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## The state and prospects of investing in the development of agriculture in conditions of instability

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► **Abstract.** To achieve positive changes in the economy and society, it is necessary to constantly intensify the investment process in agriculture, which affects the development of most types of economic activity in the state. The purpose of the article is to investigate the trends of quantitative and qualitative changes in investments for the development of agriculture in Ukraine in conditions of instability. Such methods were used in research: dialectical, abstract-logical, correlation-regression, strategic planning, project analysis, tabular, graphic, and forecasting. According to the results of research carried out using methods of correlation and regression analysis, it was found that capital investments in agriculture in conditions of instability were the most important factor in the growth of not only commodity products and profits in agriculture, but also the gross domestic product of the state. The dynamics of investments and sources of their financing, which have been unstable in Ukraine for a long time, have been analysed. A significant differentiation of levels of investment in the development of agriculture in the regions was revealed. A conclusion was made regarding the cyclic nature of investment processes in the agri-food sectors of the economy and their investment attractiveness, and the periods of its favourable and unfavourable phases for agriculture were clarified. The efficiency of capital in agriculture, which changes under conditions of cyclical investment processes related to investment attractiveness, is studied. In order to create conditions for achieving sustainable development of agriculture, the necessity of forming an investment-oriented agricultural policy based on principles tested by world practice is substantiated. The results of the forecast of capital investments in the development of agriculture in conditions of instability for the period up to 2030 are presented. The results of the research are of practical importance for the formation of an investment-oriented investment policy of the state, investment strategies of agricultural formations, and the development of the state economy in conditions of instability

► **Keywords:** capital investment in agriculture, instability, investment dynamics, sources of investment financing, cyclicity of investment processes, investment efficiency, investment policy

### ► Introduction

Investments are the most important factor in the economic and social development of Ukraine. They are especially important in agriculture, the products of which are used in most sectors of the economy, which creates multiplier effects in them. It is especially important to ensure the stability and growth of investment processes in agriculture in a period of instability when the normal course of economic and other life support processes is disrupted. In conditions of instability, investments in agriculture allow not only to restore but also to increase the production of agricultural and food products, preserve

the food security of the state, increase the level of efficiency of the entire economy, and significantly increase the gross domestic product.

Given the multifaceted nature of investment issues in agriculture, great attention should be paid to scientific research and the practice of investment management at all levels, solving problems related to the preservation and strengthening of the positive impact of investments in agriculture on the entire economy. This will be facilitated by measures to overcome the investment slump, intensifying the investment activity of agricultural producers of all

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forms of management at the expense of their own and involved sources of financing, smoothing, as well as the implementation of an investment-friendly agricultural policy.

Given the importance of investment issues, it is actively studied. Foreign scientists M.V. Donckta, Ph. Chanb, and A. Silvestrinic (2021) studied the aggregate flows of capital investments and capital in agriculture, forestry, and fisheries using the example of 189 countries for the years 1995-2017, the long-term dynamics of the relationship between investments and added value in agriculture, and also summarized global and regional trends in gross accumulation fixed capital in agriculture. N. Akber, K.R. Paltasingh, and A.K. Mishra (2021) investigated how public policies encourage private investment in agriculture in India. A. Eskesen, R. Agrawal, and N. Desai (2014) – paid considerable attention to the impact on investments of macroeconomic factors and proposals for their improvement. A. Eskesen, R. Agrawal, and N. Desai (2014) – researched investment support in small and medium-sized agribusinesses and directions for its solutions.

Ukrainian scientists, in particular, Yu.O. Lupenko, O.V. Zakharchuk (2018), N.P. Reznik, A.M. Slobodianyuk, V.O. Kotlyarov (2018), and M.I. Kisil (2021), studied the problem of investing in the development of agriculture. Aspects of investment support for rural development were studied by V. Ilchuk, T. Shpomer (2017) and O. Shubravskaya (2012), regional investment – N.I. Mezentseva, I.M. Frost (2011). Investment methodology was studied by N.P. Reznik (2008), and certain aspects of the state and prospects of investing in the development of agriculture – O.V. Zakharchuk, M.I. Kisil, V.V. Nechyta (2022). Investigating directions of state regulation of investment activities in agriculture, Yu.M. Dzyurakh and O.O. Drugov (2018) identified its main direction – the formation of a complete system of its mechanisms and tools.

