
2) production of pork per 100 hectares of arable land;
3) production of pork for one main sow;
4) labor costs for one main sow.

6. Indicators of result of pig production intensification:

1) the cost of gross production per basic sow;
2) the cost of one main sow;
3) volume of pork production in the farm;
4) production of pork per 100 hectares of arable land.

7. Indicators of economic efficiency of pig intensification:

1) the cost of gross production per basic sow;
2) the cost of gross output per average annual employee;
3) the cost of gross production per 100 ha of arable land;
4) volume of pork production in the farm.

8. Indicators of economic efficiency of pig intensification:

1) the cost of gross production per basic sow;
2) proceeds from the sale of products for 1 UAH. fixed assets;
3) level of marketability;
4) the cost of gross production at 1 UAH. production costs.

9. Economic efficiency indicators of pig intensification:
1) the cost of one sow;
2) recoupment of additional costs;
3) realized live weight of pigs;
4) sales revenue.

10. Ways to increase the economic efficiency of pig production:
1) increase in pork production;
2) increase in the number of pigs;
3) improving pig productivity;
4) raising the marketability of pig production;
5) introduction of industrial production technology.

THEME 18. ECONOMICS OF OTHER LIVESTOCK INDUSTRIES

18.1. Economics of sheep and goat breeding

18.2. Economics of poultry farming

18.3. Economics of beekeeping

18.1. Economics of sheep and goat breeding

Sheep farming is an important branch of productive animal husbandry, which provides the national economy with such important products as wool, sheepskin, smushki, lamb and milk.

Goat breeding is a branch of animal husbandry, which is engaged in breeding goats for milk, meat, wool, down, skins, fur. Goat milk is characterized by a high content of fat and protein, bactericidal action. From skins goats make Chevron, chrome, Laika, suede, Morocco and the like, and from down — high-quality lungs tissue, the thin Jersey, best varieties felt, headscarves. Fine wool is used to make technical fabrics, carpets, lizhniki and knitwear, and coarse woolen fabrics and knitwear.

Sheep and goat farming contribute to the efficiency of agricultural land use, especially in arid steppe and mountain areas. Sheep and goats-grazing animals, relatively unpretentious to the conditions of detention. They can make good use of unproductive natural land and the cheapest coarse and succulent feed. Thus, a high payment for feed is provided, and the production costs for their maintenance are relatively small.

Sheep are characterized by wool, meat, dairy, sheepskin, lamb productivity. According to the principle of productivity, the classification of sheep breeds is carried out. When breeding sheep, it is necessary to choose such breeds that in specific climatic and economic zones can show their characteristics and productivity to the greatest extent. Among the sheep breeds are the following:

- fine-wool breeds: Australian Merino, ascanian fine-wool, precos, Stavropol, Caucasian and others;
- semi-fine breeds: Gypsy, black, Merino plays, ascanian meat-Voinova and other;
- coarse breeds: Karakul, Sokolskaya, Romanovskaya, reshetylivs gornokarlovatsky sheep (racke, curcani), Wallachian, Ukrainian gornokarlovatsky and others.

In Ukraine, more than 30 breeds of goats are bred. Most popular Swiss dairy breed as zaranska and toggenburgs. There are the following main directions of goat breeding:

– milk (rock Sayanskaya, toggenburgs, Megrelian, nizhnenovgorodsky and regional population),
– sale duvet breed (breed Orenburg, Sochi, gornoaltayskoe),
– the wave rock (rock Angora, Soviet Volnova),
– hard-boiled milk-meat and combined.

At the end of the XX century these branches of productive animal husbandry of Ukraine were based on the fact that the main sales from the cultivation of these animals came from the sale of wool, not meat. In recent decades, the world leaders in this business have become producers from Australia and New Zealand, the demand for Ukrainian wool has fallen significantly (table 18.1).

Table 18.1

Development of sheep and goat breeding in Ukraine

Year	Number of sheeps and goats		Produced wool, tons, incl.		Produced lamb and goat, thousand tons
	Total, tsd heads	Including in agricultural enterprises	sheep	goat	
2005	1629,5	270,9	3023	172	16,2
2010	1731,7	298,4	4059	133	21,0
2015	1325,3	186,9	2233	37	13,7
2016	1314,8	187,2	2033	39	13,4
2017	1309,3	187,0	1924	43	13,5

The study of the state of sheep and goat breeding in Ukraine shows that during the period from 2005 to 20017r. the number of sheep and goats has decreased dramatically, and due to this, the production of wool. In 2017, almost 86% of sheep and goats were concentrated in households.

