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G.V. Zhavoronkova, L.I. Krachok**PROVIDING THE FINANCIAL SUPPORT TO THE TASK
OF THE TECHNOLOGICAL SECURITY PROVISION
IN THE FARMING SECTOR OF UKRAINE****Г.В. Жаворонкова, Л.И. Крачок****ФИНАНСОВОЕ ОБЕСПЕЧЕНИЕ
ТЕХНОЛОГИЧЕСКОЙ БЕЗОПАСНОСТИ
АГРАРНОЙ ОТРАСЛИ УКРАИНЫ**

Ukraine is an agrarian country, judging by its historically established type of economy, its natural resources, national mentality – and the high share of farming products in its gross domestic product. All these factors make the problem of funding the technological security in the farming sector most urgent. In order to simplify the process of raising funds for the farming sector, we suggest the following: working out unified integrated norms of goal-oriented public financing of high priority development areas; in order to modernize farming enterprises: defining clear rules of regulating public funds allocated for these goals; motivating enterprises to attract investment into innovations; offering preferential loans or partial refunding of loan interests from local or regional budgets – for the enterprises which have adopted innovative technologies, etc. Thus, technological security of the farming sector requires a range of mutually agreed actions. Changes are mostly needed in such areas as legislation, statutes and regulations, institutional management environment and implementation of innovative and technological activities in the farming institutions and organizations, the mechanism of financial assurance and fiscal support. The essential issue here is a program of high-priority development areas in the farming sector for technological modernization and strengthening the national R&D potential. Besides, a special significance is given to the process of establishing an executive control body to manage the technological security of the sector, and authorizing it to ensure the highest practicable level of security in the national agriculture. It seems to be obvious that science-based technological modernization of agriculture in the country shall contribute to the sustainable development of its agro-industry and to the stable growth of the gross domestic product due to the production of competitive farming products.

TECHNOLOGICAL SECURITY; FINANCIAL SUPPORT; THE FARMING SECTOR OF UKRAINE; TECHNOLOGICAL MODERNIZATION; GROWTH OF THE GROSS DOMESTIC PRODUCT.

Рассматриваются мероприятия по упрощению привлечения финансовых ресурсов в аграрную отрасль Украины. Важнейшим при этом является разработка программы приоритетных направлений развития аграрной отрасли в сфере технологического обновления и укрепления научно-технологического потенциала. Особое значение приобретает также процесс формирования органа управления технологической безопасностью аграрной отрасли и наделения его полномочиями, достаточными для обеспечения оптимального уровня безопасности сельского хозяйства. Ведь научно-технологическая модернизация сельского хозяйства позволит обеспечить стабильное развитие агропромышленного комплекса и будет гарантировать прирост валового внутреннего продукта через производство конкурентоспособной аграрной продукции.

ТЕХНОЛОГИЧЕСКАЯ БЕЗОПАСНОСТЬ; ФИНАНСОВАЯ ПОДДЕРЖКА; СЕКТОР СЕЛЬСКОГО ХОЗЯЙСТВА УКРАИНЫ; ТЕХНОЛОГИЧЕСКАЯ МОДЕРНИЗАЦИЯ; РОСТ ВАЛОВОГО ВНУТРЕННЕГО ПРОДУКТА.

Since Ukraine is an agrarian country – if we are to judge by its historically established type of economy, its natural resources and the nation's mentality – and since the share of farming products in its gross domestic product is quite high, the problem of tackling the key issues of ensuring the country's technological security becomes more than urgent in this light.

Taking into account that there is no universally accepted definition of the term «technological security of the farming sector», we suggest our own interpretation as follows: it is «such a state of the scientific, technological and industrial potential of the sector which allows us to ensure sustainable operation of the sectoral economy sufficient for reaching and maintaining

proper competitiveness of farming products and for ensuring economic self-sufficiency due to innovation technology».

The gist of technological security of the farming sector can be revealed through its key factors. This requires: enhancing innovation activities at farms and processing companies; revealing the existing threats to sectoral interests and estimating their impact; assessing potential risks; applying the system analysis methods to assess the current state of all the elements of technological security in farming; formulating a state policy on the improvement of technological security with a view to ensuring sustainable development of the farming sector; establishing a system of monitoring and control of how technological and innovation policy is being implemented and what results are achieved both on the sectoral and governmental level.

Currently the farming industry of Ukraine has been operating and developing in the conditions of uncertainty and under the ever increasing pressure of the scientific and technical progress which creates a highly competitive environment, which in its turn brings about multiple threats to the national, economic and technological security. This is the reason why there is a need to work out and deploy a managerial and economic mechanism to ensure the security of farming in the area of technological progress; a tool capable of timely detecting and eliminating all and every existing threats.

