

1.7. FACTORS OF EFFICIENCY OF INNOVATION-INVESTMENT ACTIVITY OF AGRICULTURAL ENTERPRISES

Efficiency is a fundamental and diverse economic category characterized by integrity, dynamism and multidimensionality. In a broad sense, efficiency means the ability of enterprises to successfully operate in the market, to have competitive advantages. Economic efficiency, covering all processes and stages of the enterprise, serves as the basis for the formation of its quantitative and qualitative criteria and is used to substantiate the parameters of extended reproduction.

From the point of view of content, efficiency is primarily attributed to the performance of the work or activity, as well as to the cost-effectiveness, that is, the minimum amount of expenditure to perform a particular job or action. That is why determining the level of efficiency is one of the most important among the set of problems facing the enterprise, which is directly related to the achievement of a certain ultimate goal of its activities.

Efficiency is a complex economic category, associated with purposeful, rational human activity. It reflects certain industrial relations, which are formed between society as a whole and enterprises, as well as individual workers. Effectiveness reflects the action of objective economic laws, the development of productive forces, and the nature of production relations. It is a form of expression of the purpose of production.

Most authors, who formulate the concept of efficiency, understand this category as the ratio of the result to the costs or resources that were spent on its receipt. That is, the efficiency criteria are formed on the basis of expendable (consumed resources) and resource (applied resources) approaches. The cost approach reflects the effect of each unit of aggregate costs or individually the cost of living or ordinarily labor. Resource approach is designed to characterize the efficiency of the use of resources: labor, material, financial.

Fedulova L.I. understands efficiency as the optimal ratio of satisfaction of the needs of certain groups. Such satisfaction depends on the degree of realization of the interests of the participants in the process of functioning of the enterprise. Matching interests and forming on their basis a set of goals of the enterprise is in this approach the main task of management¹.

According to the definition given in the ISO standards, efficiency is a set of attributes that determine the relationship between the quality level of the operation of a particular asset (object) and the volume of resources under certain conditions.

Consequently, the analysis of the concept of "efficiency" has shown that there are different approaches to its definition. The point of view prevails that efficiency is the ratio of results to costs (resources): that is, the so-called "traditional" definition. Depending on the approach, this concept determines the effectiveness of objects (systems) of different levels – society, enterprises, management systems.

By sharing the views of leading scientists in determining the cost-effectiveness, we offer our vision of this category. Economic efficiency is the maximum benefit that can be obtained at a minimum cost in the process of economic activity, taking into account the additional conditions that occur at the time of determining the effectiveness of the relevant economic measure. Under economic measures means the introduction of new types of products, the conclusion of contracts with suppliers, buyers, acquisition or modernization of new technology, increase production, etc.

The overall level of economic efficiency is defined as the ratio of the result to costs or resources. Increasing efficiency can be achieved both by reducing costs (saving resources) and by improving the use of capital and increasing profits. This approach involves a contradiction: the main purpose of the activity is to maximize the result (effect); with limited resources and high cost, it is necessary to achieve rational reduction of their use.

Effectiveness from the point of view of a certain result that was received or desired by an enterprise can be assessed both quantitatively and qualitatively. In this case, the qualitative side of the efficiency will be reflected in the form of a certain criterion (for example, profitability,

¹ Fedulova, L.I. (2003): *Menedzhment orhanizatsii* [Management of organizations]. Kyiv : Lybid, p. 448.

solvency, etc.): and quantitative – in the form of a set of indicators that characterize a certain criterion of efficiency (profit, productivity, profitability, etc.): That is, the calculation of the level of efficiency depends directly on the form of its manifestation, which is why, when evaluating it is advisable to distinguish between criteria and performance indicators.

In some cases, the criteria and performance metrics may coincide. For example, G.V. Savitskaya believes that in conditions of market relations, the main criterion of economic efficiency is profit, as the main quality result of the operation of the enterprise¹.

According to A.D. Sheremeta, profit – the main indicator of financial results of the enterprise, which characterizes its economic effect². At the same time, in our opinion, it is necessary to take into account that profit is an absolute indicator that reflects the result (effect) and can not detail the level of efficiency of the enterprise.

