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Methodological Aspects of Creating the System of Indicators of Crisis Prevention as the Foundation for Stabilization of Agricultural Production Based on Ukrainian Experience

Abstract. The article deals with the methodological principles of determining the indicators of the economic development of agricultural production, which are based on the requirements of the EU Common Agricultural Policy and which will identify the possibility of crises both in agriculture and its sub-sectors, as well as the national economy as a whole. The system which is reacting to the crisis indicators and allows assessment of the stability of economic development of agricultural production was proposed. Analytical approaches to diagnosis prehistory development and identify indicators – reacting to the crisis indicators by analyzing and evaluating indexes of dynamics in periods of stability (relatively stable path of development) and the crisis (sharp kink economic dynamics) and graphically analytical method of determination. For sectors show synthetic indicators (agricultural production, the level of monetization of the economy, import-export ratio) that serve as functional criteria for identify in previous periods of force majeure or crisis as precursor's crisis.

Key words: indicators of crisis, agricultural production, stabilization, crisis prevention, economic development, agrarian economy

Introduction

Current state of the economic development of agricultural production in Ukraine raises acute strategic issues of analysing the factors and components of economic growth aimed at levelling main structural imbalances and further sustainable economic development.

World economic environment is characterized by increasing impact of global challenges and rapid spread of crisis in all spheres of public life. The economy of any country cannot be considered as a separate economic system that is not influenced by geopolitical, demographic, foreign financial and economic processes, as well as climatic changes. Growing interdependence and interaction between national economies increase vulnerability to negative effects due to their interconnected financial-credit and foreign trade sectors.

Ukrainian agriculture is characterized by considerable openness and high potential growth rates. The process of structural transformation of the current economic system acquires new features and aims to improve its functioning. The economic system and the

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mechanisms of state regulation are in the process of formation. This reinforces the urgency of a comprehensive approach to assessing the factors that may adversely affect the economic development of the national economy and its sectors, as well as lead to internal crises. There is an overwhelming need to develop methodological approaches to the assessment of the economic stability, to integrate them into the system of national governance, namely to establish an appropriate system of indicators that will allow to respond quickly to crises in various government branches. The analysis of international experience in establishing indicators, which mark the existence or emergence of threats to the stability of economic development, shows that the most complicated step is the actual choice of variables to describe each separate crisis.

In the literature there are different definitions of "an indicator". The term "indicator" is defined as an aggregate measurement, connected with an important issue or phenomenon and performed on the basis of a series of observed facts. Indicators can be used to determine a relative item, or to indicate a positive or negative change. According to Eurostat, the statistical indicator shows the statistical data for a specific time, place, or other relevant characteristics, adjusted in at least one dimension (usually size), in order to enable comparisons (European Union, 2013, p. 20). In general, "indicator" and "measure" are terms used alternatively (Borys, 2005, p. 62). The most important feature of an indicator is its comparability (as opposed to the characteristics generally expressed in absolute values), which enables ranking of the compared object with other objects (Central Statistical Office, 2011, p. 15; Sekerka, Obrsalova, Bata, 2014, p. 223).

Ukrainian regulation ensures evaluation of the state economic and food security as an integral characteristic of the economic system, which includes the evaluation of the macroeconomic, investment, innovation, financial, social, foreign trade, energy, food, and demographic security components.

The development of a common framework for the assessment of countries' progress towards food security is challenging. Food security is a multifaceted phenomenon that is suited to multidimensional assessment (De Haen 2003; Heidheus& Von Braun 2004; CFS 2011). In the last two decades, the complexity of the concept, compounded by the impossibility of observing food security outcomes directly (Barrett 2010), led to a veritable proliferation of indicators (Hoddinnott 1999, CFS 2011). Accordingly, a common framework for the monitoring of food security – on the model of the Millennium Development Goals indicators (UN, 2003) – requires the international food security community to select and reach agreement on a core set of indicators that alone can provide an exhaustive, yet synthetic, picture of countries' and global food security. Ultimately, this overall objective relates to the selection of the most appropriate informational basis (Sen 1999) for the assessment of food security and to which criteria should underline the choice of a limited set of measures among the hundreds proposed in the literature. Clearly, the selection of the informational basis for the evaluation is inextricably linked to the formulation of value judgments, which need to be transparently conveyed to each of the relevant stakeholders of the assessment in order for it to be accepted by its final users (JRC-OECD 2008).

