3.2. Investment providing of innovative development of Ukrainian agriculture

Economic growth of Ukraine is associated with the solving the problems of innovative restoration and development of basic industries, their structural reorganization, and the introduction of new economic relations between the market actors. The necessity of upgrade the production capacities, increasing their technical and operational characteristics due to a significant deterioration of fixed assets. The outreach of opportunities for the quality goods and services provision is determined by the efficiency of innovation and investment processes, the new investment technologies introduction, the predictability of the innovative projects and programs implementation final results.

It should be pointed out that Ukrainian economic development results from the restoration of the old technical base and the free production facilities loading. Once the potential of this kind is exhausted, the country's economy will face the threat of another economic crisis. In this situation, only innovation can lead the economy to stable development. That is why the company's high results can only be achieved through systematic and purposeful innovations aimed at finding opportunities that open the environment for the new types of goods production and introduction, the development of new production markets and production organization forms.

In a market economy, most agricultural enterprises require investments in order to upgrade their fixed assets and expand their volumes, introduce innovative technologies, purchase new varieties of plants and animal breeds, as well as other capital-intensive innovation and investment projects. Therefore, the question arises about the search for new forms and methods of activating the organizational and economic mechanism for the innovation and investment activities development.

The term innovation comes from the Latin ‘*innovare’*, that means to change or renew. Innovation is a result of systematic activity aimed at the scientific and technological progress achievements and improvements realization, that contributes to the quantitative and qualitative changes in the enterprise internal environment and provides the efficiency increase and competitive advantages acquisition.

Innovation is the introduction of something new to the technique, technology, labor organization or management. It is based on the use of science and best practices. It is the final result of innovation activity.

J. Schumpeter considered innovations as a constitutive essential element and a necessary condition for economic development, which manifest itself in certain combinations of changes for the purpose of introduction and use of new consumer goods, new means of production, vehicles, markets and forms of production organization in industry [1, p. 176].

I.V. Safronov interprets the concept of "innovation" in its own way. He says

that it is a manifestation of modern advances in scientific and technological progress, a special kind of knowledge that was implemented as a new or improved product, a new or improved technological process used in practical activities having a set of functions that were implemented by them, which are aimed at meeting existing needs in the relevant market segments and bring an economic effect [2, p.129].

The object of innovation is an innovation. It should be noted that the terms novation and innovation are not identical. Novation (lat. *novatio* - update, change) is a product of person's intellectual activity, the result of fundamental, applied or experimental researches in any sphere of human activity that is aimed at increasing the work efficiency. From the moment of the adoption of the innovation to the implementation and distribution, it acquires a new quality, i.e. it becomes the innovation. In the world economic literature there are many definitions of innovation. Domestic scientists consider innovation as the term introduction.

In The Law of Ukraine on innovation activity [3] innovation is the newly-formed (applied) and (or) advanced, competitive technologies, products or services as well as organizational and technological solutions of industrial, administrative or other nature that improve substantially the structure and quality of production and (or) social sphere. Innovation is defined as an activity that is aimed at the use and commercialization of the research and developments results and that causes the launch of new competitive products and services. That is why innovation activity inherent such features as:

– scientific and technical novelty;

– production application;

– realization on a commercial basis;

– the latest or improved technologies introduced into production;

– new organizational and technical decisions of an administrative, commercial or other nature, used in practice.

Innovative processes require assistance in the form of financial and credit support, government preferences, as well as the creation of specialized infrastructure. The main criteria for the numbering of products and processes among those that are innovate are their novelty and significance.

Agricultural production today has an extensive character and this state of development is caused by a number of factors and, above all, the apathy of the state to the agriculture development state. As a result one can notice the shortage of financial and logistical resources in agricultural enterprises, the outdated labor force of fixed assets. Thus there is the need to increase the cost for their repair.

In modern conditions the activation of investment activity is decisive due to the global food crisis that has led to a sharp rise in the prices for foodstuffs. It has led to the need for domestic and foreign investment attraction.

Thus, investment is the most important part of the extended reproduction

financing that can provide economic growth in the long run. It determines the pace of agricultural production development. Investment application can cause structural changes, technological re-equipment and modernization, the introduction of modern high-performance and resource-saving technologies, the market power and priority of the industry.