To achieve technological security in the farming sector, this device implies identifying a combination of institutional, economic, managerial and statutory methods to reconcile the interests of private businesses and those of the national economy. It should – with regard to the particular nature of farming and to the implementation of research and engineering developments – lead to the improvement of farming efficiency to the level as would be sufficient to ensure economic security, part of which is the technological one.

The essential function of this mechanism is : enhancing the intellectual potential of agriculture; wide implementation of highly efficient farming methods and technologies and resource-efficient cropping systems; manufacture of competitive science-intensive farming products – which in combination should secure growth for the sectoral economy.

The organizational and economic mechanism of technological security in farming includes the

following components: organizational framework; managerial functions, substantiation of the implementation of efficient forms and methods of technological security development, improvement and enhancement of the technological security; means of controlling the threats and levers to eliminate them; indicators and assessment criteria; statutory, financial and informational/statistical support.

In order to establish the mechanism of technological security, one has to adhere to a set of principles as follows: rule of law; systemacity; complexity; timeliness; substantiated and adequate protection measures and sectoral interests; delineation of authority and obligations among executors who bear responsibility for the enhancing of the technological potential of farming; using the intergovernmental systems of collective security; cooperation between the executive bodies of the government and the businesses; democracy of control. This mechanism must include four levels of action: governmental, regional, sectoral levels and the level of individual farming enterprises.

The governmental level (macro-level) of technological security is where the science-based, engineering and innovation strategy is shaped for the development of the farming sector, which in its turn provides support for businesses through the statutory framework, the basic budgetary, tax-related and food policy regulations, the technology transfer and intellectual property rights protection.

A government activity, by choosing the innovative economic development generally, is channeled to the achievement of the following tasks:

- defining and shaping: build-up and development of a new economic model based upon science-intensive technologies;
- motivation: using fiscal policy levers to stimulate businesses, organizations and executive authorities to implement innovation;
- organization: concrete activities of the government to ensure the establishment and efficient operation of the innovation infrastructure [8, p. 49].

At the governmental level, a number of measures have to be applied to regulate and stimulate innovation activities: state-sponsored programs aimed at increasing the demand for research and development in farming; projects to promote and encourage innovation among

individual agricultural enterprises; development of reasonable financial and taxation systems [2, p. 103]. Proceeding from the aforesaid, we can assert that the key role of the government in the area of technological development is to establish a legal framework capable of regulating and controlling technological security of the farming sector. Legal regulation of the technological security is needed to ensure normalization of the protection of all the stakeholders' interests in the agribusiness on the basis of clearly defined and unified criteria, rules and standards.

The meso-level – i. d. regional – is the one we have already considered in [3] where we suggested the establishment of an executive controlling body in charge of technological security in order to enhance the innovation potential of the farming sector.

The sectoral level of the organizational and economic mechanism of technological security of the farming sector is, logically, the extension of the activity promoted by the legal framework and the result-oriented approach to the innovative strategy of the country. Among the key tasks we can list the following: 1) developing a range of sectoral programs concerned with the issues of enhancing the technological level of farming enterprises; 2) setting up the infrastructure for research and development and innovation activities (collaboration between farmers and research institutions involved in the development of science-intensive products and in the training of high-qualification personnel); 3) financial incentives to widen and enlarge the components of this infrastructure [8].

The microlevel of technological security requires a designed system which should help to

implement such modernization policy. The system must include: innovation activity management; strategic planning of change, analysis of the current and perspective potentials of innovation; assessment of the risks of innovations to be implemented; personnel management, further personnel training; provision of funds for research and development; implementation of effective marketing services at the farms [4].

Ensuring innovation and technology development of the farming sector means financial, investment and governmental support which, unfortunately, is currently underfinanced and done at random. Underfinancing of technology development has been caused by:

- unreasonable distribution of budget funding between individual areas of action within innovation and technology policies;
- financing of R&D and innovation programs without reliance upon an integrated and balanced scorecard;
- dedicated budget programs do not fully correspond to the tasks and goals of the institutions in charge of their implementation;
- dissipation of resources on multiple programs and putting them in the hands of many executors and controllers, which wholly contradicts the idea of resource concentration and channeling them to high priority areas of innovation development of the sector;
- nonexistence of reliable efficiency assessment of how such scientific and technology programs are implemented;
- a weak motivation for business enterprises to participate in the financing of R&D projects and programs.