The agricultural sector is one of the most important components of any national economic system. In addition, its characteristic features are most noticeable during crises. It is explained by the fact that agricultural production is traditional and produces goods for mass consumption. Therefore, in times of economic recovery it develops relatively slower than other branches. However, during crisis and recession agricultural sector demonstrates

a higher level of stability that transforms it into a significant stabilizing factor in the development of national economy. At the same time, the most powerful macro challenge for the national agricultural sphere is economic reduction caused by diminished purchasing power, which lessens the capacity of the domestic food market. Thus, overcoming crises and stabilizing agricultural production in Ukraine are possible when there is a system of indicators preventing crises that will serve as the basis for stabilizing agricultural production.

The lack of theoretical and methodological study of this topic, its relevance for economic and social development of Ukraine helped us to define the research topic.

Currently there is no single methodology for monitoring and inspecting country's financial stability, which would be aimed at detecting harbingers of financial instability as crisis predecessors. Such inspection of macro indicators would allow to see the first signs of the crisis and to develop ways to prevent it using state regulation. Therefore, this research aims to develop the system of indicators recognizing pre-crisis states that would serve as the basis for stabilizing agricultural production.

The aim and methodology of the research

The aim of the research is to develop methodological principles of determining the indicators of the economic development of agricultural production, which are based on the requirements of the EU Common Agricultural Policy and which will identify the possibility of crises both in agriculture and its sub-sectors, as well as the national economy as a whole.

For this purpose, the method of descriptive analysis of secondary data has been followed (documents test method, literature analysis and critique). Based on the analysis of existing data, the key strategic documents and statistical information related to Ukraine have been reviewed.

Previous research allowed identifying the list of key macroeconomic indicators of stability and crises prevention, which are common for different countries and can be used in Ukraine (Table 1).

It should be noted that not all of these parameters could be used in the analysis of crisis (or development stability) due to the fact that there is no statistics on these indicators or they may not be effective for a particular country.

Therefore, the combination of these assessment features and indicators for monitoring and evaluating the stability of the national economy provides new quality analysis, modelling and forecasting of the economic development and integrates their key features.

There are various approaches to the definition of indicators preventing crises. The most frequently used indicators include government debt and GDP ratio, budget deficit and GDP ratio, trade balance and GDP ratio (Skrypnychenko, 2015). For quantitative analysis of indicator levels it is necessary to include the following markers: real sector indices (consumer price index, producer price index, GDP growth rate and deflator); budgetary sector indices (budget revenues and expenditures, deficit (surplus) of the unified and state budgets); monetary sector indices (weighted average interest rates on loans and deposits, inflation, exchange rate, foreign currency reserves, government debt); external sector indices (balance of payments of current account, exchange rate, external debt, etc.). External impact factors include: crisis intensification in a globalized economic environment, shock changes in energy prices, financial stability and access to financial

resources, geopolitical situation, international political relations, global supply and demand, trade barriers between countries, natural phenomena, ecology and more.