However, in the conducted studies, the connection between investments in agriculture and the results in the economy was not revealed, the investment process in its dynamics and components was not systematically evaluated, and the directions of activation in conditions of instability were not determined.

For the correct choice of options for the development of agriculture in the national economy in conditions of instability, this article highlights the results of scientific assessments of the state and prospects of investment and participation in it. The purpose of the study is to assess investment processes in the agricultural economy of Ukraine and their impact on the state economy, as well as to determine the most important directions for their activation in conditions of instability.

### ► Literature Review

The works of many foreign scientists are devoted to various aspects of the state and prospects of investing in the development of agriculture in conditions of instability, namely: Nicolas Büttner, Michael Grimm, and Sidiki Soubeiga (2022) on the example

of Burkina Faso, the influence of political instability and social conflicts on economic results and investments studied. It was concluded that instability, especially caused by armed conflicts, will lead to a decrease in investment and efficiency.

A.Ye. Gyapong (2020) used the example of Ghana to study the impact of large-scale investments on population employment and the consequences of investments in land grabbing as well as the concentration of land for employment. The negative consequences of large-scale agriculture on employment have been revealed. A conclusion was made regarding the need to improve the distribution of benefits from investments in land.

X. Qian (2021) investigated a farmer's investment in a service cooperative to better provide the necessary resources. A multi-period model of the justification of investment decisions is considered, in which the farmer first studies the feasibility of joining the cooperative, and then solves the task of making additional investment contributions to the cooperative based on profitability criteria.

P.L. Billon and M. Sommerville (2017) investigated investment processes in large-scale agricultural and mining projects. The authors found out that the investment processes in such projects take place in the context of different ontologies, evaluations, and options for land use by investors, who combine and compete to create new spaces and subjectivities. A conclusion is drawn regarding the need for investments in the infrastructure of agriculture and to counteract the growth of tension and contradictions in the conditions of the open land market for investments in their capture.

Zh. Liu, L. Long, B. Hu, L. Shi, B. Huang, and Yu. Zhao (2021) studied investment decisions that lead to carbon emissions and other negative environmental impacts in agriculture that produce instability. The authors developed a game model for comparing optimal solutions and profits to choose the optimal investment options for reducing emissions by the manufacturer, as well as decentralized and centralized decision-making. A conclusion was made regarding the need for investment and cooperation of agricultural producers and market intermediaries in the production and sale of products, increasing profits, as well as protecting the environment.

V.H. Thu and D. Goto (2020) studied the relationship between the security of land tenure and investment in agriculture using the example of Vietnam. The authors provided evidence that as agricultural land use terms increase, farmers' investments increase, primarily in irrigation, soil conservation, water conservation, and organic fertilizer application, which curbs the manifestations of instability.

Ukrainian scientists pay considerable attention to the problems of investments in conditions of instability. Thus, researching ways to intensify investment activity in the conditions of the economic and political instability of Ukraine, R.S. Chorny, N.P. Chorna, I.I. Berdei (2018) proposed a set of measures to

overcome the crisis, attract investments, promote the development of the national investment market and its integration into the global space.

I.S. Kramarenko (2016) studied the causes of Ukraine's economic instability and the ways out of it. He substantiated the conclusion that a scientifically based investment policy, a favourable investment climate, and the attraction of foreign investors are necessary for the exit of the national economy from the crisis and further stable development.

The state and prospects of investment activity in Ukraine in conditions of economic instability, research by N.P. Tanasienko and V.Yu. Rud (2017). They identified factors that positively affect the investment climate and contribute to investment activity.

Studying the effectiveness of the use of land resources, N. Gvozdei (2022) found out that the main condition for the growth of agricultural production in conditions of instability is the improvement of the credit situation of farmers. At the same time, all sources of financing must ensure investments in the expanded reproduction of capital.

Yu.B. Kolupaev, S.S. Zalyubovska, and I.O. Melnychuk (2018) studied the problem of attracting investments in conditions of instability and substantiated the need of the national economy for financial investments and measures to improve the investment climate. It was found out that to revive investment and innovation activities and improve social conditions on this basis, comprehensive and consistent reforms are needed, the goal is to release entrepreneurial initiative, create a competitive environment and stimulate investments.

