

Methodological foundations of sustainable development of the agricultural sector

The paper analyzes the different perspectives on the concept of “sustainability”, “sustainable development”, the content of sustainable development of the agricultural sector as a complex socio-ecological-economic system is clarified and supplemented. The factors and indicators of sustainable development of agriculture are identified.

Stability, sustainable development, factors, indicators, agriculture.



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The modern concept of sustainable development

The idea of sustainable development of mankind began to dominate in 1960 – 1970s when a number of environmental and socio-economic problems began to threaten the life of current and future generations. These include: environmental degradation (chemical pollution of food, deforestation, desertification, bogging, pollution of surface and ground water, reducing the species diversity of living organisms, diseases, genetic abnormalities, reduced life expectancy, emergence of acid rain, ozone reduction, global warming and other environmental issues), the use of inefficient resource destroying technologies; disparities

in socio-economic development between developed and developing countries, expanding poverty and increasing differentiation between the rich and the poor; the food crisis and the spread of hunger, exhaustion and escalating shortage of mineral raw material and energy resources; ethnic conflicts, etc.

The issues of sustainable development of the agricultural sector are particularly relevant to the northern regions. Fruitful life in the harsh climate is only possible if there is a healthy diet. Whole milk, fresh vegetables and meat, eggs as a source of adequate protein, vitamins, minerals and other biologically active substances are indispensable for a balanced diet of inhabitants of the northern territories.

The lack of fresh food here has a depressing effect on human and sharply reduces ability to work. The consumption of these foods is largely dependent on the level of their production on the spot. However, during the period of market reforms the production potential of the industry degraded. As a result, agricultural production has become significantly more difficult, having largely lost its industrial character.

The village is undergoing a systemic crisis, the main manifestations of which are not only decreasing agricultural production, but also worsening demographic situation, high unemployment among rural population, its poverty problems, reduced quality of life. Modern agricultural production is characterized by the preservation of nature devastating type of management. A considerable part of arable land, hayfields and pastures are not used and overgrown with forest. The removal of nutrients with the crops from the soil on arable land exceeds their entry.

The theory of sustainable development in recent decades has become the most popular. According to some scholars, the theory of economic growth has been replaced by the concept of sustainable development [1, p.46]. Now in the literature, there are more than 60 definitions of sustainable development. This reflects both the complexity of the concept including economic, environmental and social aspects of human development and the difference of views of scientists, businessmen and politicians.

Historically, the concept of “sustainable development” is associated with the ecology. One of the earliest definitions of sustainable development was proposed by the Canadian Commission on the Environment in 1915 “Every generation has a right to a certain percentage of natural capital, but the bulk of this capital should be transferred intact to the next generation” (cited by 2, p. 115).

The International Commission on Environment and Development in 1987 has defined sustainable development in the following way: “Sustainable Development is a development that meets the needs of the

present, but without compromising the ability of future generations to meet their own needs. It includes two key concepts:

1) the concept of needs, in particular the needs necessary for the existence of poor people who should be the subject of primary importance;

2) the concept of constraints conditioned by the state of technology and social organization imposed on the environment’s capacity to meet current and future needs” [3, p.50].

According to some scholars, the translation of the term “sustainable development” into Russian is not quite accurate. Thus, A.M. Reteyum believes that the recommendations taken by the UN Conference “Environment and Development” (UNCED), Rio de Janeiro, 1992, on the transition in the XXI century to a strategy of sustainable development, which was poorly translated in this country is closer to the meaning of ‘self-maintenance’ [4, p. 8].

According to N.V. Chepurnykh, the term “sustainable development” is inaccurate; the phrase “sustainable development” should be translated as “acceptable” or “permissible” development. The author also believes that the term “sustainable development” is also unfortunate because it is more related to engineering sciences and creates the illusion that crisis-free progressive socio-ecological and economic development is possible. In fact, we are talking about working out a strategy that would make the inevitable crises less painful [5].