Table 1. Main economic development indicators used to evaluate threats in international practice and appropriate for testing in Ukraine

Sectors/Preventing indicators	Countries					Suggested for use in Ukraine
	Poland	Russian Federation	France	Hungary	Germany	
	Non-financial sector					
Indicator of the industrial sector development	+	+	+	+	+	+
Indicator of the agricultural sector development (agricultural production)	+	+	+	+	+	+
Indicator of consumer sensitivity			+		+	+
Level of business activity in the country			+		+	+
	Monetary sector					
Level of demand/supply of money (M2-M3 unit)	+	+	+		+	+
Price index (consumer price index)(CPI), producer price index (PPI))	+		+	+	+	+
Real interest rate on loans			+		+	+
Foreign currency exchange rate of the national currency to the US dollar	+	+	+	+	+	+
Volume of bank loans	+		+			+
	Budgetary sector					
Level of the unified budget deficit	+	+	+	+	+	+
Level of foreign debt	+	+	+	+	+	+
	Foreign economic activity sector					
Foreign trade indicators (export, import, trade balance)	+	+	+	+	+	+
Level of external state debt	+	+	+	+	+	+
	Financial markets					
Stock market index	+	+	+	+	+	+
Indices of foreign stock markets	+	+	+	+	+	+

Source: developed using references: CFS, 2011; Csortos, Szalai,. 2014; Czyżewski, Kułyk,2010.

Results of indicator evaluation serve as the basis for the balanced macroeconomic policy in a volatile economic situation both for developed and developing countries. The choice of indicators and evaluation criteria was carried out basing on EU Macroeconomic Imbalance Procedure, Maastricht criteria of European integration, foreign research, and the analysis of trends in the Ukrainian economy.

The research results

The calculation results for determining indicators preventing crises and macroeconomic imbalances for real, budgetary, monetary and external economic sectors of Ukraine are given in Table 2. Indicators of imbalances in 2013-2014 show general macroeconomic disproportion. Growing imbalances in each sector in 2013-2014 create pessimistic forecast for the development of the macroeconomic situation in Ukraine in 2015 with further decline in economic dynamics and mounting crises.

The next step is to define the basic components of sustainable economic development of agro-food production, corresponding indicators, as well as their values using existing regulations and functioning experience of agro-food systems of the developed countries as the foundation. Afterwards, it is necessary to justify the fields of state influence, which should provide full-scale implementation of this process.

Sustainable economic development of agricultural production is determined by stable growth of its volume, structural balance, environmental, economic and social efficiency. The abovementioned factors allow describing the development of the industry from the perspective of its economic sustainability using the following characteristics:

1) the dynamics of production volume and its turnover;

2) the ratio between livestock and crop production; structure of crops sowing and production amounts of livestock products;

3) the complexity of area resources use (regional specialization that meets bioclimatic, organizational and commercial potential of the area); specific output; level of economic diversification in rural areas; wages of employees in agriculture;

4) the share of organic farming; the level of use of environmental and resource-saving technologies, including waste management.

Table 2. The dynamics of macroeconomic indicators for crisis prevention and identification of sectorial imbalances in the economy of Ukraine

Indicators	Criterion	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Forecasting
Real sector													
Change in real GDP,% (YOY)	min -3% max 7%	9,50	12,10	3,00	7,40	7,60	2,30	-14,80	4,10	5,40	0,20	0,00	-6,8
Consumer price index (average per year),%	min - 2% max - 10%	5,20	9,00	13,50	9,10	12,80	25,20	15,90	9,40	8,05	0,60	-0,30	12,10
External sector													
Current account balance to GDP ratio,%	min - 4% max - 6%	5,77	10,49	2,94	-1,50	-3,69	-7,09	-1,49	-2,14	-6,05	-8,08	-8,75	-5,24
Change in the average exchange rate, UAH to USD, (YOY),%	min - 5% max - 5%	0,11	-0,25	-3,66	-1,46	0,00	4,30	47,92	1,85	0,40	0,29	0,02	93,92
Increase (decrease) in foreign direct investment in Ukraine (YOY),%	min 50%	102,48	21,44	340,28	-24,77	61,50	7,33	-53,13	24,86	22,96	-6,49	-38,14	-99,14
Budgetary sector													
Unified budget balance to GDP ratio,%	min - 3% max - 3%	-0,20	-3,20	-1,80	-0,70	-1,10	-1,50	-4,10	-6,00	-1,80	-3,60	-4,36	-6,40
Increase (decrease) in government debt to GDP ratio (YOY),%	max 4%	-13	-14	-28	-18	-17	11	149	13	-9	1	10	108
Monetary sector													
Change in average annual weighted rate on loans of commercial banks in national currency (YOY),%	min 5% max 5%	-19,0	-3,4	-7,5	-5,6	-7,9	26,6	16,5	-28,8	2,7	18,7	-10,7	17,6

Source: Skrypnychenko, 2015.