Investment resources, in actual volumes, do not provide extended reproduction, and most of domestic enterprises has their own funds as their main source of investment. All these facts have caused the situation when most agricultural enterprises are unprofitable. They use the outdated equipment and most of the working capital is used not for upgrading of the equipment, but for the current and major repairs.

It should be noted that over the long period the investment activity had been falling that was due to inflation and a decrease in the stability of the national currency, budget deficit, and mostly due to the errors and imperfection of legislation. Insignificant financing of the industry led to catastrophic deterioration of the equipment, which greatly reduces the efficiency of the agrarian enterprises functioning, social decline of the countryside, unemployment rising in rural areas. The further development of agriculture will depend on the state's policy. A set of measures aimed at increasing the efficiency and stimulation of investment activity should be developed.

The main methods of such stimulation are:

– reduction of tax pressure on certain types of agricultural products;

– increase of the volume of agricultural production financial support;

– stimulation of import and export (exemption from export duty).

Since the investment activity is a social and economic process of investing that is aimed at ensuring the stable development and achievement of high results in the economy, a decisive factor in the whole economic policy it is necessary to determine the directions of its development.

In the Law of Ukraine on investment activity [4] innovation activity is defined as one of the forms of investment that is carried out in order to implement the achievements of the scientific and technological process in the production and social sphere which includes: the issue and distribution of fundamentally new types of equipment and technology; progressive interdisciplinary structural changes; realization of long-term scientific and technical programs with high payback period; financing of fundamental research in order to make qualitative changes in the state of productive forces; development and introduction of a new resource-saving technology that is designed to improve the social and ecological environment.

An innovative development model is an important tool for Ukrainian agriculture competitiveness improvement. The increase in the efficiency of agricultural production is largely caused by the widespread introduction of

domestic and international achievements in scientific and technological progress. The innovation activity plays there the strategic role.

In recent years the positive trends in the financing for performing scientific and scientific and technical works have been observed. However, the process of commercialization of development and the interest of agricultural producers for them remains unsatisfactory.

Agriculture is one of the priority and key sectors of the national economy. In the current economic and military-political conditions that are extremely difficult only agricultural production showed some positive dynamics and ensured an increase in the export potential of the state. However, further economic growth and a significant increase in the efficiency of production and investment in agriculture is possible only due to the industrialization of enterprises in the industry, the transition to an innovative development model, throughout the modernization and agricultural production re-equipment.

The main formation and development features of the innovation process in the agriculture are the following:

1) significant differences in the regions of the country in terms of natural and climate conditions and production specialization;

2) variety of agricultural products, processing products, the significant difference in the process technology, keeping and feeding animals;

3) a large difference in the periods of production of certain types of agricultural products and products of its processing;

4) the presence of a large variety of production types under different organizational and legal forms and forms of ownership, size, specialization, subordination, cooperation, etc.;

5) the high dependence of agricultural production technologies on natural and climatic conditions, road and transport networks, distance from supply centers and product markets and other factors;

6) isolation of agricultural producers, their remoteness from information and consulting services and organizations that produce scientific and technical products;

7) different social and educational levels of agricultural employees;

8) the absence of a clear and scientifically determined organizational and economic mechanism for transferring the science achievements to agricultural commodity producers and, consequently, the condition of a significant lagging behind the development of innovations in production [5].

It is worth to consider the main indicators that characterize the intensity of innovation in agriculture.

Distribution of national academies of sciences of Ukraine institutions, which carried out scientific researches and developments in 2016 as shown in Fig. 1.