Studies of investment problems in conditions of instability, conducted by foreign and Ukrainian authors, mainly concerned the entire economy. There were also separate studies on agriculture. V.V. Lavruk and L.M. Budniak (2020) studied the task of investment support for the development and increasing the competitiveness of agricultural production. The authors proposed to consider investment efficiency as the main criterion of product competitiveness, systematized indicators of investment efficiency, identified priority areas of investment, and also substantiated proposals for intensification of the processes of reproduction and modernization of the material and technical base of agriculture.

The investment problems of agriculture in conditions of instability, which were significantly increased due to the war, were not thoroughly investigated. Firstly, this concerns the mechanisms for overcoming the investment recession and crisis, investment support for the sustainable development of agriculture, as well as strengthening the positive impact of agricultural investments on food security, increasing export potential, and the development of the entire economy.

### ► Materials and Methods

The basis of the research methodology is the dialectical method of scientific knowledge (when learning about investment processes and phenomena),

a systematic approach (for studying the state and prospects of investing in the development of agriculture in conditions of instability); abstract-logical (when substantiating theoretical provisions regarding the formation of investment efficiency); correlation-regression (to study the relationship between capital investment in agriculture in the regions of Ukraine and the volume of its marketable products, profit, and gross regional product with a lag of one year for 2015-2020). As well as strategic planning methods (when choosing strategic investment goals) (Kisil, 2018); project analysis (in investment efficiency assessments) (Kisil, 2021); the tabular method of calculating the average annual rates of growth, increase, and decrease (in estimates of the dynamics of capital investments); tabular and graphic (with the visual display of research results in the form of figures and tables); forecasting (for the forecast of capital investments in the production of agricultural products of Ukraine for the period up to 2030).

Adhering to the dialectical method of scientific knowledge, the authors investigated the process of investing in the development of agriculture as an object of management at all levels in the interdependence and interdependence of all its components, signs, characteristics, and investment results. The results of these assessments were used in the assessment of trends in the dynamics of investments and investment prospects for the development of agriculture. Given the dialectic of the relationship between a specific investment and public institutions, considerable attention is paid to institutional factors affecting efficiency.

Since the investment process takes place over time and is continuous, and in conditions of instability its scale is constantly changing, the study was started with estimates of the dynamics of capital investments in the production of agricultural products, clean of the impact of price changes on investment goods and services. For this purpose, statistical indicators of volumes and indexes of capital investments up to the previous year were used, which were used to calculate the real dynamics of investments for some years (Capital investments (2010-2021); Indices of capital investments..., 2011-2021).

To achieve the representativeness of the sample for the correlation-regression analysis, statistical indicators of the gross regional product were used, which collectively reflect the gross domestic product (Gross regional product ..., 2004-2020). For this purpose, correlation-regression models were calculated using the standard Microsoft Excel computer program, for each of the years 2015-2020, with subsequent averaging of the obtained calculation results. The elasticity coefficient was analysed as an indicator that most fully takes into account the close relationship between capital investment in agriculture and the gross regional product.

The investment cycle of Simon Kuznets was studied by the dynamics of the relationship between capital investments in agriculture and the food industry for the period 1990-2020 using a parabola of the fifth order.

In the assessment of the efficiency of investments, the methodology of macroeconomic investment analysis and theoretical and methodological work on the assessment of the efficiency of agribusiness investments were used (Kisil, 2015).

In the evaluations of the investment orientation of the agricultural policy in Ukraine and the justifications of proposals for the formation of this policy for the future, data from the OECD monitoring (Producer Support (PSE)..., 2000-2021) were used.

The results of this study are summarized in an analytical report submitted in 2022 to the Ministry of Agrarian Policy of Ukraine and the National Academy of Agrarian Sciences of Ukraine (State and prospects of investment..., 2022).

### ► Results and Discussion

The economy of Ukraine has been developing for a long time in conditions of instability, which is

characterized by alternating periods of recession and intensification of investment processes in agriculture. Particularly unfavourable conditions for investments arose in connection with the military aggression of the Russian Federation, which negatively affect investment activity in all sectors of the economy.

In conditions of instability in the state, it is especially important to prevent investment decline in agriculture. The results of research carried out by the authors using methods of correlation and regression analysis show that in conditions of instability, capital investment in agriculture was the most important factor in the growth of not only marketable products and profits in agriculture but also the gross domestic product of the state. It was found that there is a close relationship between the volumes of capital investments and indicators of agricultural output, which is close to functional: averaged over all the analysed models, the multiple  $R = 0.92$ , and  $R^2 = 0.84$  (Table 1).