Previous studies reveal that the process of structural transformation of agricultural economy is now gaining new features and aims to improve its operation efficiency. Current conditions increase the need for a comprehensive approach to assessing the factors that may adversely affect the economic growth of the national agricultural economy and lead to internal crises. When developing methodological approaches to evaluating the stability of agricultural economy and outlining the conditions for their integration into the system of national governance (i.e. analysis, monitoring, forecasting and decision-making), it is quintessential to consider the factors that may cause risks for the agricultural economy operation in order to eliminate disparities and other negative conditions and processes. Only afterwards it is possible to create the growth and development forecast. Despite the differences in levels of socio-economic development and other factors, countries with transition economies have a lot in common, which permits conducting research using the same methodology. In such a way, we will be able to find the optimal agricultural business project plan, as well as determine the impact of each factor on the volume of production, and, most importantly, to outline the most significant factors for the agricultural economy of Ukraine. We use non-linear Cobb-Douglas production function (Formula 1):

$$Y=\beta_0 X_1^{\alpha_1} X_2^{\alpha_2} e^E, \tag{1}$$

where Y - stands for the production process; β_0 is the technological factor; X_1 - X_2 are the factors that affect the final result; ε is the random variable (balance or error); α_1, α_2 are the elasticity coefficients of the relevant factors; e is the basis of the natural logarithm.

In order to shift to multifactor regression model, we created the following equation logarithm (Formula 2):

$$\ln y = \gamma + \alpha_1 \ln X_1 + \alpha_2 \ln X_2 + \varepsilon \tag{2}$$

where γ is the constant.

Mathematical side of the assessment of sustainability of agricultural economy factors in the nonlinearity of economic processes through the use of the multiplicative form of the integral index, where the weights are calculated by the principal components method of the Statgraphics package, which is based on the factor analysis and the contribution of each factor into the total variance.

The term expanded production function is used for the production function with five factors. Each factor is an integral indicator and characterises the presence and completeness of internal and external resources in the formation process of the economic development strategy for agriculture.

Therefore, we developed the functionality of the expanded production function that is represented by the following correlation (Formula 3):

$$IA=F(IVD+ ITR+ INNT+ IFR+ IZED) \tag{3}$$

where IA is the integral index of agricultural production; IVD is the integral index of production activity; ITR is the integral index of labour resources; INNT is the integral index of innovation and technological development; IFR is the integral index of financial resources; IZED is the integral index of external resources.

Thus, the research of sustainability of national agricultural production (Table 3) confirms the necessity for creation of special resources, introduction of modern mechanisms and formation of policies in the field of the sustainability of national agricultural production, which would take into account current global trends of economic development. These special resources used in case of negative impacts on the economy include the compensatory resources, i.e. natural, technical, technological, personnel, space, time, financial, informational, non-material elements of national economic potential. Presence of such compensation resources as stocks of materials, financial reserves, intangible assets impart business entities with the possibility to compensate for their losses from various negative impacts.

According to the research results, there is a possibility of the negative scenario for the economy of Ukraine in 2016, which might be caused by deterioration in external economic conditions due to falling prices on world commodity markets, as well as the failure to obtain a sufficient amount of EU financial and technical resources that are necessary for adaptation of Ukrainian economy to the requirements of the European market, implementation of the association propositions and introduction of the new European standards, all of which is stated in the Ukraine – European Union Association Agreement (Skrypnychenko, Yatsenko, 2014).