In 2017, compared to 2005, the number of livestock in the country's farms decreased by 20%, while in agricultural enterprises-by 31%, and households - 17.4%.

The largest number of sheep and goats in 2017 (almost half of the total population) kept farms Odessa (344,2 thousand heads), Transcarpathian (141,1 thousand heads), Kharkiv (72,3 thousand heads) and Nikolaev (66,3 thousand heads) regions.

Wool production has also decreased since 2005: sheep wool by 36.4% and goat wool by 75%. But if over the past three years, the dynamics of reducing the volume of production of sheep wool remained, the volume of production of goat wool for the period 2015-2017. increased by 16.2%.

The rate of decline in lamb and goat production since 2005 is much lower than wool-16.7%.

In the world market, the demand for lamb has been growing steadily in recent years. Consumption of this type of meat in the world is growing steadily. Consumption of this type of meat is primarily stable in the markets of developing countries, especially the Middle East. And the production of local products lags far behind market needs.

In 2017, the share of lamb and goat meat in Ukraine accounts for about 1% of the production of all types of meat in agricultural enterprises and 1.5% - in households, so these industries in Ukraine with full confidence can be considered an area of untapped opportunities to provide the population with meat. Consumption of mutton and goat meat by our citizens is quite insignificant. This is a consequence of the lack of an appropriate culture of consumption of lamb and goat meat, low incomes of the majority of the population, the lack of powerful advertising campaigns in the media.

In Ukraine, there are simply no zoned meat breeds of these animals, and breeding animals should be imported from abroad. Therefore, today Ukrainian producers of sheep and goat meat faced the problem of having productive zoned breeds of these animals. Farms are imported primarily from Europe breeding cattle, but it all depends on the cost and high prices. So far, this is a great luxury for many agricultural enterprises. Therefore, this is the main problem constraining its development.

Table 18.2

Economic efficiency of sheep production in agricultural enterprises of Ukraine

	2005	2015	2016	2017
Wool Average cut of wool from one sheep, kg	2,6	1,7	1,6	1,6
The cost of 1 quintal of wool, RS.	1702,20	3723,68	3597,83	6567,52
Sales price of 1 centner, UAH.	462,40	1417,14	2452,71	1983,39
Profit, loss (–) per 1 kg of wool, RS.	-1239,8	-2306,54	-1145,12	-4584,13
Level of profitability, unprofitability (-), %	-72,8	-61,9	-31,8	-69,8
Lamb Average daily gain per head, g	22	47	42	49
Cost of 1 kg of live weight, UAH.	799,90	2399,95	3191,56	3763,69

Selling price of 1 kg of living mass, grn.	543,00	1690,33	2069,38	2273,27
Profit, loss (–) per 1 kg of live weight, UAH.	-256,90	-709,62	-1122,18	-1490,42
Level of profitability, unprofitability (-), %	-32,10	-29,6	-35,2	-39,6

We are pleased with the first Ukrainian successes in the export of lamb. Exports today are still small, primarily Azerbaijan, which has increased quotas for the import of relevant meat. Live animals are taken in our farms by the Turks. Turkish quota for domestic farms in the volume is quite significant-23 thousand heads per year, which is promising for Ukrainian producers.

Analyzing the indicators of economic efficiency of sheep production in agricultural enterprises of Ukraine, we see a decrease in the average wool cut from one sheep by 38,5%, while it decreased in agricultural enterprises, it fell by 38.5%, and in households - by 1,.8%.

The total cost of 1 cent of wool in 2017 compared to 2005 was 3.8 times 6567,52 UAH. Justification of possible ways to reduce production costs requires a detailed analysis of the cost, its structure and the main trends of formation. In the process of increasing the cost of sheep products change its structure and the ratio of individual items of expenditure. In the structure of production costs 1 TS wool material costs amounted to 57,7 %, including feed-40.9%, labor costs-28,4%, General production and other costs-13,9 %.

The average sale price of 1ts wool in 2017 was 1983.39 UAH., which is 4,3 times more than in 2005. But this did not allow to withdraw production from a deep loss.