Another criterion of efficiency is the cost-effectiveness of the researchers. According to I.A. Blank, profitability characterizes the ability of an enterprise to generate the necessary profit in the course of its economic activity and determines the overall efficiency of the use of resources and invested capital³.

Various existing models of economic efficiency do not always provide reliable results in the practice of enterprises, because agriculture has a number of specific features that shape its specific organizational and production structure and the final financial results.

Agricultural production requires the organic combination and interaction of four factors – labor, fixed assets, labor and land. In the process of production, the industrial consumption of these resources is carried out in order to obtain certain consumer values that are able to meet the respective needs of people. Consequently, any production involves the cost of resources and the receipt of certain results. But for the same amount of resources spent, companies can get far from the same results. In this case, it is said that enterprises are manufacturing with different efficiency.

To determine the economic efficiency of agricultural production it is necessary not only to calculate the result obtained at the same time, but also to compare it with the costs of means of production and living labor.

The essence of improving the economic efficiency of agrarian enterprises is to ensure that each unit spent material, labor and financial resources to increase the volume of production. This will increase the income of enterprises, which is the basis of expanded reproduction of production, increase of wages and improvement of social and household conditions of its employees.

Innovation and investment activities of agrarian enterprises should be considered at the micro level for a separate economic entity, as well as meso- and macroeconomic levels of management, depending on the sources of investment attraction, the size and possibilities of using the potential of innovations.

Different types of efficiency, interconnected and in aggregate ensure the implementation of reproductive processes in agriculture. Table 1 presents indicators for assessing the effectiveness of the functioning of the economic system, in which innovative and investment processes in the industry interact.

Technological efficiency characterizes the use of own and investment potential of agricultural enterprises and allows to assess the innovation of production and marketing processes, processing and storage of agricultural raw materials and food. Cost estimates of the quality of chemicalization, mechanization, melioration, seed production and other subsystems of agriculture are also based on technological efficiency, since they have a direct impact on the technological processes of production in agriculture.

¹ Savickaja, G.V. (2004): Analiz jeffektivnosti dejatel'nosti predpriyatija: metodologicheskie aspekty [Analysis of the effectiveness of the enterprise: methodological aspects]. Moscow : Novoe znanie, p. 160.

² Sheremet, A.D. (2006): Kompleksnyj analiz hozjajstvennoj dejatel'nosti [Complex analysis of economic activity]. Moscow : INFRA-M, p. 415.

³ Blank, I.A. (1998): Slovar'-spravochnik finansovogo menedzhera [Dictionary-Handbook of financial Manager]. Kyiv : «Nika-Centr», p. 480.

Table 1. Indicators of efficiency of innovative and investment activity of agrarian enterprises

Type of performance	Estimates
Technological	Yield of agricultural crops; output per unit of raw materials; quality parameters of agricultural products; losses during transportation; waste when storing agricultural products
Social	Demographic, economic and social indicators of living standards
Ecological	Indicators of quality of productive land; soil erosion; the percentage of saline and contaminated land
Economic	Cost; gross output at current prices; gross income; profit; profitability; financial stability; solvency

Social efficiency is determined by the social status of the rural population living on a particular territory, and measured by indicators of living standards. Social efficiency is also due to the social potential of the agricultural enterprise, which is understood as the set of social elements of production, infrastructure, personnel supply, which determine the possible limits of meeting the social needs of peasants, belonging to the socio-territorial community. Sufficiency of social potential is determined by social indicators (aggregate incomes, wages, indices of population reproduction, birth rates, mortality, correlation of real aggregate incomes with the size of the consumer basket, etc.) by comparison with actual values.

The isolation of environmental efficiency in an independent form is due to at least two reasons. First, it is the need to create an environmentally friendly environment for people, in which the biological balance is maintained, the production of environmentally friendly products and the pollution of the environment with chemical means of agricultural use are not allowed; and secondly, the need for the existence of an indicator to determine the harmonious development of production.

Environmental efficiency is manifested as a result of preserving the natural and biological environment, ensuring the rational use of natural potential, reducing the environmental quality of products, improving the quality of agricultural products by increasing its environmental friendliness. The estimation indicators of ecological efficiency include the coefficients of comparison of the actual and maximum permissible levels of contamination of elements of the environment.