Table 1

Funding for R&D in the farming sector in Ukraine and in other countries, 2007–2013, million USD [7]

Country	2007	2008	2009	2010	2011	2012	2013
Germany	588.431	689.724	822.344	967.78	954.817	906.658	938.174
Norway	39.032	154.992	170.005	168.087	176.662	185.209	204.268
Denmark	82.615	69.756	71.071	69.717	77.914	66.844	75.606
Russia	242.119	144.423	327.688	–	–	–	–
Romania	65.687	115.348	73.81	151.994	97.225	80.228	38.692
USA	2325.1	2332.0	2629.0	2628.0	2211.0	2386.0	2218.0
Ukraine	43.078	59.293	57.211	65.746	68.486	76.118	-
Finland	107.432	107.287	111.854	109.254	106.938	109.387	106.455
France	265.167	304.906	337.315	364.275	435.7	342.099	364.569
Japan	1072.58	1126.14	1169.52	1120.82	1058.81	1006.47	970.182

By the level of its national expenditure on R&D in the farming sector, Ukraine does not measure up to that of the leading global economies (see Tab. 1). Ukraine's total R&D funding in 2012 was 313 times lower than that in the USA and 13.2 times lower than that in Japan. On the other hand, the last 6 years' dynamics show that this indicator in Ukraine has risen considerably – by 77 %.

Comparison of the key technological security indicators in different countries demonstrates: non-existence of a comprehensive public support for R&D innovation in farming; weak agrosience; insufficient innovation activity among Ukrainian researchers; insufficient demand for innovative products; inadequate system of funding for R&D institutions; inconsistency of the investment support for innovation activities in the sector.

The presence of multiple innovation-funding recipients in the country and in some of the sectors of its economy does not represent the efficiency. In this context, one has to establish an effective system of funds distribution and application which will ensure reasonable financing of technology modernization in the farming industry.

The key roles in the distribution of funding in Ukraine are performed by the following public bodies:

- Ukrainian Cabinet Council: develops the draft of the budget and accounting law and ensures its enforcement;
- Ukrainian Ministry of Finance: prepares the draft law and submits it to the Cabinet, implements the unified government budgetary, financial and fiscal policy;
- Ukrainian Parliament (Verkhovnaya Rada): passes the budget, controls its implementation;
- State Agency on Investments and Development: prepares suggestions concerning the amount of budget funds to be used for financial support of individual businesses;
- special-purpose government-supported foundations: designed to raise additional funds to finance government programs;
- regional and local public authorities: carry out governmental, regional and sectoral development programs, report on the implementation of such programs.

Thus, we suggest setting up an executive body in charge of the issues of technological

security which will earmark necessary funds and distribute them among executors in accordance with specified priority areas of work.

Financial and investment support for the processes of technological security may have different sources; see their scheme in the Tab. 2.

Table 2

Financial sources of ensuring technological security in farming

Source	Components
Public funds	Target refunding from the budget; preferential loans; tax credit
Own funds	Reinvestment of profits; demising, selling of property, selling of science-intensive products, company's funds
Borrowings	Loans; bond issue; leasing
Raised funds	Securities issue; shares and contributions of/by the shareholders; venture capital financing; foreign investment; joint innovation and investment projects, grant awards; charitable contributions

In order to simplify the process of raising funds for the farming sector, we suggest the following:

- to develop unified integrated norms of goal-oriented public financing of high priority development areas;
- to define clear rules of control over public funds in order to modernize the farming enterprises;
- to motivate the enterprises to attract investment on their innovation;
- to offer preferential loans or partial refunding of loan interest from local or regional budgets – to the enterprises which have implemented innovative technologies, etc.

We suggest that the main levers of implementation of fiscal policy focused on improving the technological security in farming should be as follows:

- a change of the tax assessment base: cutting taxes and mandatory payments through the increase of contributions to funds which are included in the cost of production;
- cutting taxes and duties/fees to the budget for the manufacturers of science-intensive products;
- tax exemption and tax concession;



- accelerated depreciation as a means of the active technical modernization promotion;
- the simplification of the tax system for foreign investors, in order to create a favorable investment climate;
- offering tax deferrals;
- reducing the amount of tax statements and administrative burden on tax payers [10].

By taking the above suggested steps, the government shall build a bridge between the activities in the area of technology and the strengthening of the economy, which in its turn will lead to the increased potential for transferring and implementing of foreign technologies. This will also bring about the synergy of interests of the institutionalized organizations and farming enterprises in such areas as security, science, technology and engineering at all the stages of the process of technological security provision.