Low purchase prices for wool constrain the development of the industry. They do not provide reimbursement for its production. Prices on wool depend on its quality. In Ukraine, wool is mainly obtained from rough - haired, very little- from fine-and semi-fine-wooled sheep. Hence the low purchase price for it.

Production and sale of wool in agricultural enterprises of all regions of Ukraine is unprofitable. In General, in Ukraine in 2017, the loss from the sale of one hundredweight of wool was 4584,13 UAH. The level of unprofitability of wool production in 2017 increased to 69.8%.

The level of unprofitability of lamb production has not changed significantly in recent years and ranges from 30-40%. The average daily growth of one head of young sheep increased over the study period by more than 2 times and in 2017 was 49g.

The economic efficiency of lamb production depends on the level and dynamics of the cost of live weight of sheep and the prices of its implementation. During 2005-2017, the cost of 1 kg of live weight of sheep increased by 4,7 times, and sales prices at the same time increased by 4,2 times. As a result, the loss rate increased from 32,1% in 2005 to 39,6% in 2017.

The main constraining factors in the development of sheep breeding in Ukraine is currently:

- lack of a civilized market for products;
- low purchase prices for wool, sheepskin;
- the presence of small individual farms with a small number of livestock and the inability to provide it with pasture and modern technology and technological solutions;
- lack of control in breed breeding of sheep without taking into account the compliance of biological capabilities of animals with natural and climatic, economic and economic conditions of the breeding zone;
- low fertility and preservation of newborn lambs to realization;
- unsatisfactory conditions of feeding and rearing of young animals, taking into account the peculiarities of their growth in different age periods;
- insufficient use of domestic sheep gene pool to increase wool and wool productivity and fertility of ewes;
- unsatisfactory conditions of feeding and keeping of ewes in different periods of their physiological state.

The priority task for the revival of sheep breeding is to restore the sheep population, increase its productivity and the introduction of such technological solutions and methods of production that would ensure the competitiveness of the industry.

In Ukraine, there are only a few farms for breeding goats, where the population has more than 100 animals. Therefore, the range of products produced from goat's milk is insignificant. In small volumes, mainly in Lviv, Kiev, Kirovograd regions, pasteurized and sterilized milk and several types of cheese are produced. Of course, such goods will not quickly become cheap and mass. However, the prospects for the development of industrial production of goat milk and its processing products in Ukraine.

The industry of industrial dairy production of goat milk has been developing dynamically in the last 20 years. In the world, there are effectively functioning farms and 7,000 or more milking goats on one site.

In world practice, there is a clear tendency to replace cow's milk with goat's milk, especially for the production of children's, medical nutrition and cheeses.

There are more than 860 million animals in the world. goats of different directions of productivity: dairy, meat, wool, down, combined. World production of goat milk is constantly growing. This figure is more than 15.3 million tons per year, which is almost twice the production of sheep's milk.

In 2015, goat breeding in Ukraine was not in the best condition. In the country there were 585,3 thousand heads of goats. The annual increase in the number of goats in agricultural enterprises was positive - as of the beginning of 2015, 4.7 thousand heads of goats were industrially kept, which is less than a percent of the total population.

Centers of goat breeding are Odessa (87.5 thousand heads), Kharkiv (37.7 thousand heads) and Transcarpathian (35.5 thousand heads) region. According to FAO data, Ukraine produces 254.6 thousand tons of goat milk, that is, an average of 435 kg per goat.

In 2017, the number of goats was more than 650 thousand., mainly dairy and combined directions of productivity. Of these, 95% are in private farms, where they contain from 1 to 50 animals.

Already organized in Ukraine more powerful breeding and commodity high-tech farms for the production and processing of both milk and meat with livestock from 500 to 5000 goats. This increases the number of farms-breeding reproducers.

At the end of 2017, there were only five of them, but three are registered this year: FH "Anglo-Nubian goats", SC "Dobrynya", FH "Goat yard". There are also specialized farms "Tatiana 2011" and "Golden goat", which registered two breeds. And if before the hearing was only panenska breed, it also gives the Anglo-Nubian and Alpine. Today, most of the agricultural producers are designed for the domestic market.