**Table 1.** Correlation-regression relationship between capital investments in agriculture in the regions of Ukraine and the volumes of its marketable products, profit, and gross regional product with a lag of one year, 2015-2020

Item No.	Regression options	The value of the regression coefficients between the capital investment of the corresponding year (X and) and the performance indicator of the next year (X and+1)					In general, for the period
		2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	
1	Y1 – production of agricultural products; X1 – capital investment in agriculture						
1.1	Multiple R1	0.92	0.89	0.91	0.95	0.93	0.92
1.2	Coefficient of determination ( $R^2$ )	0.84	0.78	0.83	0.90	0.86	0.84
1.3	Coefficient of elasticity (E1)	1.01	0.85	0.98	0.94	0.78	0.91
2	Y2 – profit from agriculture; X2 – capital investments in agriculture						
2.1	Multiple R2	0.88	0.91	0.90	0.24	0.72	0.73
2.2	Coefficient of determination ( $R^2$ )	0.77	0.83	0.81	0.06	0.52	0.53
2.3	Coefficient of elasticity (E2)	1.05	1.05	1.09	0.75	0.72	0.93
3	Y3 – gross regional product; X3 – capital investments in agriculture						
3.1	Multiple R3	0.43	0.51	0.47	0.35	0.31	0.41
3.2	Coefficient of determination ( $R^2$ )	0.18	0.26	0.22	0.12	0.09	0.17
3.3	Coefficient of elasticity (E3)	0.53	0.61	0.62	0.41	0.31	0.50

**Source:** calculations of executors according to the data of the State Statistics Service of Ukraine (Gross regional product ..., 2004-2020; Profit before taxation of..., 2014-2020; The volume of produced..., 2014-2020)

A great dependence between indicators of capital investments and profit was also revealed:  $R = 0.73$ ,  $R^2 = 0.53$ . The calculated coefficient of elasticity (E), the most acceptable for measuring the tightness of the correlation-regression relationship, shows that other things being equal, changes in capital investments lead to a variation in the volume of

agricultural products by 91%, profit by 93%, and gross regional profit by 50%.

Although the gross domestic product is formed by all branches of the economy, half of the changes in its volumes are determined by capital investments in agriculture, the share of which in their total investments in the state is only 10%. Therefore, in



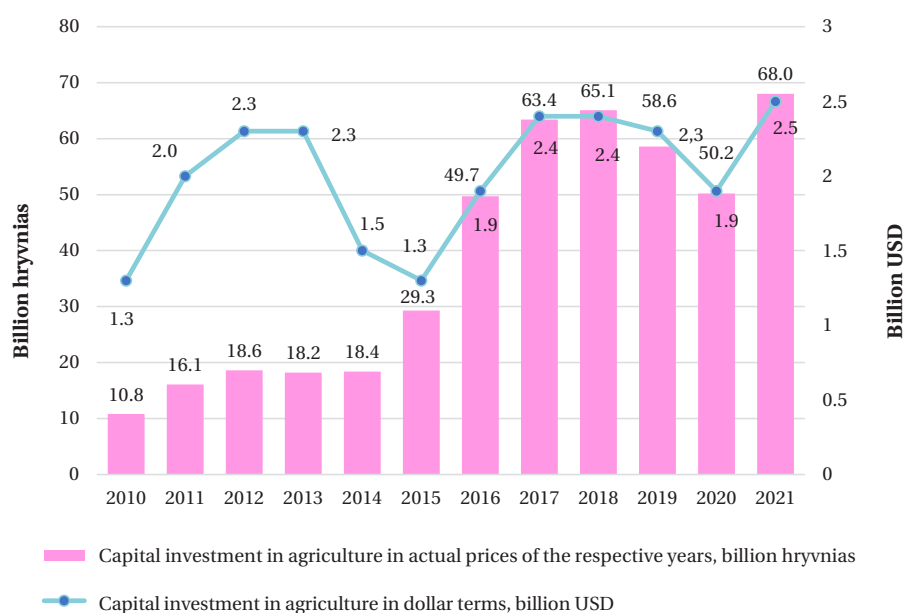
conditions of instability, it is expedient to increase investments in agriculture as a factor in achieving stability and development of the entire economy of the state through various measures of state economic policy.