A number of scientists believe that a more accurate translation of the term sustainable development is as “acceptable development” or “inexhaustible development” [6, p.133].

Scientists of the Institute of Geography of RAS consider sustainable development “as a multilevel, hierarchical, controlled process of co-evolutionary development of society and nature with mass, conscious participation of the population. Its purpose is to provide a healthy, productive life in harmony with nature for the present and the future generations based on the protection and enrichment of cultural and natural heritage” [7, p. 23].

N.F. Glazovsky believes that sustainable development requires social justice, economic development and high environmental quality. All three components of sustainable development are closely related to each other, but these relationships are not enough studied at the present time. It is particularly important to establish how the efficiency of natural resources use changes depending on the level of economic development, because it can help in developing strategies to improve it [8, p. 17].

According to E.I. Glushenkova, the most complete and accurate is the following definition of sustainable development. Sustainable development is a normative theory, which assumes control of living conditions on the basis of four principles: 1) satisfaction of the basic needs of all people currently living, 2) equal standards of this satisfaction for the entire world's population, 3) careful use of natural resources, 4) preservation of opportunities for future generations to realize the basic needs. All these principles are of equal value, but the central is the third one based on the idea of the limited ability of natural systems to economic carrying capacity, forming the core of the theory [cited by 9, p.67].

There are many other definitions of sustainable development (SD) associated not only with the environment, but also including economic and social components. Thus, A.D. Ursul notes: "Broadly speaking, SD is interpreted as a process of designating a new type of existence and development of world civilization, based on the radical changes in historical landmarks in all practical parameters of being: economic, social, environmental, cultural, etc. With this understanding of SD we are talking the optimal control of not only the natural resource potential, but also the entire socio-cultural sphere (economy, culture, public-legal institutions, etc.)" [10, p.22].

D.S. Lvov considers sustainable development in the narrow and broad sense. According to him, sustainable development in the narrow sense involves environmental sustainability,

in the broad sense it includes all forms of resistance (demographic, economic, social, anthropogenic, etc.) [11, p. 48].

Analysis of the literature on sustainable development shows that, although many scholars and public figures indicate the inadequacy and inconsistency of the translation of the English concept of "sustainable development", translating it as "stable", "controlled", "supported", "equilibrium", "balanced development", the generally accepted interpretation for more than 20 years is the term "sustainable development", and it is not reasonable to change it. Most interpretations of the term "sustainable development" one way or another are based on the definition given by the Commission G.H. Brundtland, which is rightly considered as classic.

In Economics sustainability has been historically associated with economic development. In the classical theory of economic equilibrium, represented by A. Smith, D. Ricardo, K. Marx, the basic concept was reduced to the equality of supply and demand, income and expenses, profit maximization. The neoclassical theory of economic equilibrium (L. Walras, V. Pareto) adhered to the concept of competitive balance, price flexibility and optimal use of resources [12].

Currently, the term sustainable development has been applied in economic theory to describe the type of economic development. "... development, as well as its derivative meaning – economic development, is characterized by non-linear (abrupt and jerky) process of growing complexity in the transition from one qualitative state to another, as well as the change of these types. No accident that in the world economic science, along with the theories of economic growth, a new scientific field has spread – the theory of economic development" [13, p. 45].

The concepts of "economic growth" and "economic development" are closely linked. Sustainable economic development requires sustainable economic growth.

In turn, sustainable economic growth determines sustainable economic development. Sustainable economic development is a steady improvement of one state to another by virtue of the positive growth and a balanced interaction between the components of the economic system in the long interval of time. The instability of the economic system is its inability to keep moving along the positive growth trajectory because of its negative components [14, p. 8].

Based on the study of the concept of “sustainability” and “sustainable development” we can note the following. Stability should be understood as the ability of any system to return to a certain balance after the exposure to it of external and internal factors.