Thus, ensuring technological security of the farming sector requires the carrying out of a range of mutually agreed actions. A change is mostly needed in such areas as legislation, statutes and regulations, institutional environment for the management and implementation of innovative and technological activities of institutions and organizations in the farming sector, the mechanism of financial assurance and fiscal support. Essential here is a program of high-priority development areas in the farming sector for technological modernization and strengthening of the national R&D potential. Also a special significance is given to the process of establishing an executive control body to manage the technological security of the sector, and of vesting it with the authority to ensure the highest practicable level of security in the national agriculture.

Respectively, the implementation of the suggested ways and methods of improving the sectoral technological security – as part of national economy control and management and its appropriate funding – shall significantly improve the efficiency and competitiveness of Ukrainian farmers through the deployment of the latest engineering and process solutions in the production of science-intensive products and reduction of the dependence of the Ukrainian farms upon the imported technologies, materials and equipment. In addition, monitoring of the above mentioned processes and mechanisms is needed.

The main goals of the technological security monitoring in farming are as follows:

- 1) To evaluate the state and dynamics of technology development and the level of security in the farming sector.
- 2) To reveal and identify destructive changes in these processes and strengthen the overall potential of the sector.
- 3) To identify the causes for, sources, nature, consequences and the impact of the threatening factors upon the production, material and technical and research and development potential of the farming industry.
- 4) To predict the consequences of the impact of the threatening factors upon the technology potential of the sector.
- 5) To carry out systems analysis of the situation and its trends.
- 6) To develop a set of objectives to eliminate the threats [9].

The users of the monitoring data – depending on the degree of disclosure of the information obtained during the investigation – can be internal and external.

The system of monitoring and control of the process of ensuring technological security can be conventionally broken down into two complementary components: 1) direct monitoring of the present security status; and 2) monitoring of the general process of security at all levels of its organizational and economic mechanism.

To assess the initial level of technological security, one will have to carry out a comprehensive diagnostics with the goal of identifying the key threats, and then to work out and plan strategic and tactical measures to overcome them.

Considering the organizational and economic mechanism of technological security in the farming sector, we can identify a number of steps or stages of control over the process of security improvement:

- 1) Identification of the goals and objectives of monitoring and control
- 2) Building up a system of technical and economic parameters by which technological security is to be evaluated with the regard to the specific features of farming
- 3) Collection and processing of information to characterize the state of the investigated object
- 4) Revealing the factors which characterize the more promising areas of the technological security development

- 5) Modelling and shaping a security strategy
- 6) Analysis of the security indicators by individual component
- 7) Monitoring threats to the technological security
- 8) Working out suggestions to prevent potential and eliminate all the existing threats [1].

The key areas of monitoring on how the mechanism of technological security works in the farming sector are as follows:

- Inspection of the plans and accounting/reports (strategic development programs, plans of measures, financing estimates, predicted efficiency indicators)
- Examination of the current reporting
- Online monitoring using information systems
- Monitoring measures (programmes and projects assessment, international cooperation) [5, p. 130].

The executive body in charge of the technological security in farming carries out examination of and controls how the measures are taken which have to ensure such security; all this is to identify and take alternative managerial decisions. Therefore, we suggest that the process of technological security monitoring should be viewed as a system of managerial decisions to implement technological security measures using the functional approach. Ongoing monitoring will help timely detect even the weakest signals of the negative deviations, analyze and improve strategic measures to enhance efficiency of technological security in farming, including the financial ones.

Proceeding from the aforesaid, monitoring and control of the technological security in farming is a complicated multilevel structure. It includes a complex of measures to diagnose the key threats which may increase the level of negative factors in farming beyond tolerance, and to control how the planned organizational and economic measures of the technological security are taken. Definition of the principles, goals, and milestones of the monitoring as well as the distribution of the results obtained during the investigation, will allow us to analyze the situation better and take reasonable and efficient managerial decisions. The advantage of this system of monitoring and control is the ongoing detection and elimination of those problems which may arise at each of the stages of the innovative technological development of farming and implementation of its security.

Therefore, in accordance with today's requirements, we have to solve an important problem – namely that of the financial support for technological security in farming – the problem of the highest priority because upon its solution depends the successful economic development of Ukraine and maintenance of its national security on appropriate level. It seems to be obvious that science-based technological modernization of agriculture in the country shall contribute to the sustainable development of its agro-industry and to the stable growth of the gross domestic product due to the production of competitive farming products.

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