However, the dynamics of the regression coefficients given in Table 1 in recent years indicate unstably, and in recent years, even reverse phenomena, which in 2019-2021 are characterized by a decrease in the impact of investments on changes in agricultural profits and gross regional product. This is due to the crisis-related decrease in investments and net income, as well as an increase in capital and current costs. In the conditions of martial law, these negative phenomena objectively increased.

If capital investments in agriculture do not increase in the short term, we should expect a slowdown in growth rates or a decrease in the volume of commercial agricultural products, the profit of agricultural producers and their sources of investment financing, as well as a decrease in the gross domestic product of the state caused by the investment downturn, which, in the end, will lead to further deterioration of the economic and social situation in the state.

The development of agriculture in Ukraine has been predominantly influenced by external factors, which cause the instability of its development. According to the results of the study of changes in the conditions of investment activity during the period

of Ukraine's independence, it was found that the first deep and long-term investment crisis in agriculture occurred in 1991-2001 when the principles of socialist property relations were still preserved in agriculture, and reforms on the formation of market economies took place slowly and unsystematically. The consequence of the investment crisis in agriculture was a significant ageing of the material and technical base of enterprises, a decrease in production capital, and a slowdown in the pace of development of both the agricultural and the entire economy. After the massive reorganization of collective agricultural enterprises into private agricultural formations in 2001, capital investments in agriculture began to grow annually at rates that in some years exceeded 50%. The vast majority of these investments were directed to technical and technological innovations and the formation of market infrastructure, in particular export logistics. Investment growth in national agriculture stopped in 2008-2009 due to the global financial crisis. The financial crisis, which began in 2008, and already in the following year, 2009, caused a double decline in investments in agriculture. After overcoming the consequences of the financial crisis, investors partially used deferred investments, which caused the effect of the post-crisis surge in capital investments. Due to this, their volume in 2011 compared to the previous year increased by 39.4% (Fig. 1).



**Figure 1.** Dynamics of capital investments in agriculture in actual prices and in US dollars, 2010-2021

**Source:** data of the State Statistics Service of Ukraine (Capital investments, 2010-2021) and calculations by the executors

In the following years 2012-2015, which were unfavourable due to the political crisis in the state and the military aggression of the Russian Federation against Ukraine, the number of investments in agriculture changed slightly in the range of UAH 32-41 billion. When, after a certain stabilization of the military situation in Donbas, the activities of

national investors resumed, capital investments in agriculture in 2016-2017 increased by 47.6 and 31.4%, respectively, in comparative terms. But already in the following 2018, investors' expectations worsened, the rate of growth of capital investments until the previous year was only 7.4%, in 2019 they decreased altogether, and in 2020, the investment

slump turned into a crisis. This crisis was overcome in 2021, in which capital investment increased by 23.5% compared to the previous year. According to preliminary estimates of the authors, large-scale aggression against Ukraine in 2022 caused a particularly deep investment crisis in agriculture.

Investment activity in agriculture in 2010-2021 was generally low and unstable, the average annual growth rate of capital investments amounted to only 11.5% or UAH 2.8 billion in 2020 prices. The peak values of capital investments in agriculture, which were reached in 2012-2013, 2017-2018, and 2021 did not exceed \$2.3-2.5 billion, and during the recession in 2010 and 2015 – up to \$1.3 billion. If it

were not for the crisis periods for investments 2013-2015 and 2019-2020, the volume of capital investments in agriculture in 2020 prices would increase by an average of 11 billion UAH per year. Factors of instability, which arose due to various crisis phenomena in the period 2010-2021, annually caused the loss of capital investments for the development of agriculture in Ukraine in the amount of \$0.5-1 billion.

Studies of the structure of sources of financing capital investments in agriculture in conditions of instability revealed that the possibilities of agricultural enterprises to attract additional sources for their financing are significantly limited (Table 2).