The following definition of sustainable development is the most common in the literature: it is a development where the material and spiritual needs of the present generation are satisfied without compromising the ability of future generations to meet their needs. At the same time ensuring sustainable socio-economic development of the economy depends on whether it is compatible with human development in the interaction with the environment (biosphere).

The transition to sustainable development of socio-ecological-economic systems at macro, meso and micro level, at the level of the overall economy, industry, enterprise, requires new legal regulations, new performance management system.

Based on the foregoing, it can be stated as follows. Currently, the term “sustainable development” has been universally distributed. Analysis of scientific literature shows that there are many definitions of sustainable development. Most definitions of sustainable development are associated with the concept proposed by the International Commission under the direction of G.H. Brundtland. One of the main essential features of sustainable development is the characterization of three closely interrelated components: economic, social and environmental.

The concept and essence of sustainable development of agriculture

In the scientific literature on agriculture and agricultural practice the term “sustainable agriculture” is commonly used. But the common definition of the concept has not been developed so far.

In many publications, sustainable agriculture is considered as “alternative agriculture”, characterized by the transition from anthropogenic industrial agricultural system to an environmentally sustainable system, with minimal use of nonrenewable energy resources, “ecological agriculture”, “biological agriculture”, “dynamic adaptive” and “ecologically balanced agriculture” with a minimum use of material and energy resources of non-farm origin. In all these definitions, the main is the transition from an intense anthropogenic system to environmentally sustainable system of agriculture, in which agro landscape remains useful for a long time, low-cost technologies are used. Several scientists note the diversity of the term sustainable agriculture, which involves not only the conservation of natural resources, but also means a decent life of rural workers.

The definition of “sustainable development” in relation to the agrarian sector is formulated in the material adopted at the session of FAO (UN Food and Agriculture Organization) in Rome, in 1996, as follows: “The main objective of the Program of sustainable agriculture and rural development is to increase food production and provide food security.

To solve this problem it is necessary to support educational initiatives, the use of economic innovation and development of appropriate new technologies, thus ensuring stable access to the food corresponding human needs for nutritious elements; access for disadvantaged groups; the development of commodity production; reduction of unemployment and improvement of income level in order to reduce poverty; management of natural resources and environmental protection” [15].

The Second All-Russian Congress of Agricultural Economists in 2006 was dedicated to the review of sustainable development of agro-food sector as a major factor of socio-economic stability of Russia. I.G. Ushachev characterizes the essence of sustainable development of the agricultural sector as a unity of three components: economic, social and environmental, allowing to combine economic growth and increasing degree of satisfaction of the population's needs with the ecological requirements into a single social and nature system [16, p. 3-4]. I.V. Kurtsev believes that sustainable development of agriculture means the reproduction of resources at every stage of production cycle at a higher level in terms of positive outcomes: production, economic and social parameters, consistent building of capacity to improve them [17, p. 17].

P.D. Polovinkin determines the stability of reproduction in agriculture as the ability of the subjects of this reproduction to support the dynamic rational proportion continuously between the factors of reproduction in the agricultural sector and the required pace of development in terms of uncertainty to continually meet the needs of the population in food and consumer goods made from agricultural raw materials [18, p. 555].

Sustainable development of the agricultural sector is determined by closely interrelated components – economic, social and environmental. The main criteria for sustainable economic development of the industry are the increase in the production of safe food in order to meet the needs of the populations, ensuring economic efficiency of production, which provides expanded reproduction. The social component of sustainable development includes increasing the level and quality of life for farmers, stabilization the demographic and migration processes in the countryside. Stable, equilibrium nature management is related to the ensuring of sustainability of agricultural systems at present and in the long term, improvement the quality of the environment and conserving natural resources.