Environmental efficiency is determined by the amount of contributions directed at protecting the environment. The assessment of its level is determined by the following indicators:

- share of net profit, directed on environmental measures; the share of profits spent on waste utilization;
- the share of environmentally friendly products in its overall production;
- availability of treatment facilities and storage facilities for technological wastewater storage;
- the share of environmentally friendly feed for feeding animals in their total amount;
- the number of medicines used for animal veterinary services.

Economic efficiency reflects the realization of economic interests, which is measured by the profitability of production and sales of products. To determine the economic efficiency of certain types of agricultural products can be based on the calculation of specific indicators of gross income and profits. The production (operating) cycle in agriculture for many types of agricultural products is long, and there is a significant time gap between investment in production and production, which must be taken into account when determining the efficiency of innovation and investment activities of agrarian enterprises.

The effectiveness of innovation and investment activities of agrarian enterprises can be studied from different positions: production, cost, effective, strategic, competitive. Target filling the increase in the economic efficiency of the enterprise, ultimately, is to ensure the growth of profits (revenues) per unit of investment in the process of their exploitation. This can be achieved on the basis of rational use of material and technical base, acceleration of turnover of working capital, increase of labor productivity.

The notion of "efficiency" is closely linked to its initial defining characteristics: effect (result): resources (costs): Despite the similarities, there are differences between the paired categories of "effect – result", "resources – costs".

The categories "result" and "effect" are quantified by absolute magnitude and reflect the results of the system's development. The difference in effect as a relatively independent concept is manifested in the fact that it acts in a specific form of the final result and allows to give a general assessment of the result of activity. If the effect is the difference between the value estimates of the result and the cost, then the efficiency is the ratio of results to costs, which ensures their receipt. Resources and costs take part in the processes of production and sale, during which the transformation of material and material parts (capital and working capital) into capital under the influence of human labor (human resources, labor costs):

In accordance with objective reproduction laws, distinguished between used and consumed resources. The fixed assets, working capital and working capital collectively constitute advanced capital, or applied resources. That part of the resources used, which is used in the process of specific activities and includes separate elements of total production costs (wages, depreciation, material costs) refers to consumed resources. On this basis, costs can be considered as moving resources, and resources – as fixed costs. That is, deeply exploring the concept of "resources" and "costs" can only be based on differences in their dynamic characteristics. An indication of the effectiveness of the resulting effect in terms of revenue per unit of resource or investment cost reflects a resource-cost approach to efficiency.

In the so-called reproductive sense, this category takes into account the dynamics of reproduction of products on an investment-innovation basis. Effective innovation and investment activities are thus aimed at creating a favorable environment for the reproduction of rural areas, natural potential and the acquisition of high-quality and competitive agricultural products.

Innovative methods of organization of agrarian production are the result of the development of complex mechanization. Based on the scientific system of agrarian production, they are focused on obtaining high yields based on the rational use of biological, logistical and human resources. This involves the use in the production of high-performance agricultural machinery, optimization of fertilizer application, herbicides and other plant protection products, a comprehensive reclamation, the work of highly skilled specialists.

The investigated category of efficiency can be classified on various grounds: it takes into account the costs, flow of cash flows in time, completeness of the accounting of results and costs (Fig. 1)¹².

The efficiency of innovation and investment activity of agrarian enterprises as a basic category reflects the economic relations and interests of participants in innovation and investment processes regarding the achievement of the optimal balance between the result of the exploitation of investments in innovation and the costs incurred. The accompanying effect from the introduction of technological innovations is the saving of labor costs and funds, which, in turn, contribute to reducing the complexity of production, the release of manpower, the reduction of specific production costs, and stimulate expanded reproduction and new investment.

In the global aspect, the innovative development of agricultural production, in addition, helps to eliminate existing contradictions between the city and the countryside, forms the material foundation for the transformation of agricultural labor into industrial. On this basis gradually there is a qualitative transition to a new professional and technical level of personnel of mass professions, who have the skill of efficient use of modern agricultural machinery and equipment.

The effectiveness of innovation and investment activity is shaped by the influence of objective and subjective factors, which is the subject of close attention from the side of economists. So, Nechaev VI, Artemov E.I. and Kravchenko N.P.³ distinguish external and internal groups of factors.