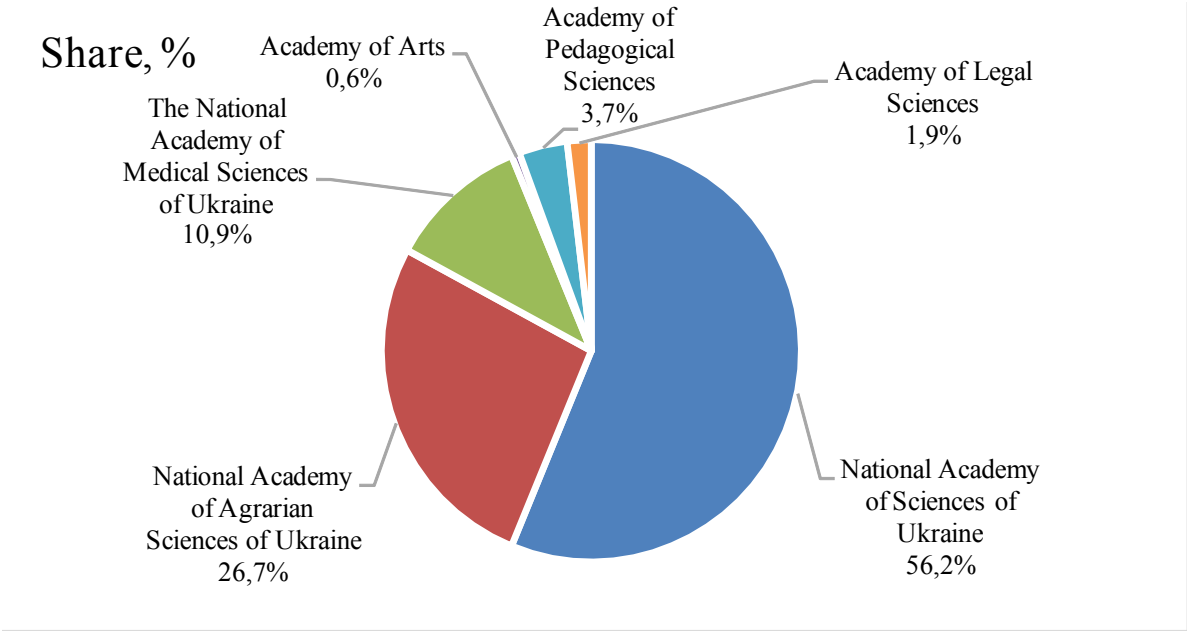

Figure 1. Distribution of organizations of national academies of sciences of Ukraine, which carried out scientific researches and developments in 2016 (% to the total number of organizations) [6]

As shown in Fig. 1, the Academy of Agricultural Sciences that specializes in scientific research in the field of agriculture was 26.7% in relation to the total number of scientific organizations in Ukraine as of 2016. This indicator is quite significant comparing the share of the Academy of Agrarian Sciences to other scientific organizations. One can see that the Academy of Agrarian Sciences is ranked the second (after the Academy of Sciences – 56.2%) by the number of scientific organizations.

The dynamics of the number of scientific personnel in the field of agricultural sciences during 2014-2016 is presented in the Table. 1

Table 1

The dynamics of the number of scientific personnel in the field of agricultural sciences during 2014-2016

Years	Total for Ukraine			In the field of agricultural sciences		
	the number of doctoral students	accepted for doctoral studies	Graduated from doctoral studies	the number of doctoral students	accepted for doctoral studies	Graduated from doctoral studies
2014	1561	603	459	24	10	12
2015	1821	650	563	42	12	13
2016	1229	20	551	30	-	12

As shown in Table 1, the number of doctoral students in the field of agricultural sciences during the 2014-2015 period increased by 18 people. However, in 2016 it its decrease to 30 people was observed (-12 people compared

to 2015). The situation above shows that during the period 2015-2016 the level of training of scientific personnel was reduced. It is worth paying attention to the number of researchers who carried out research and development in the field of agricultural sciences (Table 2)

Table 2

The number of researchers who carried out research and development in the branches of science by sector of activity in 2016 [6, 7]

Index	Total	Including					
		natural sciences	technical sciences	medical science	agricultural sciences	social sciences	huma-nities
Total	63694	18461	26266	4845	4663	6506	2953
by sectors of activity:							
state	30192	12369	5504	3141	3776	3208	2194
entrepreneurial	15673	2155	13040	116	297	49	16
higher education	17829	3937	7722	1588	590	3249	743
private non-profit	–	–	–	–	–	–	–

It is evident from table 2 that the largest number of scientific and technical personnel in the agricultural sector was employed mainly in the public sector by 2016 – 3776 employees (81% of the total). In the sector of higher education, 590 employees were employed (12% of the total). Only 297 employees (6% of the total) were involved in the entrepreneurial sector.

It should be noted that the large part of employees involved in the implementation of scientific research and development in the field of agriculture are the employees of the Academy of Agrarian Sciences (Table 3).