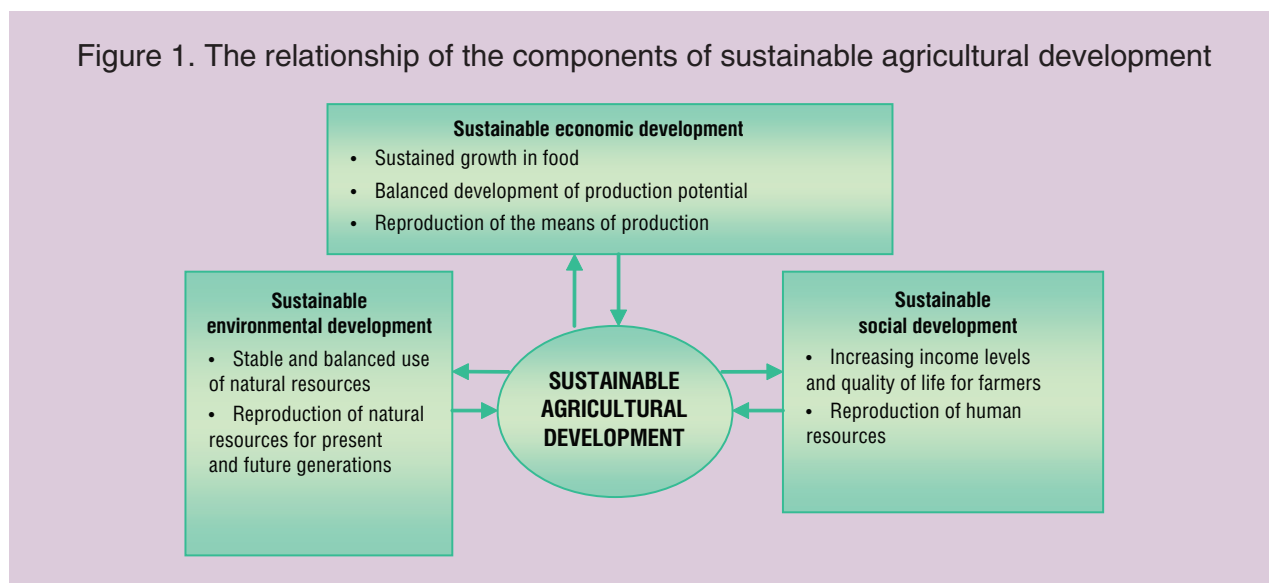
Sustainability of environmental development of agriculture will allow to avoid degradation and loss of arable land, to increase soil fertility.

The concept of sustainable development of agriculture is inextricably linked with the growth of food production, efficient use of economic and intellectual resources, improvement of wealth and quality of life for rural residents, stable and balanced nature management. Only when there is a balance of economic, social and environmental components, there is sustainable development in the industry for a long time. The close relationship of the components of sustainable agricultural development is shown in *fig. 1*.

Sustainability of agricultural production is determined by the specific industry and market relations in agricultural production – heavy dependence on climatic conditions, making the agricultural sector less stable compared to other sectors of the economy; the use of land in production as a rare and limited resource, and living organisms characterized by different production potential per unit of resources expended; the incomplete process of intensification and industrialization of agricultural production, a complex and poorly developed industrial and social infrastructure, leading to extremely low levels of productivity and wage; the fact that the agricultural sector does not fit into the modern model of market economy and can only develop with government support. The peculiarity of the approach to the justification of stable operation of agricultural enterprises and farms is the compulsory registration of the specifics of agriculture as a complex socio-ecological-economic system.

Agriculture as an unstable system cannot develop itself without external influence. Especially for the northern regions it is necessary to enhance the impact of the state to increase the efficiency of agricultural production, improve living standards of the peasant community, save the environment for future generations.

Figure 1. The relationship of the components of sustainable agricultural development



The dynamic development of the agricultural sector depends on the activity of the primary link (business), the rational inter-industry and industry relations, economic relations between the spheres of the reproduction process.