¹ Orehova, M.S., Gurnovich, T.G. (2018): *Prioritetnye napravlenija razvitija innovacionno-investicionnoj dejatel'nosti v rastenievodstve* [Priority directions of development of innovation and investment activity in crop production]. Moscow : Izd. dom «Mirakl'», p. 116.

² Coelli, T.J., Prasada Rao, D.S., O'Donnell, C.J. et al. (2005): *An introduction to efficiency and productivity analysis*. Second Edition. New-York : Springer Science, p. 331.

³ Nechaev, V.I., Artemova, E.I., Kravchenko, N.P. (2010): *Problemy ocenki jeffektivnosti innovacionno-investicionnyh proektov v rastenievodstve* [Problems of efficiency evaluation of innovation and investment projects in crop production]. APK: jekonomika, upravlenie – AIC: economy, management, No. 12, pp.22-27.

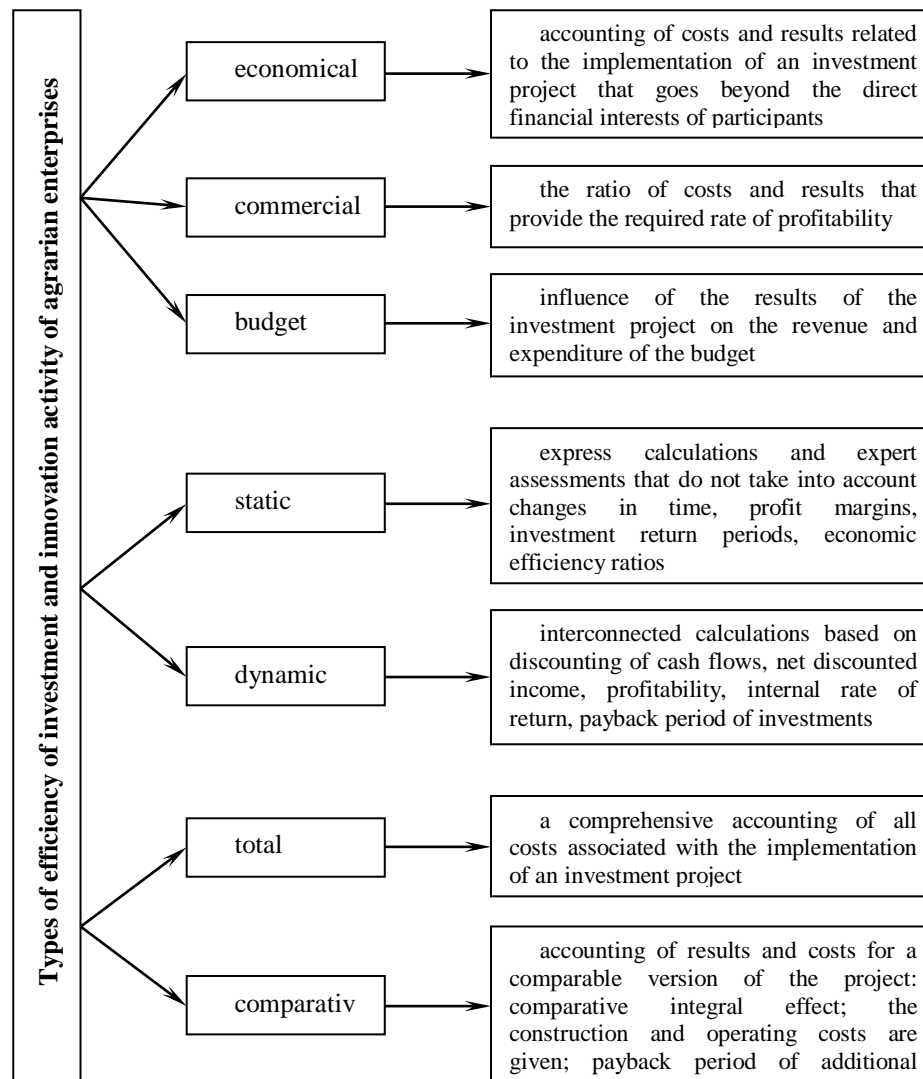


Fig. 1. Classification of efficiency of investment and innovation activity of agrarian enterprises

The external ones include:

- normative-legal regulation;
- provision of conditions for market competition in the domestic and foreign markets;
- state investment and innovation policy;
- pricing;
- taxation;
- lending;
- inflation processes;
- subsidies and compensation;
- creation of additional conditions for conducting private business;
- integration of the country into world economic relations;
- conformity of technical and technological parameters of production to world standards.