Ukraine produces many types of products, especially soft and hard goat cheeses, which are in great demand. The products of some farms were highly appreciated at exhibitions and fairs, including international ones. A wide range of products (milk, cottage cheese, sour cream, butter, yogurt, cream, fat, meat, etc.) are sold through shops, restaurants, sanatoriums and individuals. Although the range of domestic producers is inferior to European. The market today is free for goat meat products. Therefore, in the future it is planned to breed goats of meat and combined directions of productivity. Although many of our compatriots appreciated the benefits of goat products, but not everyone can afford to buy it. So, goat's milk in rural areas is sold at the prices of cow's milk, and in cities it costs 2-3, and sometimes 5 times more expensive than it, when in Europe this advantage is only 30-50 %.

Assessing the current situation, supply and demand for goat products in the coming years should be expected:

- increase in the number of breeding and farming farms with livestock from 100 to 2000 thousand head.;
- increase in the share of highly productive breeding animals;
- increase productivity and quality of goat products;
- reduction of production costs and prices for goat products;
- strengthening of personnel and scientific support of the industry.

18.2. Economics of poultry farming

Poultry farming is a branch of agriculture that provides the population with high-calorie dietary food. The main products of poultry farming-eggs and meat-are nutritionally superior to most foods.

Chicken eggs contain about 12% of full-fledged proteins, 12% of fats, vitamins and trace elements. Scientifically justified rate of consumption of eggs-280 PCs. per person per year. In 2017, 365 eggs per person were produced in Ukraine, that is, the level of self-sufficiency with this product is 119.8%. Egg consumption Fund includes, in addition to eggs, egg powder and melange in terms of eggs. In 2017, one Ukrainian consumed 273 pieces of eggs, which is 97.5% of the norm.

Poultry meat is also noted for its high nutritional qualities. The meat of chickens and turkeys contains up to 23% protein and 17-24% fat, in the meat of ducks and geese-respectively 23-34% and 16-46%. During the study period, the share of poultry meat in the structure of meat production of all types increased from 11.6% in 2000 to 51.1% - in 2017.

In the process of processing birds receive down and feather, are valuable raw materials for light industry. Waste of incubation and slaughter of poultry is used for the production of feed flour. In addition, poultry farming provides valuable by-products-bird droppings.

Agricultural poultry is characterized by precocity, high fertility, intensive growth and productivity, which leads to good feed payment and efficient use of means of production. Hens of egg breeds already in 4,5-5 months begin to nest and give up to 350 eggs a year. Chickens meat breeds for 45-50 days reach living masses 1.5-2 kg, ducklings for 50-55 days-2.0-3.0 kg, and living mass goose in 4-5-monthly age accounts for 6-8 kg. Bird characterized by high slaughter host, the exit meat accounts for in average 65%. Due to the precocity and high quality, poultry products occupy a priority place among the branches of animal husbandry.

Ukrainian poultry farming has become one of the most economically attractive and competitive types of agribusiness, as evidenced by the steady growth in the production of poultry meat and eggs.

Since poultry farming is one of the most precocious branches of animal husbandry, which provides a rapid turnover of invested funds, so its development can be carried out thanks to a diversified type of production, which can include both meat, egg and egg-meat specialization.

A feature of the current state of development of the industry over the past decade is the growth of the number of poultry of all kinds, increasing production, increasing domestic demand and exports (table 18.3).

Table 18.3

Development of poultry farming in Ukraine

Year	Number of poultry, mln heads	Average egg production of 1 laying hen in agricultural enterprises	Egg production		Produced poultry meat (slaughter weight), thousand tons
			total, billion pcs.	Per 1 person, pcs	
2005	162,0	213	13,0	277	497
2010	203,8	281	17,1	372	954
2015	204,0	220	16,8	392	1144
2016	201,7	224	15,1	354	1167
2017	204,8	228	15,5	365	1185

Poultry keeping is developing intensively in all areas of Ukraine. Its location is influenced primarily by the proximity and concentration of the urban population. The industry is developing along the way of creating large industrial complexes around large cities and industrial centers.

The largest number of poultry in 2017 was concentrated in Vinnytsia and Kiev regions, respectively, 29,7 million heads (14.5% of the total population) and 29,5 million heads (14.4%). A significant number of livestock were kept in Cherkasy region – 24,4 million heads (11,2 %) and Dnipropetrovsk region – 18,5 million heads (9,1%). Together, these regions contain 49,2% of the total poultry population in Ukraine.

In 2017, the number of poultry in all categories of farms amounted to 204 million heads, including 55% in agricultural enterprises (table 18.4). The highest share in the structure of the poultry population is traditionally occupied by chickens and roosters-91.2% in 2017. There is a tendency to increase the number of ducks by 22,9% in the period 2005-2017.