At the level of commercial organization the concept of stability is usually reflected in its financial position. Thus, in the contemporary economic dictionary stability of the enterprise, the firm is defined as “the financial condition of the company, economic activity of which provides under normal conditions the performance of all its obligations to employees, other organizations, the state through an adequate income and therefore income and expense” [19, p. 360].

In our view, it is improperly to determine the stability of the company only in terms of its financial position. It does not take into account other key factors of the production system efficiency, the most important of which are industrial-technological potential of the company and its ability to continue to fulfill its basic function, i.e. to produce the products demanded by consumers. Even with the bankruptcy of the company its productive capacity may not be susceptible to fracture. Worn production facilities, outdated technology, human capital impervious to innovation always result in a weakening of the stability of the enterprise, because it violates its functional properties.

Therefore, not less (if not more) adequate is the relationship of the stability of the enterprise not only with its financial situation, but also with its production and technological parameters, with their dynamics, i.e. with the state of the reproduction process and its adequate capabilities to respond to changing market conditions, technical and technological advances [20, p. 47].

In the works of local economists, there are many definitions of economic sustainability of the enterprise. Some researchers consider stable operation of the enterprise as the ability to maintain (or increase) the volume of sales over a long period of time with various changes in the infrastructure and with fluctuations in consumer demand [21, p. 185].

Others point out that economic stability requires a qualitative and quantitative conservation, restoration and expansion of profit-maximizing orientation, ensuring stable circulation of capital, its renewal and accumulation in the interests of the owners of the enterprise and socio-economic security of its staff [22, p. 21]. Still others believe that the economic sustainability of the enterprise is its ability to adapt with minimal losses to the impact of changes in the external environment, adequately responding to its impacts, as well as internal disturbances [23, p. 25].

A number of scholars believe that the company is a relatively stable, coherent and bounded on the environment independent socio-economic system, integrating the processes of production (realization) of goods and the reproduction of resources in time and space. The connecting link between these processes and the “face” of the firm is its potential – a set of resources and opportunities, determining the expected performance of its development under various real scenarios of environmental change. The main object of the decision-making is the distribution of resources and efforts of the firm between increasing potential and its use, between reproduction and production, between the present and the future [24, p. 20].

The initial production unit is rightly regarded as a complex system. Systems’ functioning is performed by the laws of dynamic development. One of them is the transition of quantitative changes into a new qualitative state. At the same time every system has a tendency to a relative equilibrium when the forces acting on it are mutually balanced. This equilibrium can be stable and unstable due to the influence of factors disturbing this balance. Otherwise, the balance of the system loses its properties and becomes a new qualitative state, which is characterized in a different regime. The study of these discontinuities has led to the creation of catastrophe theory. Due to such changes agriculture in many regions of Russia has appeared to be on the verge of a catastrophe.

We share the position of the authors who believe that “development” and “sustainable development” are not concept-synonyms. Development requires an sequence of cycles of abrupt (through the stage of the disaster) transition of the system (e.g., agriculture) to another level as a prerequisite. In other words, “development” is presented as repetitive with a regular cycle: a gradual change in the spatial state of a system, a crash (fluctuation), the transition to the next level and start of a new cycle of development of a qualitatively different system.

In contrast to the regularly coming disasters (crises) in the case of “development”, “sustainable development” implies a balance between interrelated elements of the system – economy, social and environmental spheres. Thus, for a “sustainable economic development of agriculture”, it is necessary that it would be able to reproduce the natural environment, the means of production, the human, while avoiding disasters for an unlimited length of time [25, p. 9-10].