Table 3

The number of employees involved in the conduction of scientific research and development in scientific organizations of national academies of sciences of Ukraine in 2016, (people) [6, 7]

Index	Total	Including					
		natural sciences	technical sciences	medical science	agricul-tural sciences	social sciences	huma-nities
Total for national academies	35829	15043	6594	3760	5198	2852	2382
Academy of Agrarian Sciences	6337	340	419	7	5196	330	45
The share of the Academy of Agrarian Sciences in the total number, %	17,7	2,3	6,4	0,2	100,0	11,6	1,9

An important criterion for innovation development in agriculture is the indicator of research financing. Its dynamics is reflected in Figure. 2

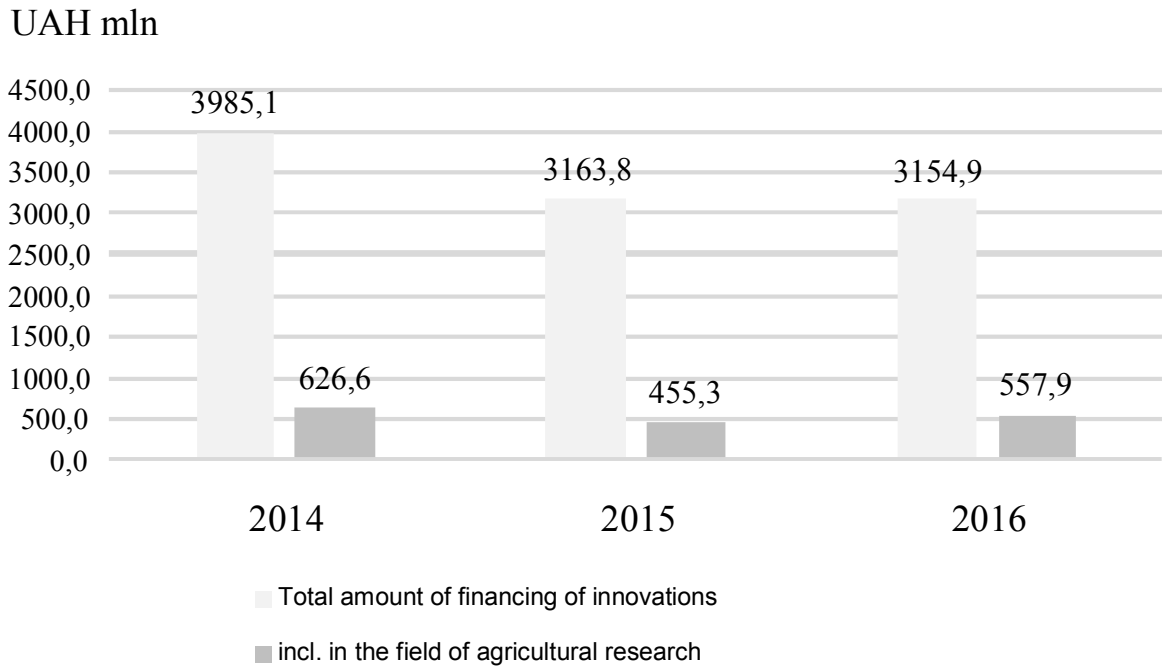

Figure 2. The total amount of financing of innovations in the agricultural sphere of Ukraine, mln. UAH [6, 8]

The volume of financing of innovations in the agricultural sector tended to decrease during 2014-2016. Thus, in 2015 financing of research expenditures in the field of agriculture amounted to 455.3 million UAH. (2.3% of the total funding).