Describing the production of poultry products by category of farms, it should be noted that agricultural enterprises, which contain 55% of the poultry population, concentrated 54% of egg production in the country in 2017.

Table 18.4

Poultry population in Ukraine

Types of poultry	Year				
	2005	2010	2015	2016	2017
Poultry, total including	161993,5	203839,8	203986,2	201668,0	204830,9
chickens and roosters	142573,0	183611,3	186354,3	184335,9	186737,2
geese	8099,1	6269,0	5114,7	4183,4	4116,9
duck	8909,4	10777,1	10150,2	10876,4	10953,7
turkeys	1882,7	1884,4	1825,0	1575,3	1951,0

The increase in poultry meat production is primarily due to the growth of demand from the population and food industry enterprises. Poultry has become a substitute for most meat consumers, as there has been a significant reduction in the supply of beef and pork in recent years. In addition, consumers prefer dietary poultry meat.

A significant increase in poultry production was made possible primarily due to the construction in Ukraine of modern high-tech poultry farms and complexes, which are provided with machinery and equipment of both leading world and domestic manufacturers.

In increasing the production of eggs and poultry meat, modern methods of intensive poultry farming on the basis of specialization and concentration of the industry are becoming increasingly important. Large specialized farms produce eggs and poultry meat on an industrial basis. Poultry farms are highly specialized large enterprises operating mainly on purchased feed. As a result of the narrow specialization of poultry farming is completely separated from feed production, but it remains indispensable.

The export potential of the industry deserves attention. It is known that Ukrainian poultry products are in demand in many countries of Asia, Africa and Europe. The highest demand for poultry meat is in Iraq, Kazakhstan and the Netherlands. In 2015, the export of poultry meat from Ukraine amounted to 190 thousand tons; in 2014, this figure was 175 thousand tons, which is 30 thousand tons more than in 2013.

Table 18.5

Balance of eggs (including egg products), thousand tons

	2005	2010	2015	2016	2017
Production	753	985	969	872	896
Changes in inventories at year-end	13	9	-4	0	0
Import	5	7	11	5	7
Total resources	745	983	984	877	903
Export	1	75	126	112	155
Spent on feed and incubation	91	125	136	95	72
Toll	6	16	21	11	6
Consumption fund	647	767	694	659	670
in calculation on 1 person, pieces	238	290	280	267	273

In recent years, Ukraine has significantly increased the export of eggs (table 18.5). In 2005, Ukraine exported 1 thousand tons of eggs, in 2017-155 thousand tons. Recently, Ukraine has been developing the direction of egg processing with the subsequent export of finished egg products, which is a very positive trend.

The main importing countries of fresh eggs from Ukraine were: Iraq, the United Arab Emirates, Moldova. The main countries where the export of egg products is carried out are the countries of the Middle East. Relations with countries of the African continent have also expanded in this regard. Ukraine received a quota for the export of eggs and egg products to the European Union.

Poultry farming, which is conducted on an industrial basis, is the most intensive branch of animal husbandry. It requires a high level of development of material and technical base, breeding of linear hybrid poultry of specialized breeds, as well as uninterrupted and complete satisfaction of the needs for high-quality feed with the use of full-fledged feed and protein-vitamin supplements, trace elements, amino acids, antibiotics for all species and age groups of poultry.

Production efficiency of poultry products is characterized by the following indicators: performance birds - the average annual egg production of laying hens and the average daily gain in live weight of young birds, the cost of 1000 eggs and 1 kg live weight of bird, price realization per unit of output, the level of profitability of its production (table 18.6).

Table 18.6

Economic efficiency of poultry production in agricultural enterprises

Indicator	2005	2010	2015	2016	2017
Egg production					
Average egg production of laying hens, pieces.	213	281	220	224	228
Cost of 1 thousand eggs, UAH	174,2	397,8	862,58	1108,87	1259,23
Sale price 1 thousand eggs, UAH	192,8	471,9	1388,14	1114,78	1145,90
Profit, loss (-) from 1 thousand eggs, UAH	18,6	74,1	525,57	5,92	-113,33
Level of profitability, %	10,6	18,6	60,9	0,53	-9,00
Meat production					
Average daily increase in live weight of one head, g	23	28	29,3	35,3	36,0
Cost of 1 kg of live weight, UAH	563,57	1028,5	1436,89	2011,81	2643,47