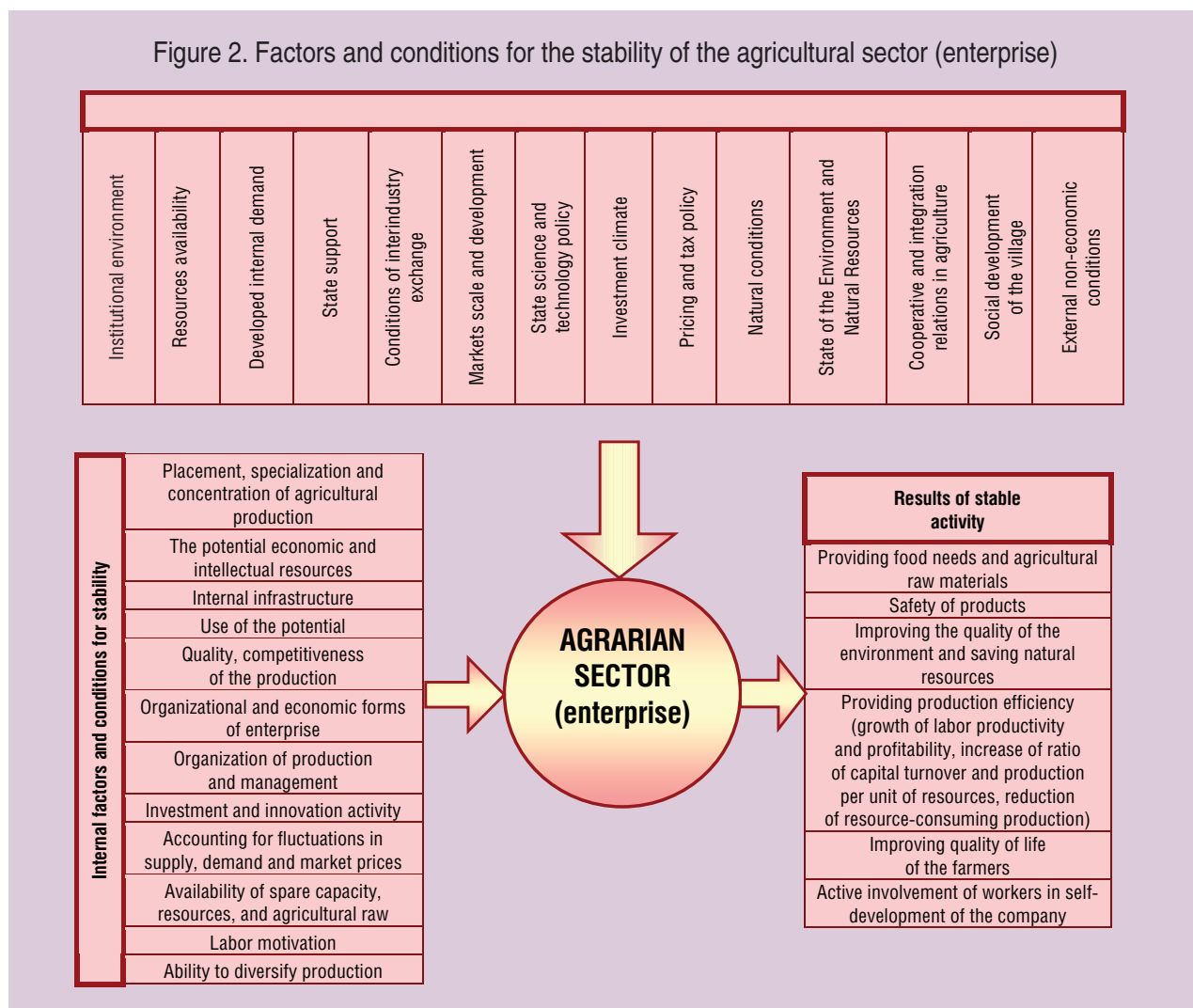
Thus, the sustainable development of the agricultural sector is defined by three closely interrelated components: economic, social and environmental. Sustainable development is achieved if the reproduction of productive capacities, human resources and the environment is ensured for a long time in the unity and interaction. A crucial role in sustainable agriculture and its various branches is played by the socio-economic and agrarian policy of the state.