Internal factors include:

- achieved level of technical and technological development of the enterprise;
- degree of use of material, technical, labor, financial, investment and intellectual resources.

It should be noted that the large-scale introduction of innovative approaches in the production of agricultural products requires all branches of agriculture. This can be achieved by increasing their technical equipment, increasing labor power, rationalizing the use of equipment and personnel potential.

The effectiveness of innovation and investment activity is determined by a set of general

parameters that influence the results of its assessment, among which:

- kind of investments used;
- type of mastered innovations;
- goals to be achieved when introducing innovations;
- the value of the calculation period and the discount rate;
- innovative potential of the agricultural enterprise;
- the ability of the enterprise to implement innovations;
- the speed of the innovation process¹.

The efficiency of innovation and investment activity of agrarian enterprises is influenced by a set of factors that form the technological, social, economic and environmental components of the efficiency of production of certain types of agricultural products.

As general indicators of estimation of results of production in agriculture can be used:

- production of gross output per hectare of agricultural land, on average annual worker, per 1 man-year, for 1 UAH of fixed assets and working capital;
- the amount of current production costs per 1 UAH of gross output;
- the amount of gross and net income (profit) per 1 hectare of agricultural land, on the average employee, per 1 man-year, for 1 UAH of fixed assets and working capital;
- the level of profitability and the rate of profit (net income) of agricultural production.

All these indicators together, with the allocation of any of them as the main or without allocation of such, give an opportunity to more fully characterize the efficiency of agricultural enterprises. They reflect reflection on the level and efficiency of using all types of resources and costs involved in production:

- land as the main means of agricultural production – the value of gross output, the amount of gross income, profit (net income) per unit of land;
- live labor – the value of gross output, the amount of gross income, profit (net income) per unit labor costs or the number of average annual employees;
- the past indefinite labor in the main means of production – the value of gross products, the amount of gross income, profit (net income) for 1 UAH of fixed assets;
- current production costs – the cost of gross output, payback of production costs, the level of profitability.

Consequently, the system of performance indicators should:

- reflect costs of all types of resources consumed by the enterprise;
- create preconditions for identifying reserves for improving production efficiency;
- to stimulate the use of all reserves available at the enterprise;
- Provide information on the production efficiency of all levels of the management hierarchy;
- perform a criterion function, that is, for each of the indicators should be defined rules for the interpretation of its values²³.

Among the factors that influence the efficiency and, accordingly, determine the effectiveness and production introduction of innovation and investment activities of agrarian enterprises, can be distinguished the following groups: natural, technological, technical, organizational and economic, socio-demographic, and environmental.

Determining the factors of ensuring the efficiency of innovation and investment activity of

¹ Lundvall, B.A. (1990): Innovation as an interactive process: from user-producer interaction to the national system of innovation. Technical change and economic theory. G. Dosi et al. (Eds.): London: Pinter Publisher Limited, p. 349-367.

² Azizov, S.P., Kaninskyi, P.K., Skupyi, V.M. et. al. (2001): Orhanizatsiia vyrobnytstva i ahrarnoho biznesu v silskohospodarskykh pidpriemstvakh [Organization of production and agricultural business in agricultural enterprises: studies]. S.P. Azizov (Ed.): Kyiv : IAE, p. 834.

³ Kudelskyi, V.E. (2013): Ekonomichni zasady vyrobnytstva silskohospodarskoi produktsii pidpriemstvamy ahrarnoho sektora [Economic basis of agricultural production enterprises of the agricultural sector]. K.L. Larionova (Ed.): Ekonomika ta upravlinnia pidpriemstvom: suchasni pidkhody, metody ta modeli – Economics and enterprise management: modern approaches, methods and models. Kamianets-Podilskyi, pp. 133-161.

agrarian enterprises (Fig. 2) due to the influence of politico-economic, natural-biological, techno-technological, organizational and economic processes¹.