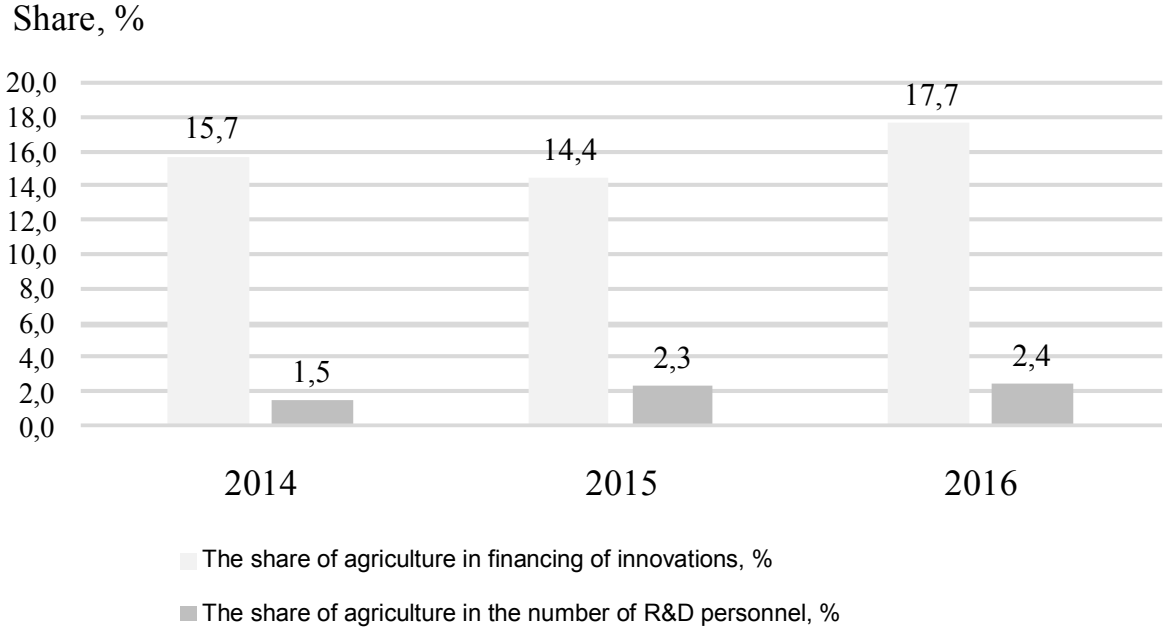

Figure 3. The share of agriculture in financing of innovations and in the number of R&D personnel in Ukraine, % [6, 8]

At the same time, for the period of 2014-2015, the level of financing of innovations in the agricultural sector decreased by 171.3 million UAH. (-27.3%). At the same time, in all branches of the economic complex of Ukraine the reduction of financing of innovation amounted to 821.3 million UAH. (-20.6%). In terms of the abovementioned data one can conclude that the volumes of reduction of financing of innovations in agriculture were more pronounced than in other branches. This is mainly due to the consequences of economic crisis and Russia's military aggression. However, in 2016, the situation in the financing of innovations began to improve somewhat. The volume of financing in the agricultural sphere has increased by 102.5 million UAH. (+22.5%) against the background of a general reduction of financing of innovations in the economy as a whole by UAH 9 million (-0.3%). It proves that the public administration gives the priority to innovation development in the field of agriculture.

The agrarian industry specialists search for innovative investment ideas, actively studying the experience of leading foreign countries. France is the largest producer of agricultural products in Western Europe and one of its largest exporters in the world. It is due to the favorable natural conditions and large areas of fertile soil. France is inferior only to the United States, Russia, India and Canada in the gross grain production. The population of France is provided with food products of its own production. Farmers in France receive subsidies to increase the efficiency of production and for the introduction of innovations, improvement of living conditions, for the withdrawal of arable land from agricultural production, support of land fertility, compensatory payments for the work in ragged natural conditions areas.

Agriculture in Germany is a highly developed industry. Germany belongs to the largest agricultural producers in the European Union. More than the half of the country's territory is used for agriculture. Pig breeding is widespread everywhere in Germany. The country ranks fourth in the world and the first in Europe in the pig population. A relatively high proportion of fodder crops characterizes crop production, which is along with pastures and natural meadows a reliable basis for the livestock-breeding development.

Nowadays Israel's agriculture is the most productive and advanced in the world by almost all indicators. Israelis have achieved it with due to the modern agricultural technology, which is effectively used by local farmers and due to the large number of innovative solutions that are implemented annually in the industry. It is necessary to borrow from Israeli such a considerable experience and apply it in Ukraine as well. Saving water is the core of the successful pursuit of agricultural activity in Israel.

Drip irrigation is used everywhere for open soil as well as aerosol irrigation in greenhouses which is conducted in a computerized way. It allows to feed water just when it is needed. Israel has developed a unique technology for turnkey

greenhouse complexes. Hothouses function in extreme conditions, in the absence of external irrigation and in excess of snow, in the conditions of the polar winter and in the heat. These organizations select the best solution for any client, selecting agricultural crops that have the highest demand in the market, designing the entire greenhouse complex, installing greenhouses and the entire infrastructure of the project. They are engaged in the supply of equipment and training of personnel, they are concerned about the financing of the project as a whole [10].