Factors and conditions for sustainable development

Sustainability of the agricultural sector as a complex, open and multi-level system is determined by factors and conditions. We should find out the essence of the concepts of “factors” and “conditions”. In the Dictionary of the Russian language factor’ is “defined as the driving force, the cause of any process, phenomenon” [26, p. 834]. Condition’, according to the dictionary is 1) “the circumstance on which anything depends”, 2) “the rules laid down in some areas of life, activity”, 3) “the situation in which something is happening” [26, p. 826].

In the classification of factors and conditions that foster sustainability of the industry, consider the following situation. The most reasonable is the division of agricultural sustainability in economic, social and environmental dimension. Based on the diversity of his home factors and conditions, they can be divided into two groups: external and internal (*fig. 2*).

Figure 2. Factors and conditions for the stability of the agricultural sector (enterprise)



Decisive role in the stability belongs to the external factors and conditions: the institutional environment, resource availability, competitive environment, the development of domestic demand, government support, the terms of interdisciplinary exchange, the extent and sophistication of markets, state science and technology policy, investment climate, price and tax policies; natural conditions, the environment and natural resources, cooperative and integrative relations of agriculture, rural social development, external economic conditions.

The first group can be defined with the term “external environment”. The external environment is essential for the functioning of the agricultural sector and its business entities defining all of their internal factors.

Stimulating or restraining influence of external factors on the stability primarily depends on the socio-economic and agricultural policy. Sustainability of agriculture of the North is defined by making and adjustment of agricultural legislation, the level of budget support, government participation in the marketing of local products, the market of provided material resources, the formation of multifunctional agriculture in the countryside.

The impact of internal factors on the stability of agricultural producers are subject to availability (lack) of highly skilled management team that is able (unable) to apply advanced technologies to modernize and diversify production, to use the resource potential efficiently, to adapt to changing environmental conditions.

Sustainable development of agriculture and some of its branches are also affected by such internal factors and conditions as location, specialization and concentration of agricultural production in accordance with local realities, the potential of economic and intellectual resources, internal infrastructure, the use of potential, the quality and competitiveness of production; organizational economic forms of enterprise, organization of production and management, investment and innovative activity, accounting fluctuations in demand, supply and prices in the market, the presence of spare capacity, resources, agricultural raw materials, labor motivation.

Agriculture as a complex production system will operate stably if all the factors of production are balanced, the socio-economic and agricultural policy is accompanied by legal and financial security. The system will be unstable if the factors of production are imbalanced and the level of resource potential is low.

A special place in the sustainable development belongs to the institutional environment, which is seen as a means to reconcile economic, social and environmental components of sustainability. The institutional environment in the Russian countryside has historically evolved under the influence of a particular manifestation of land ownership, serfdom, communal ownership of land and farm system that has shaped the mentality especially in rural areas. The moral and ethical standards of the Russian peasantry, their customs, traditions, patterns of behavior and thinking, spiritual values and way of life that still continue to exist to some extent in rural areas now have been formed over the centuries. Economic mentality of the Russian man has been formed in these very specific conditions [27].

Psychology of the Russian peasantry has not been finally formed historically as private ownership. Their customs, traditions and psychology are quite stable and cannot be changed overnight, they are to some extent continue to influence the modern development of market relations in agriculture.

Managing the sustainable development of agriculture in the North we should be aware that until recently there has been a most nationalization of agrarian relations. Historically, in the North there has developed a communal system of land tenure, and therefore, the psychological mood of people to team work and staying in the joint settlement is expressed here to a greater degree than in the southern regions of Russia.

Indicators of sustainable development of agriculture

For quantitative characterization of the stability of the agricultural sector it is advisable to use a system of indicators (*fig. 3*).

It is also important to assess the degree of sustainability of agricultural production. For these purposes we use the stability coefficient, which measures the fluctuation measure of actual levels of dynamic range relative to theoretical levels, the coefficient of resistance changes, the coefficient of rank correlation [28].