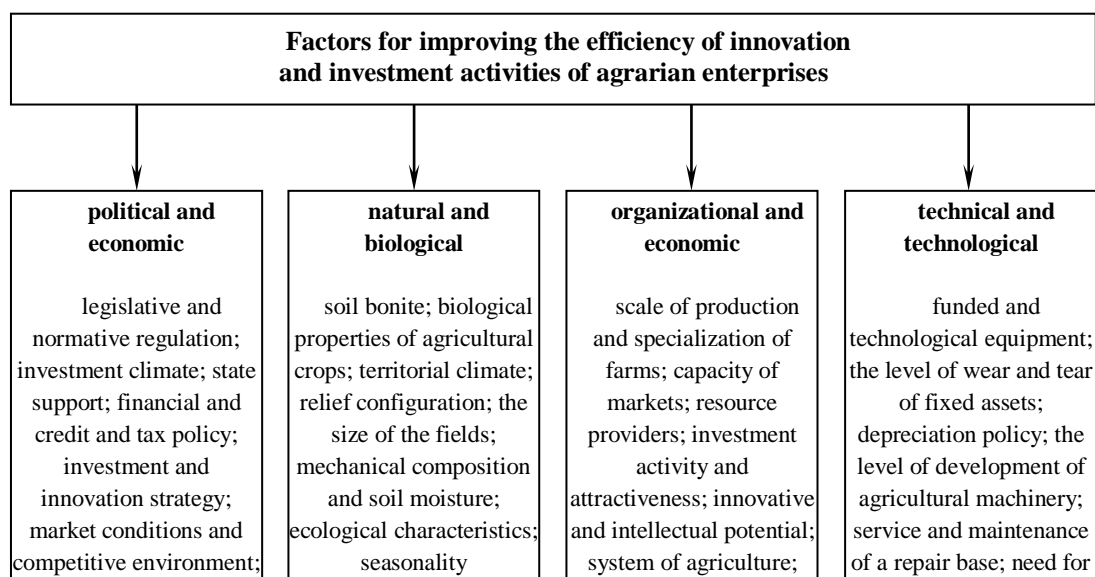


Fig. 2. Factors influencing the efficiency of innovation and investment activity of agrarian enterprises

These groups of factors are interconnected. The reproductive processes provided by innovation and investment activities are based on the use of investment resources, the acquisition of additional value and the transformation of its part into capital.

Among the conditions that determine the dynamics of innovation and investment processes are factors that both positively and negatively affect the development of agrarian enterprises.

Constraining factors that negatively affect innovation and investment processes in agrarian enterprises are: price disparity; strengthening monopolization in industries and criminalizing markets; unsatisfactory financial condition of producers and consumers of innovative products; the level of business taxation; Compression of domestic food demand; departmental disunity, weakness of scientific potential; backwardness of the material, scientific and information base; low wages, lack of trained personnel to innovate; aggravated competition in the agro-food market; insufficiency of financing of innovative projects and developments; shortcomings in the planning of innovation activities; underdevelopment of innovation infrastructure; inconsistency of interests of participants in the innovation process; orientation on the quick recoupment of innovative products being implemented.

Positive factors contributing to innovation and investment processes of agrarian enterprises are: the capacity of the food market; variety of forms of ownership and management; increase of state support; increase in the efficiency of innovation from all participants involved in bringing the agricultural product to the consumer; the best quality of agricultural products, obtained through the introduction of innovations, allows us to produce quality food products that meet world standards; achieved level of technical and technological development of the industry; availability of best practices in the use of innovative technologies; contests of innovative investment projects; formation of a positive image of enterprises in partners and society based on changes in the environmental and social environment as a result of innovation and investment activity²¹.

¹ Orehova, M.S., Gurnovich, T.G. (2018): *Prioritetnye napravleniya razvitiya innovacionno-investicionnoj dejatel'nosti v rasteniyevodstve* [Priority directions of development of innovation and investment activity in crop production]. Moscow : Izd. dom «Mirakl'», p. 116.

² Mykytiuk, P.P. (Ed.): (2015): *Innovatsiyni rozvytok pidpriemstva* [Innovative development of the enterprise]. Ternopil : PP «Prynter Inform», p. 224.