**Table 2.** Structure of sources of financing of capital investments in agriculture for January-December 2018-2021, in percentage

Year	Total number of sources	Including at the expense of:			
		state and local budgets	own funds of enterprises	bank loans	other sources
2018	100.0	0.2	86.7	12.9	0.2
2019	100.0	0.4	90.9	8.6	0.1
2020	100.0	0.0	90.8	8.7	0.5
2021	100.0	0.1	90.9	8.9	0.1
Average for 2018-2021	100.0	0.2	89.8	9.8	0.2

**Source:** calculated by the executors according to the State Statistics Service of Ukraine (Capital investments by sources ..., 2010-2019)

From the data presented in Table 2, it can be seen that the average annual share of own sources of financing capital investments of agricultural enterprises was 89.8% on average for 2018-2021, and bank loans – 9.9%. At that time, only 0.3% was accounted for by budget financing and foreign sources. There were no fund and other financial sources at all. The lack of attracted sources of investment financing restrains the development of agriculture and the economy in general. It is advisable that the share of

borrowed and otherwise involved sources of financing capital investments should be 25-30%, but not exceed 1/3 of their total volume, which corresponds to the conditions of financial independence and sustainable development of agribusiness.

A negative feature of the investment process in national agriculture in the conditions of its instability and limited sources of financing was the decrease in the participation of small agribusiness in it (Table 3).

**Table 3.** Dynamics of the structure of capital investments in agriculture by large, medium and small enterprises, 2010-2021

Year	Capital investments of agricultural enterprises in % of their total indicator				
	Total	in particular			
		large	medium	small	of them, micro-enterprises
2010	100	5.6	75.2	19.2	3.5
2011	100	k	k	–	–
2012	100	15.3	57.4	27.3	7.0
2013	100	12.1	58.8	29.1	6.9
2014	100	9.4	58.6	32.0	8.4
2015	100	13.1	49.6	37.3	8.8
2016	100	5.4	50.3	44.3	12.1
2017	100	6.9	50.2	42.9	10.1
2018	100	12.4	50.1	37.5	9.3
2019	100	18.4	49.1	32.5	5.7
2020	100	13.6	54.6	31.8	1.4
2021	100	15.8	51.6	32.6	2.1

**Source:** calculated by the executors according to the State Statistics Service of Ukraine (Capital investments of enterprises..., 2010-2021)

**Note:** k – data of 2011, which were not made public in order to ensure the requirements of the Law of Ukraine “On State Statistics” regarding the confidentiality of statistical information (primary and secondary blocking of vulnerable values)

If the share of small enterprises in the total volume of capital investments in 2016 was 44.3%, in 2017 it was 42.9%, in 2018 it was 37.5%, and in 2019-2021 it slightly deviated from 32%. During this period, the share of investments in micro-enterprises decreased especially sharply (from 10-12% in 2016-2017 to 1-2% in 2020-2021). Conversely, the corresponding share of large and medium-sized agricultural enterprises increased. A decrease in the level of investment activity of small enterprises in agriculture is caused by the deterioration of the conditions of their economic activity, a reduction in the amount of state support, and a decrease in their own and attracted sources of investment financing. Small enterprises sell the majority of their products to market intermediaries at relatively lower prices. They have higher risks of losing products and property due to raiding, and smaller possibilities of lending and receiving state support.

Support and stimulation of investment activities of small agribusiness entities in conditions of instability should be one of the most important tasks of the state's agricultural policy. This support should be provided through partial compensation of the cost of domestically produced agricultural machinery and equipment, especially for small agricultural producers, credit support for investment projects of small and medium-sized agricultural commodity producers in the amount of 50-70% of the credit rate of an authorized commercial bank, and through other economic and financial mechanisms and organizational measures.

Manifestations of instability in investment have distinct regional features. Therefore, the activity of investment processes in the agriculture of Ukraine differs significantly by region (Table 4).

**Table 4.** Amounts of capital investments in agriculture in the context of regions of Ukraine, 2016 and 2021 year

Region	Capital investments for 1 ha of land, UAH		2020 in % until 2016
	2016	2020	
Vinnytsia	2641	2353	89.1
Volyn	3053	3959	129.7
Dnipro	2574	1933	75.1
Donetsk	812	1372	169.0
Zhytomyr	2184	3245	148.6
Zakarpattia	1970	2932	148.8
Zaporizhzhia	1931	1594	82.5
Ivano-Frankivsk	3903	4751	121.7
Kyiv	2706	3411	126.1
Kirovohrad (Kropyvnytskyi)	2908	2353	80.9
Luhansk	1729	1277	73.9
Lviv	4293	3929	91.5
Mykolayiv	2535	1597	63.0
Odesa	2213	898	40.6
Poltava	2697	2804	104.0
Rivne	1907	4125	216.3
Sumy	2098	2532	120.7
Ternopil	3195	44170	139.9
Kharkiv	2501	2037	81.4
Kherson	2551	2141	83.9
Khmelnyskyi	2056	3006	146.2
Cherkasy	2730	3129	114.6
Chernivtsi	1842	1389	75.4
Chernihiv	2135	3624	169.7