Scientific researches require annual large-scale financing and large-scale state support since the scientific level and quality of innovations depend on it. It is extremely important in the conditions of spreading on the Ukrainian market of scientific and technical products of competitive foreign firms, technologies and technologies that exceed technical and economic parameters of domestic analogues. This is especially true for the import of agricultural machinery, seeds of foreign plant varieties and plant protection products. Financial support for innovation activity is also required at the other stages of the innovation process, since the promotion of implementation should provide the demand for domestic research [11].

Historically, Ukraine has significant scientific and innovative potential. In the field of agricultural production, a wide network of scientific institutions, experimental productions and experimental farms of the National Academy of Agrarian Sciences of Ukraine was established. The Ministry of Agrarian Policy and Food of Ukraine had a large number of high and secondary education institutions.

Ukraine is the country that has the best natural and favorable climatic conditions in the world for agricultural production but due to technological backwardness and irrational organization of production today cannot provide its population with high-quality affordable food products.

On the domestic market, domestic products are being driven out by imported products because the latter are of the higher quality and higher competitiveness, that is achieved through the use of more advanced technologies. The development of innovation in agriculture in Ukraine is an important direction in the increasing of its competitive advantages, as the agricultural sector of economically developed countries gradually transforms into a knowledge-intensive industry.

It is essential to pay more attention to the development of innovation activity in Ukraine. As the objects of innovative activity in the field of agriculture can be:

– innovative programs and projects;

– production equipment and processes;

– production infrastructure;

– organizational and technical solutions of industrial, administrative, commercial or other character that significantly improve the structure and quality of production;

– raw materials, means of their extraction and processing;

– mechanisms of the consumer market and commodity products marketing formation.

As the subjects of innovative activity in the field of agriculture can be:

– natural or legal persons of Ukraine;

– natural persons or legal entities of foreign states;

– stateless persons, associations of these persons who carry out innovations in Ukraine and involve property and intellectual values, invest their own or borrowed funds in the implementation of innovation projects in Ukraine.

The financing of innovative agricultural programs should include:

– investigation of the innovation program expediency (at cost and planned profit taking into account possible risks);

– development of the program implementation plan;

– organization of financing that should include assessment of possible forms of financing and selection of the one that meets the innovator's requirements;

– definition of investor organizations and funding sources structure; control over the implementation of the plan and terms of financing [9, 12, 13].

Innovative activities in the field of agriculture should be aimed at the creating and the attracting from the external environment such innovations that would promote competitiveness, strengthen market positions and provide a development perspective.

The weak innovation and investment activity of agricultural enterprises in the current economic conditions is primarily caused by the high commercial risk of investing in the innovative sphere, as well as the need for high financial costs, long payback period, and the imperfection of legal system that is related with the scientific and technical activities. The situation is aggravated also by the fact that today there is no sufficient ground for stimulating the wide introduction to organizational production of organizational and economic and innovation in equipment and technology. Fiscal and financial and credit policy is imperfect, there is no specialized infrastructure of production resource provision and its innovation and investment activity [14].

In addition, there is low innovation and investment activity of agricultural enterprises. It is due to the lack of solvent demand for scientific and technical and science-intensive products as a result of unsatisfactory financial and economic situation, insignificant volumes of budget financing and discriminatory conditions for access to banks' credit resources.

The weak link in the development of innovation-investment processes in agricultural production is also the lack of innovative products market development, the lack of an effective organizational and economic mechanism for innovative activity management, especially for small and medium-sized enterprises in the industry. Another problem is that not all scientific, technical and research

developments are brought to the level of scientific production that is ready for implementation and effective use in agricultural production.

There are no organizational and economic structures in the agrarian innovation area today, whose competence includes study of the market of innovative products and the existing demand for it. The weak link in innovation in agriculture is that many selected agricultural and innovative investment projects do not undergo a technical, technological, architectural, environmental and economic expertise. Most agricultural enterprises do not use or even have at their disposal even an elementary system of indicators for the economic expediency analysis and effectiveness of the innovation and investment projects implementation and the justification of optimal schemes for their introduction into production. As a result of this there are quite often some difficulties in solving the issue of financing such projects for bank loans. Most of the appeals of agricultural enterprises to banks on this issue have an analytical basis that would convince the credit institution of the project participation expediency.