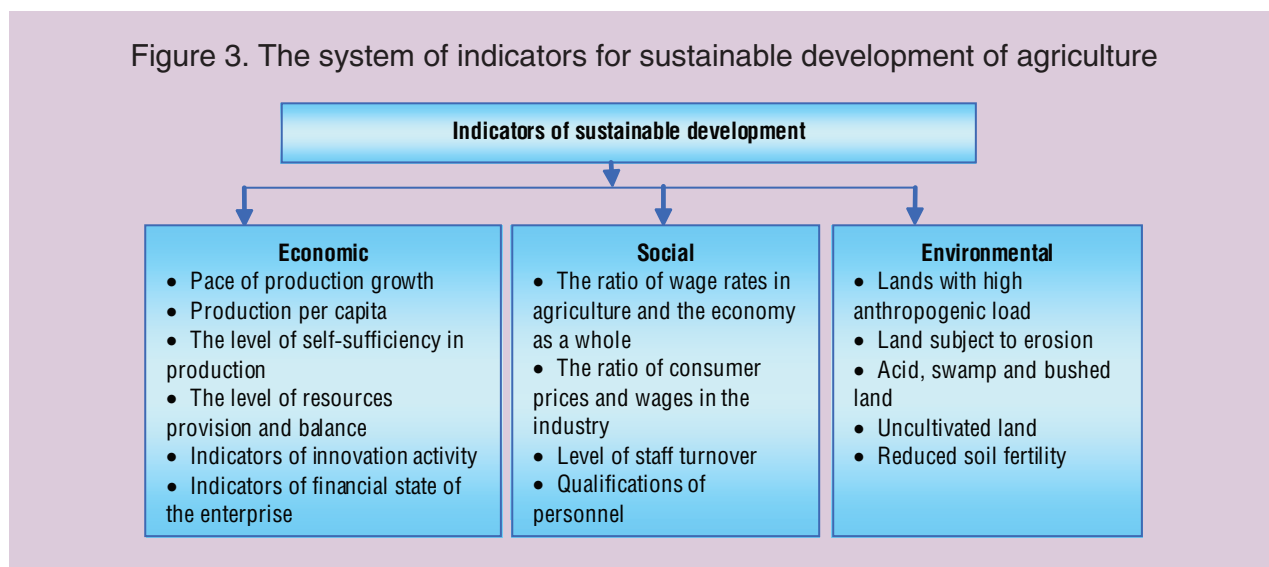
Depending on the sustainability assessment level (a particular type of product, industry, of agriculture as a whole) the indicators characterizing the essence of the concept will change.

Sustainability indicators should meet the following criteria: the ability for quantification and use within a country, region, industry, enterprise; basing on available statistical reporting; use of a limited number of key indicators.

Thus, the performed study allowed the following conclusions.

1. Analysis of scientific literature shows that there are many definitions of sustainable development. Most interpretations of this term are based on the definition given by the Commission G.H. Brundtland: "Sustainable development is a development that meets the needs of the present, but without compromising the ability of future generations to meet their needs."

Figure 3. The system of indicators for sustainable development of agriculture



2. Sustainable development of the agricultural sector is defined by three closely interrelated components – economic, social and environmental. Sustainable development is achieved if the reproduction of productive capacity, human resources and the environment is ensured for a long time in the unity and interaction.

3. The two groups of factors affecting the sustainability of agriculture are allocated: external and internal. Decisive role in the stability belongs to external factors and conditions. Agriculture as a complex production

system will operate stably if all the factors of production are balanced, the socio-economic and agricultural policy is accompanied by legal and financial support. The system will be unstable if the factors of production are unbalanced and the utilization level of the resource potential is low.

4. To characterize the degree of economic, social and environmental sustainability of agricultural production quantitatively the system natural, cost and relative measures (indicators) is proposed.

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