Investment support for the innovative development of agricultural production is objectively necessary to increase the level of food independence of the state and the competitiveness of the industry's products in the market of agricultural raw materials and food. In addition, the innovative restoration of the material and technical and technological base of agricultural production contributes to the comprehensive modernization of all functional subsystems of the reproductive cycle: management, service, marketing, organizational, environmental, socio-economic. The low investment opportunities of agricultural producers, the devaluation of their resource potential and the level of its use on an innovative basis, actualize the task of introducing the achievements of scientific and technological progress in the development of production on the basis of external stimulation of innovation activity.

The steady renewal of production potential on the basis of the introduction of innovations necessitates the introduction of efficient resource-saving technologies for the production of agricultural products.

References:

1. Azizov, S.P., Kaninskyi, P.K., Skupyi, V.M. et al. (2001): Orhanizatsiia vyrobnytstva i ahrarnoho biznesu v silskohospodarskykh pidpryiemstvakh [Organization of production and agricultural business in agricultural enterprises: studies]. S.P. Azizov (Ed.): Kyiv : IAE, p. 834.
2. Blank, I.A. (1998): Slovar'-spravochnik finansovogo menedzhera [Dictionary-Handbook of financial Manager]. Kyiv : «Nika-Centr», p. 480.
3. Coelli, T.J., Prasada Rao, D.S., O'Donnell, C.J. et al. (2005): An introduction to efficiency and productivity analysis. Second Edition. New-York : Springer Science, p. 331.
4. Fedulova, L.I. (2003): Menedzhment orhanizatsii [Management of organizations]. Kyiv : Lybid, p. 448.
5. Kudelskyi, V.E. (2013): Ekonomichni zasady vyrobnytstva silskohospodarskoi produktsii pidpryiemstvamy ahrarnoho sektora [Economic basis of agricultural production enterprises of the agricultural sector]. K.L. Larionova (Ed.): Ekonomika ta upravlinnia pidpryiemstvom: suchasni pidkhody, metody ta modeli – Economics and enterprise management: modern approaches, methods and models. Kamianets-Podilskyi, pp. 133-161.
6. Lundvall, B.A. (1990): Innovation as an interactive process: from user-producer interaction to the national system of innovation. Technical change and economic theory. G. Dosi et al. (Eds.): London: Pinter Publisher Limited, p. 349-367.
7. Mykytiuk, P.P. (Ed.): (2015): Innovatsiinyi rozvytok pidpryiemstva [Innovative development of the enterprise]. Ternopil : PP «Prynter Inform», p. 224.
8. Nechaev, V.I., Artemova, E.I., Kravchenko, N.P. (2010): Problemy ocenki jeffektivnosti innovacionno-investicionnyh proektov v rastenievodstve [Problems of efficiency evaluation of innovation and investment projects in crop production]. APK: jekonomika, upravlenie – AIC: economy, management, No. 12, pp.22-27.
9. Orehova, M.S., Gurnovich, T.G. (2018): Prioritetnye napravlenija razvitija innovacionno-investicionnoj dejatel'nosti v rastenievodstve [Priority directions of development of innovation and investment activity in crop production]. Moscow : Izd. dom «Mirakl'», p. 116.
10. Savickaja, G.V. (2004): Analiz jeffektivnosti dejatel'nosti predpriyatija: metodologicheskie aspekty [Analysis of the effectiveness of the enterprise: methodological aspects]. Moscow : Novoe znanie, p. 160.
11. Sheremet, A.D. (2006): Kompleksnyj analiz hozhajstvennoj dejatel'nosti [Complex analysis of economic activity]. Moscow : INFRA-M, p. 415.
12. Vytvytska, O.D., Kulaiets, M.M., Babiienko, M.F., Buzovskyi, Ye.A. (2009): Innovatsiini protsesy v ahrarnomu sektori ekonomiky [Innovative processes in agrarian sector of economy]. Ekonomika APK – Economy AIC, No. 9, pp. 26-30.

¹ Vytvytska, O.D., Kulaiets, M.M., Babiienko, M.F., Buzovskyi, Ye.A. (2009): Innovatsiini protsesy v ahrarnomu sektori ekonomiky [Innovative processes in agrarian sector of economy]. Ekonomika APK – Economy AIC, No. 9, pp. 26-30.