In case of continued geopolitical confrontation economic dynamics will stall: hryvnya devaluation will occur gradually, the inflation level will rise, growth of production costs and the lack/halting of external and internal investment will not provide the required development of industries and will reduce the competitiveness of Ukrainian products, as well as lead to the loss of some segments of international markets.

Table 3. The level of sustainability of agricultural production in Ukraine for thebiennium 2010 -2020

Year	*Forecast sustainability level
2010	0,492
2011	0,502
2012	0,508
2013	0,499
2014	0,476
2015	0,430
2016	0,436
2017	0,448
2018	0,451
2019	0,520
2020	0,60

* corresponds to: poor sustainability level (0.4-0.59); sufficient sustainability level – > 0.80; satisfactory sustainability level – 0.6-0.79; dangerous sustainability level – 0.2-0.39; critical sustainability level – <0.19.

Source: calculated by the author.

During the forecast period of 2010-2020 the risks and negative factors influencing Ukrainian agricultural economy include:

• increased influence of the external economic environment risks on domestic economic conditions;

• decline in foreign investment, curtailing investment plans, deteriorating external economic conditions;

• uncertainty of the energy costs (the price of natural gas) and sources of its supplies to Ukraine;

• further complication of external economic relations;

• rising unemployment, aggravating problems of balancing state and local budgets;

• increased devaluation expectations in the exchange market;

• higher inflation, maintaining low credit activity of commercial banks, continued growth of the insolvency of the real economy, significant emission to finance budget deficit;

• increasing domestic debt without adequate use of the resources for the economy modernization;

• instability of the domestic financial and banking systems, low level of trust.

Calculations of the stability level of agricultural production and the parameters of the agricultural production functioning in Ukraine display non-compliance on all markers (Table 4), which suggests that current agricultural model provides low economic sustainability.

However, it is clear that sustainability limit values have not been reached, as agricultural production is quite dynamic, although unbalanced. The main question is the margins of the agricultural system that largely characterize the potential for further development, as well as establish key indicators for further assessment and monitoring (which should be able to determine the impact and indicate its direction).

Factors affecting the development of the agricultural system that are based on economic sustainability are quintessential for the research. The most important endogenous factor is the manufacturer's financials, while macro-level factors include government policy in agricultural production, agricultural markets and incomes of the population.

The most important characteristic feature of the development prospects of the research area is its financial condition, including its sustainability. In this regard, it is important to monitor the investment level of the industry and profitability of agricultural production. We discovered that although the profitability of agricultural production in 2010-2012 was four times higher than the average profitability in the national economy, the level of fixed investment in the industry in 2011 exceeded the average investment level of the previous year only by 10%. Moreover, it should be highlighted that the resources of the industry are the smallest (almost ten times less than the average index).

Table 4. The system of indicators preventing crisis in agricultural production

Indicator	Indicator value	International indicators	Indicators in Ukraine
1	2	3	4
1. Growth rate of agricultural production	4%		2001-2005 – 1,95 %; 2006-2010 – 2,4 %; 2012 - –0,5%; 2013 – 13,7 %
2. Level of crops yield variation	no more than 10%	5 %	15 %
3. Optimal structure of agricultural crops sowing	improving soil fertility by 40-55 %	50-70 %	violations in all regions of Ukraine; violation in Zhytomyr region exceeded the norm by sowing sunflower 11 times
4. Structure of meat production by type	beef-pork-poultry 40-45% - 30-35% - 15-20 %	Canada 1: 1,7: 1,08	1 : 1,8 : 2,7
5. Amount of livestock per 1 hectare of arable land:	according to sales sources	-	demand is not satisfied by 40%
including : balance of humus in the soil	1 head of cattle produces 9-10 tons of manure; 8-13 tons of manure are necessary, therefore value amounts to 1	1	1990 – 1; 2012 – 0,4.
water overspend, groundwater contamination	-	USA: 16 kg of grain and 70 thousand litres of water per 1 kg of beef	low level of livestock raising development
6. Soil fertility	resource-saving equipment and technology, organic fertilizers	resource-saving equipment and technology, organic fertilizers	water and wind erosion reduces approximately 450 to 600 million tons of topsoil annually; 30 million hectares of land are degraded; 14 to 17 million hectares of land are in erosion danger
7. Gross production: including production per 1 ha	1300	France – 1955 Canada - 449	530 USD/hectare
production per 1 employee	256105	France – 46772 Canada - 45438	4360 USD per 1 employee
8. Energy capacity of agricultural production	0,05	USA – 0,048; Russian Federation – 2,1	0,116
9. Share of processed agricultural products	≈ 100 %	level of socio - economic development	beef - <2%; milk - 0.01%; grains and legumes - 1%; sunflower - 0.4%; vegetables - 0.3%; poultry - 89%