Sale price 1 kg of live weight, UAH	367,57	997,2	1349,12	2112,63	2828,51
Profit, loss (-) per 1 kg of live weight, UAH	-187	-31,3	-87,77	100,82	185,04
Level of profitability*, %	-33,2	-3,6	-6,1	5,0	7,0
Marketability of poultry meat, %	36,1	10,6	8,2	4,5	3,8

* excluding own processing

Analyzing the price situation, it should be noted that the sales price of 1000 eggs in 2017 are unable to cover the costs of production of these products, resulting in agricultural enterprises received 113,33 loss of UAH 1,000 eggs, which has reduced profitability to 9%. The relatively low level of egg production efficiency is the result of high cost, which has increased due to the sharp increase in 2016-2017. the cost of electricity, feed, fuel etc.

Analyzing the poultry market, it is necessary to pay attention to the very low level of marketability in the period 2015-2017 - it fell to 3.8%. This was facilitated by the increase in production capacity in agricultural enterprises with their own processing of poultry meat. Therefore, the calculations can be considered very conditional and understated.

During 2016-2017, the production of poultry meat ceased to be unprofitable, because the sale prices of 1C of live weight of poultry compensated the producers for the costs and allowed to get 185.04 UAH. profits.

None of the branches of animal husbandry over the past 10-15 years has had such a positive growth dynamics as poultry farming. This experience needs to be generalized for further revival of other less successful branches of animal husbandry. At the same time, the ability of the domestic market to ensure sustainable growth rates of production is objectively limited due to its glut of industry products. Consequently, the prospects of poultry farming are directly related to the development of exports to both traditional world markets and new ones.

Given the possibility of rapid saturation of the domestic market due to the development of powerful poultry enterprises, the development of the poultry market should be based on an export-oriented strategy that will balance supply and demand in the domestic market through exports to developed and new world markets. In order to implement this strategy, it is necessary to create conditions for regulating the circulation of food, taking into account the requirements of the world market. The formation and effective functioning of the poultry market should be based on the scheme, which provides for the relationship of domestic producers, processing enterprises, consumers and export-import operations.

18.3. Economics of beekeeping

Beekeeping is a branch of agriculture that is engaged in breeding bees and obtaining honey and other useful products from them. Bees pollinate many species of plants, being used to increase yields. Among the products of beekeeping is not only a valuable dietary product honey, but also wax, propolis, poison and others, they are widely used, in particular for human health - this medical practice is called apitherapy.

Ukraine is one of the leading countries in the world, which has developed beekeeping, which provides pollination of crops, production of honey, wax and other bee products for the needs of the population, food, medical, chemical and other industries.

Ukraine is recognized in the world as the birthplace of cultural beekeeping, founded by our compatriot P. I. Prokopovich, who created the first school of beekeepers and developed the basics of the industry almost 200 years ago.

Table 18.7

Development of beekeeping in Ukraine

Indicators	2005	2010	2015	2016	2017

Availability of bee colonies, thousands					
in farms of all categories	3369,0	2921,5	2590	2487	2642
including agricultural enterprises	184,3	95,4	49,9	47,1	43,6
households	3185	2826	2540	2440	2599
The production of honey, tonnes					
in farms of all categories	71462	70873	63615	59294	66231
including agricultural enterprises	2461	1620	918	901	847
households	69001	69253	62697	58393	65384
Honey was obtained on average per 1 bee family, kg					
in farms of all categories	21,21	24,26	24,56	23,84	25,07
including agricultural enterprises	13,35	16,98	18,40	19,13	19,43
households	21,67	24,50	24,68	23,93	25,16

In 2017, 99.3% of bee colonies were in households (table 18.7). Beekeeping in Ukraine is engaged in about 400 thousand persons. This is one of the largest indicators in the world. In fact, every hundredth Ukrainian is a beekeeper. At the same time, according to the organizational form of management, beekeeping is the closest to farming, whose share in the structure of content was only 0.2% in 2015-2017 .

The gross annual production of honey in 2017 amounted to 66.2 thousand tons, which is 7.3% less than in 2005. This amount of honey produced puts Ukraine in first place in Europe and fourth in the world in this indicator after China, India and Argentina.