**Source:** calculations of executors based on data from the State Statistics Service of Ukraine (Capital investments, 2010-2020)

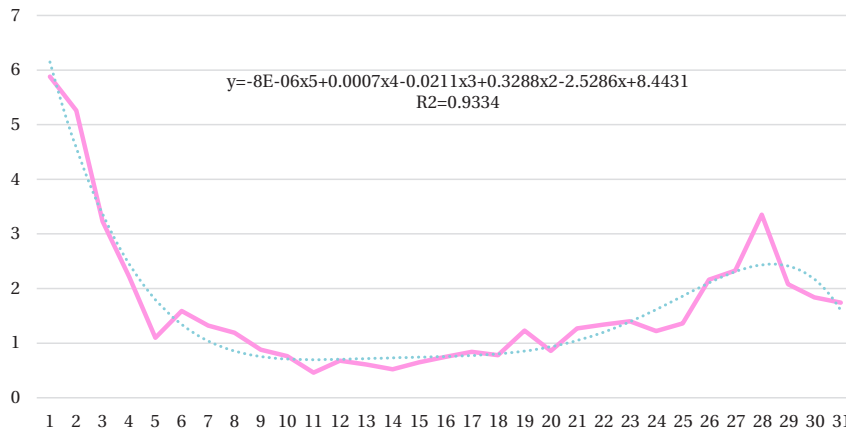
The average amount of capital investment per 1 ha of agricultural land in 2020 in the Poltava region (\$100/ha) largely depends on the regional structure of production. In 2020, the largest amounts of capital investment in agriculture per 1 ha of land, which

is more than \$150, were in the Ivano-Frankivsk, Ternopil, and Rivne regions. At the same time, Odesa, Luhansk, Donetsk, and Chernivtsi oblasts are distinguished by a particularly low level of investment in agricultural development, where capital

investment did not exceed \$50 per hectare of land. The extreme values of the series of indicators of this indicator differ by 5 times. In most of the unstable eastern, southern, and other regions characterized by a low level of investment in the development of agriculture, the deepest investment decline took place in 2016-2020. In the conditions of war, this decline increases instability not only in these regions but also in the entire state. Priority measures are needed to support investments in agriculture in

regions freed from occupation, affected by war and investment crises.

The investment cycle of Simon Kuznets is manifested in the agriculture of Ukraine, in which the priority of investing in the development of agriculture and the food industry alternates (Zakharchuk, Kisil, Nechytyaylo, 2022). The peculiarities of this cycle in the agri-food sectors of the economy of Ukraine in the period 1990-2020 are characterized by the data shown in Figure 2.



**Figure 2.** Actual amounts of capital investments in the food industry in hryvnias given the corresponding investments in agriculture per hryvnia in 1990-2020 according to actual indicators and a parabola of the fifth order, hryvnia/hryvnia

**Source:** calculated by the executors given the data of the State Statistics Service of Ukraine (Zakharchuk, Kisil, Nechytyaylo, 2022; Capital investments, 2010-2020; capital investments by types..., 2010-2020)

**Notes:** \*Numbering on the abscissa axis from 1 to 31 years corresponds to the sequence of years from 1990 to 2020, and on the ordinate axis – the size of the analysed indicator in dynamics

\*\*The broken line in the figure reflects the dynamics of actual indicators of capital investments, and the curve – their values aligned by a parabola of the fifth order

The duration of the full investment cycle of Simon Kuznets in the agro-food sectors of the Ukrainian economy is 26-28 years, and the phases of this cycle that are favourable for agriculture or the food industry are 13-14 years. The last phase of the investment cycle, favourable for agriculture, began in 2009-2010. According to the algorithm of the course of this cycle, it should be expected that the priority of investments in agriculture, which was the highest in 2017, will gradually weaken and continue until 2024-2025. The investment priority will be given to the food industry, which will contribute to the growth of the export potential of agri-food products with high-added value. Taking this into account, national agri-food companies should already

focus on the formation of strategies, programs, and projects to increase the capacity for processing agricultural raw materials and the production of food and other products with high added value. Such investment strategies, programs, and projects should be given an export orientation.