1	2	3	4
10. Ratio between wages of rural population and the average salary in the country	1	balanced wages	rural population receives 67% of the urban population salary
11. Employment in rural areas	100 %	reasonable settlement of urban and rural population	the share of people whose age exceeds working age is 1.6 times higher than that of urban population and the share of the easiest professions is two times higher.
12. Proportion of arable land used for organic farming	5 %	average through Europe - 3%	1 % (0,7)
13. Level of use of agricultural production wastes	100 %	≈ 100 %	official statistics does not provide such indicators (biogas, dry organic fertilizer, pellets, bioplastics, etc.)
14. Financial state of the industry	100 %	100%	profitability of agricultural production is 4 times higher than the national economy average index; resources of the industry are 10 times less than the national economy average index ; investment rate amounts to 2-6% of the total investment
15. Amount of innovative enterprises	100 %	100%	80% of agribusinesses have net income; innovative activity of farmers amounts to 20-25%
16. Supply of agricultural production equipment: - number of combine harvesters per 1000 hectares of sown area of grain; - tractor engine power per 100 hectares of arable land	100 %	USA 15; 200 France 16; 277	- 4 units; - 53 hp;
17. Share of irrigated land	9,5 %	drip irrigation	0.5 to 2/3 of water volume is lost
18. Use of certified containers for durable storage	100 %	100 %	≈ 70 %
19. Share of skilled agricultural workers to the total number of workers	100 %	≈ 90 %	agriculture - 30%; average national economy index - 57%
20. Agricultural national policy	scientifically justified	preventive measures, subsidies, grants	expenditure amounts to 2012-2013 - 8.5 billion UAH; GVA - 8.7 billion UAH

Source: own calculations.

As for the agricultural policy and the policy for the population incomes, it is necessary to assess the level of state support of agricultural production and the real income of the population. Obviously, public sector funding is inadequate (especially during crisis years) and structurally imbalanced in groups of producers and fields of impact. These issues are the subjects of debate; however, the situation does not change significantly. The level of budget financing of agriculture, forestry and fisheries in Ukraine is quite low: 2.4% of total expenditures and 9.1% of gross value added in agriculture in 2009-2011 (as compared to 0.6% and 14.6% respectively in the USA, 7% and 51% in Latvia, 11% and 30% in Belarus) (Esquivel G. and Larrain F., 1998).

Total amount of costs allocated by the Ministry of Agrarian Policy and Food of Ukraine in 2012 - 2013 has been relatively stable (8.5 and 8.7 billion UAH) (The Law of Ukraine, 2012). However, the costs for "Research, applied scientific and scientific and technical developments..." reduced by 29% during this period. The volume of financial support of the agricultural activities reduced even more (from 827 million UAH in 2012 to 97 million in 2013).

One of the main prerequisites for the stable increase in the volume of agricultural production is to raise real incomes, which determine solvent food demand. According to the research, income and food consumption in 2011-2012 enhanced, albeit slightly. Thus, total household resources taking into account changes in consumer prices in 2012 increased by 16% compared to the previous year, while the total cost of food enlarged by approximately 10 (State Statistics Service of Ukraine, *2013*).