An important condition for the effective management of investment and agricultural enterprises innovation activities is the observance of certain requirements or principles. There are many suggestions on the subject in the scientific literature, ranging from purely pragmatic propositions to postulates based on the empirical analysis results and logical and scientific substantiation. In order to resolve this issue, there should be a compromise option that can take into account the requirements of scientific logic and the wishes of the existing agricultural practice of agricultural enterprises.

When implementing investment and innovation activity in the agricultural sector, it is necessary to stick to the following principles:

– *scientific character* – investment-innovation activity should be carried out in accordance with scientifically grounded organizational and economic preconditions and methodical principles, and in the process of organization and management of it, account of objective regularities and dominant tendencies in the development of socio-economic processes established by scientific research should be taken;

– *dynamism* – investment and innovation activity requires continuous and rhythmic exercise that can ensure the dynamic growth of the enterprise in accordance with the statutory objectives, regulatory requirements and economic interests of stakeholders;

– *compromise* that takes into consideration and harmonization of economic interests and regulatory requirements of different stakeholders – owners, managers, employees, business partners, businesses, state and local authorities, etc;

– *adaptability* that means the need for rapid response to dynamic changes in the external economic environment and internal environment to ensure performance sustainability and economic development, resource balance in the

industrial and financial activities and the development of business partnership;

– *self-organization* that provides the presence of an adequate level of organizational and economic resources in order to ensure sustainable operation of all elements of the enterprise as an open social and economic system as well as providing resources and exchange with the external economic environment in the process of investment and innovation;

– *self-regulation* local regulations and adequate organizational and management structure that is capable of creating the necessary economic conditions for normal investment and innovation process are required in order to promptly identify the negative deviations that occur and quickly adjust them according to the goals and objectives of the investment and innovation and tasks of strategic economic development of the enterprise.

It is necessary to develop some measures aimed at the eliminating the possible reasons that hinder the development of innovation and investment activities in the agriculture of the regions. According to the State Strategy for Regional Development for the period up to 2020, the state task is "to increase the level of innovation and investment capacity of the regions, to improve the regional investment and innovation infrastructure, in particular to create a regional network of scientific, technological and industrial parks, as well as systems of legal, personnel and information support innovation activity, formation of a favorable investment climate, positive investment image and promotion to the foreign market investment possibilities for the Regions of Ukraine" [10]. In this regard, it is planned to take a number of measures, among which the priority is to:

– development of scientific and innovative cooperation between the state and non-governmental sectors of science, higher education establishments and scientific institutions with the real sector of the economy;

– development of innovative culture by popularizing scientific, inventive and innovative activities, as well as creation of a coherent education system taking into account personnel provision of innovation activity;

– increasing the efficiency of the standardization and certification of products mechanism, protection of intellectual property rights, observance of copyright and related rights, ensuring achievement of high quality standards, security, product environmental friendliness;

– stimulation of industrialists to introduction of the latest technologies and innovations;

– ensuring the effective implementation of the public and private partnership mechanism by improving the relevant legal and regulatory framework;

– the establishment of consulting centers on public and private partnership at the national and regional levels, as well as the authorized bodies that are responsible for the implementation of public and private partnership in Ukraine, defining the functions, tasks and responsibilities of such bodies [10, p. 26].

The main problems of the development of the agricultural industry complex today are:

– lack of effective competition mechanism;

– disinterest of agricultural enterprises and reprocessors;

– insufficient level of financing of research and development programmes in the agricultural industry complex;

– insufficient development of material and technical base of research organizations;

– low innovative activity of scientific institutions;

– weak integration of science and education, the scientific potential of agrarian higher education institutions is not sufficiently realized;

– absence of a unified system of gene pool of plants and animals storage;

– undeveloped information and service sphere of scientific services;

– flow-out of young, professionally trained personnel in other branches of activity due to the social insecurity;

– insufficiency of personnel potential in the deficit and priority areas of agricultural science, in particular, in the field of dissemination of scientific developments and knowledge [15, p. 49].

The main directions of development of innovation and investment activities in the agricultural sector of economy are:

– improvement of the innovative activities management mechanism in agriculture sector of economy;

– intensification of innovation activity in the agriculture sector by providing various benefits, subsidies using foreign experience;

– technical and technological reequipment in the agriculture enterprises.

Thus, one can conclude that the use of investment and innovative approaches to economic activity is one of the promising directions of development of agricultural enterprises of Ukraine in the context of the existence of the necessity to increase production volumes and the competitiveness level of agricultural products.

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