The main producers of honey in Ukraine are 8 regions - Vinnytsia, Donetsk, Dnipropetrovsk, Zaporizhia, Zhytomyr, Mykolaiv, Poltava and Kirovograd. These regions provide the production of 70% of the total volume of honey per year.

However, production efficiency remains very low. For example, in Canada 7 thousand beekeepers produce 29 thousand tons of honey, and in Ukraine 400 thousand producers-only slightly more than 66 thousand tons.

Productivity of a bee family, for example, in Canada reaches 50 kg of honey a year, and at us-19,43 kg in agricultural enterprises and 25,16 kg - in farms of the population. This difference in performance is due to the fact that in Canada and most countries of the world honey production is at an industrial level.

To increase the production of honey could be the Association of beekeepers in cooperatives. Beekeeping becomes profitable starting from 100 bee colonies. Now it is planned to create a unified register of beekeepers, which will actively attract investment in the development of domestic beekeeping, create cooperatives for the processing of bee products and help beekeepers produce safe and quality products for both domestic and foreign markets. Also, the register will allow to coordinate cooperation of beekeepers and agricultural producers to avoid death of bees during chemical processing of fields and gardens.

Beekeeping is an industry that is completely dependent on the environment. If its transfer to the industrial level is a matter of profitability, the preservation of its ecosystem is a matter of the existence of the industry as such.

The main factor here is plant farming, which directly affects beekeeping. Without a fruitful honey base of plants rich in nectar and pollen (buckwheat, orchards and berries), bees will have nothing to pollinate and where to produce honey. By increasing the area under rapeseed, soybeans, wheat and corn, bees produce less honey.

Agricultural producers know that bees by their pollination work increase the yield of buckwheat, sunflower, alfalfa and Apple fruits by 50%, watermelons, melons and pumpkins-by 100% or more. With proper use of the energy of worker bees, it is possible to increase the yield of peaches by 4 times, cherries and cherries - by 7, and some grape varieties-by 10 times. Only about 150 crops need cross-pollination by bees. That is why many farms use apiaries to increase yields and produce bee products, which also increase the profitability of agricultural enterprises.

In addition to preserving and increasing the number of honey plants, it is also necessary to monitor the treatment of their chemicals. From polluted pollen they get low-quality honey, will not be certified. In addition, due to the excessive use of chemicals, bees themselves are dying - since the beginning of 2018, 800 bee colonies have died in Ukraine.

The development of domestic beekeeping is extremely important, because the number of new markets for this product in recent years is growing exponentially. Every year, only 25-30 thousand tons of honey produced in Ukraine enters the domestic market. The rest is exported.

Consumption in the country has decreased significantly due to the decline of the Ukrainian economy and the increase in export prices: if honey was worth 1.5 euros, then in euros it is worth it, but in hryvnia it has risen in price - the price in the domestic market has tripled.

Since honey is not a necessary product, Ukrainians are in no hurry to pay a high price for it. Therefore, it is more profitable for producers to export. 67 Ukrainian economic entities have already received the right to export honey.

According to the State statistics service, in 2017 Ukraine exported more than 36 thousand tons of natural honey for almost 84 million us dollars, of which more than 26 thousand tons (about 60 million dollars) - to Europe. In 2014, these figures were even higher: exports of over 36.3 thousand tons of honey enriched Ukraine by more than 93 million dollars. In Europe, Ukrainian beekeepers exported more than 26 thousand tons, which is more than 66 million dollars in profit. Against this background, preferential quotas for the supply of Ukrainian honey to the EU are only 5 thousand tons. The rest of the products are supplied on a General basis, with payment of customs tariffs.

Now the largest consumers of honey in the world, with a share of up to 50%, are the EU countries-Germany (13%), the UK (6%), France (6%), Belgium (4%), Spain (4%) and Poland (4%). The second position in the world ranking of importers in the United States with 21%, the third-in Japan 7%.

Ukrainian beekeeping is now experiencing a period of recovery. However, in order for this success not to become fleeting, beekeepers and the state need to resort to systematic steps. The first should move to European standards of production, the second-to begin to protect the industry.

The main problems of the beekeeping industry in Ukraine are:

- lack of effective state financial support for the industry;
- low technological culture of production, its processing and packing lack of industrial technologies;
- reduction of entomophilic crops and insufficient use of bee pollination;
- deterioration of the ecological state of the environment and violations of technological requirements of cultivation of entomophilic agricultural plants with pesticides and pesticides and as a consequence – mass poisoning of bees;
- insufficient veterinary support and as a consequence uncontrolled spread of bee diseases;
- lack of harmonized legislation on the production and quality of industry products and as a consequence of the complexity in the implementation of the export potential of the industry.