It should be highlighted that in order to implement the objectives of the Strategy for the economic development of agricultural production the state should use various forms and methods of influence on economic processes. The form of ownership, state intervention in the economy, specific conditions and goals of socio- economic development of the country define necessity and limits of use of certain forms, as well as implementation methods.

The state should take over the function of coordinating all economic activities of the national economy, providing them with information about the objectives and priorities of socio-economic development of agricultural production, establishing social and economic standards of business preferences.

In order to achieve the abovementioned goals, the state should use state orders, credit instruments, guarantees, interest rate subsidies, tax debts restructuring, tax benefits, state appropriations, customs and tariff benefits, etc. Strategic planning is crucial for social development.

First and foremost, it makes it possible to foresee future events and take corresponding measures to solve possible problems.

Secondly, strategic planning leads to consensus between different groups of society in defining goals, ways and measures necessary to achieve the intended result.

Thirdly, it helps to determine the optimal model of use of limited material, human and financial resources. Moreover, strategic planning provides guidance that allows both government and society to assess the effectiveness of the production activity.

We emphasize that the strategic management of agricultural production should be based on the integral use of modern technology, equipment and information systems that represent the latest achievements in analysis, forecasting of the economic system, situational modelling and formalized expert knowledge for handling operational information. Such planning aims at quality decision-making in management, which would outstrip potential deviation or disturbance. It is constantly evolving to meet new

requirements of time and technological progress, therefore, there should exists a system of alternative development vectors of the investigated production branch. The basis for performance assessment is the diagnostics of the economic environment based on the evaluation and analysis of the economic, technological, social, environmental, political, market, and international factors. The criteria for the assessment of the strategy for the socio- economic development of the national agricultural production based on the interaction of factors of economic growth should include:

• profitability level of various forms of economic activity of agricultural enterprises, which, on the one hand, would provide increasing consumption, and on the other hand, give the possibility of savings;

• degree of labour resources use and increasing level of employment;

• living standards in rural areas;

• degree of capitalization and increased solvency;

• creating demand for agricultural products, formation of wholesale agricultural markets;

• improving the quality and, consequently, increasing gross and marketable products that meet market requirements and standards for export-oriented agricultural products as additional factors of economic growth;

• development of cooperative, collective and integral forms of regional management.

Thus, the main goal of the strategy for the economic development of agricultural production is to ensure sustainable economic growth of agricultural production and, therefore, the national economy as a whole taking into account the system of indicators preventing crisis; to increase the amount of competitive agricultural production in domestic and foreign markets; to reduce total cost per unit of manufactured goods levelling down human impact on the environment.

Conclusions

Given the fact that Ukraine's economy is currently in a phase of recession, it is crucial to timely identify threatening macroeconomic imbalances in order to rapidly identify and avoid potential crises. Taking into account the challenges and methodology for the sustainable development of agriculture in Ukraine, we developed the system of indicators preventing crises, which comprises social, economic, environmental and human aspects. This methodology bases on scientific approach to conducting business projects and includes modern mathematical methods, models, software applications, and international legal instruments. The system of indicators used by the international scientific community should be reviewed and adapted to the functioning peculiarities of domestic agricultural production.

The comparison between world parameters of agricultural production and those existing in Ukraine reveals non-compliance in all indicators, which leads to the conclusion that current agricultural model displays low economic sustainability. However, it is clear that sustainability limit values have not been reached, as agricultural production is quite dynamic, although unbalanced.

Solving the problem of the development of agro-food system depends on the ability of the state to effectively stimulate this field, adequately control all processes and strictly punish non-compliance. In order to improve current trends and to prevent future crises, the

fields of state influence on the agricultural sector aimed at ensuring its sustainable economic development should include improvement of the financial condition of small and medium agricultural producers and rural residents, the development of agricultural innovations, environmental security and control of natural resources use in agricultural production.

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