In Ukraine since the end of 2015 the program of development of beekeeping for the period 2016-2020 which provides not only increase in number of bee colonies, but also increase of level of profitability of apiaries is developed. The latter is closely related to the increase in production volumes, the introduction of industrial technologies, obtaining in addition to honey, additional bee products – pollen, propolis, Royal jelly and others. These products are raw materials for the creation of therapeutic and prophylactic food preparations. Further development of apitherapy will significantly increase the demand for all bee products and stimulate the development of the beekeeper. The creation of new food and drug products based on API and phytosources and their widespread introduction into health care practices will have a positive impact on the health of the population as a whole and especially on people exposed to radiation exposure.

The implementation of the Program will ensure by 2020 an increase in the number of bee colonies in Ukraine to 6, 0 million, the production of gross honey to 120 thousand tons and wax to 2.8 thousand tons, products for the needs of medical, pharmaceutical and other sectors of the economy.

Pure breeding of domestic breeds of bees in the areas provided by the plan of breed zoning of bees, creation of the branched intra-breed structure which basis basic breeding farms on improvement of aboriginal bees of Ukraine will be provided.

The creation of universal technologies for keeping and breeding bees will provide an industrial basis for the production of bee products.

QUESTIONS FOR SELF-CONTROL

1. What is the economic importance of poultry farming?
2. What are the features of poultry farming?
3. What are the features of the development of specialization and concentration of production of eggs and poultry meat?
4. What are the directions of development of intraindustrial specialization in poultry farming?
5. What are the indicators to characterize the development of the poultry industry?
6. Level of economic efficiency of production of eggs and poultry meat?
7. What is the basis for the high efficiency of broiler farming?
8. What are the main ways to reduce the cost of eggs?
9. What factors influence the price level of sales of eggs and poultry meat?
10. Tasks for the development of poultry farming and ways to improve its efficiency.

TEST TASKS

1. What are the main areas of commodity sheep breeding?

1) suburban areas of large cities;
2) Steppe;
3) Polesie;
4) Forest-steppe.

2. What indicators characterize the development of sheep farming?

1) duration of use of ewes;
2) dynamics of a livestock of sheep;
3) availability of hayfields and pastures in the farm;
4) herd structure;
5) gross and marketable products.

3. What indicators characterize the economic efficiency of wool production?

1) sheared wool from sheep;
2) cost of 1ts wool;
3) feed consumption per sheep;
4) herd structure;
5) level of profitability.

4. What indicators characterize the economic efficiency of sheep meat production?

1) profit per 1C of live weight;
2) natural decline of sheep;
3) feed costs per 1 head of sheep;
4) production of mutton on 100 hectares of agricultural land;
5) cost of 1 C increase;
6) labor costs per 1 head.

5. What factors most affect the economic efficiency of sheep farming?

1) expansion of product markets;
2) improving the quality of wool;
3) increase in production costs per sheep;
4) increase in the number of sheep.

6. The cost of 1ts wool, above all, depends on:

1) level of marketability of products;
2) the productivity of sheep;
3) number of sheep;
4) the structure of the herd;
5) the cost of spent feed.

7. What indicators characterize the economic efficiency of egg production?

1) the cost of 1000 eggs;
2) feed costs per laying hen;
3) labor costs per laying hen;
4) the level of marketability;
5) sale price 1000 PCs eggs;
6) level of profitability.

8. What are the ways to reduce the cost of eggs?

1) the decrease in cost per hen-housed;
2) reduction of feed costs per laying hen;
3) reducing the cost of feed;
4) increasing the level of marketability.

9. What indicators characterize the economic efficiency of poultry production?

1) labor costs per head of young birds;
2) labor costs per 1 C of poultry growth;
3) profit per 100 hectares of grain crops;
4) production of poultry meat per 100 hectares of grain crops;
5) profit per 1 kg of live weight.

10. What are the main directions of increasing the efficiency of poultry farming?

1) increase in sales of poultry products;
2) transfer of poultry farming to an industrial basis;
3) increase in the number of birds;
4) the increase in the production of poultry meat;

LIST OF USED LITERATURE

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