The cyclicity of investment processes in the agri-food sectors of the economy is caused by changes in the levels of their investment attractiveness, which is related to the efficiency of capital investments. If the total amount of fixed and working capital in agriculture amounted to \$63.6 billion in 2013, it decreased to \$35.2 billion in 2015. Conversely, the level of capital profitability during this time increased from 5.2% to a peak of 16.7% (Fig. 3).





**Figure 3.** Dynamics of fixed and working capital, net profit and return on capital in the agricultural economy of Ukraine in 2010-2021, billion USD

**Source:** calculated by the executors based on the financial statements of the State Statistics Service of Ukraine (Profit before taxation of enterprises, 2014-2020; Fixed assets, 2010-2020; Statistical Yearbook of Ukraine, 2021)

In the following 2016, the level of the indicator of profitability of capital in agriculture decreased to 6.6%. In the future, we should expect a gradual decrease in the profitability of capital in agriculture due to relatively lower rates of growth of financial results of agricultural enterprises.

The dynamics of the structure of the financial result of the activities of agricultural enterprises of various sizes for 2010-2021 reflects the contradiction

between changes in the share of large farms in the total volume of capital investments and a decrease in their share in the financial result. Thus, if the share of large enterprises in the total capital investments in agriculture increased during this period, the financial result, on the contrary, significantly decreased. For medium and small, especially micro-enterprises, in this period, the opposite trend of changes in the specified indicators is observed (Table 5).

**Table 5.** The structure of the financial results of large, medium, and small enterprises in agriculture in 2010-2021, in percent

Year	Total amount of sources	including			
		large	medium	small	in particular, micro-enterprises
2010	100	15.1	71.4	13.5	1.0
2011	100	k	k	–	–
2012	100	19.8	50.8	29.4	7.1
2013	100	25.6	46.0	28.4	7.3
2014	100	24.3	42.8	32.9	6.9
2015	100	24.3	42.3	33.4	9.2
2016	100	13.4	47.0	39.6	11.3
2017	100	11.7	51.2	37.1	6.0
2018	100	15.8	53.9	30.3	7.0
2019	100	5.4	73.5	21.1	6.3
2020	100	10.7	49.3	40.0	13.2
Average over the years					
2012-2013	100	22.7	48.4	28.9	7.2
2014-2018	100	17.9	47.4	34.7	8.1
2019-2021	100	8.1	61.4	30.5	9.8

**Source:** calculated by the executors according to the State Statistics Service of Ukraine (Financial results before taxation..., 2010-2021)

**Note:** k – the data were not made public in order to ensure the requirements of the Law of Ukraine “On State Statistics” regarding the confidentiality of statistical information (primary and secondary blocking of vulnerable values)

Probable reasons that generate similar atypical structural shifts in investments and financial results can be the concealment of their income by large and other business structures, the channelling of their potential benefits into intermediary formations, the decrease in profits, or the unprofitability of state corporations, the implementation of their investment projects with long payback periods, etc.

Achieving sustainable investment development requires overcoming the factors that produce instability and implementing a set of investment-oriented measures of state importance based on an effective agrarian policy. However, the current state of implementation of such a policy in Ukraine indicates its absence rather than its presence. The practice of forming the agricultural policy of developed countries shows that it is expedient to implement it not only by using budget funds but also by

using other economic and organizational mechanisms. For example, support for commodity producers in the member countries of the Organization for Economic Cooperation and Development (OECD) begins with measures aimed at ensuring that prices for agricultural products sold by commodity producers exceed the input prices for their production resources. At the same time, production output and consumed resources are estimated at world market prices. In the absolute majority of countries in the world, the ratio between the output and input prices of agricultural producers for products and resources, as well as the share of their support, is now more than one, which allows producers to form their sources of investment financing for expanded capital reproduction, and only in Ukraine this ratio is minimal or even unsatisfactory (Table 6).

**Table 6.** The share of support to agricultural producers (PSE) in % of their gross receipts, 2000-2021

Year	OECD	EU	Ukraine
2000	30.07	30.33	2.25
2001	26.84	28.20	3.40
2002	28.05	30.83	-4.71
2003	26.92	31.13	-0.26
2004	26.91	30.48	0.71
2005	25.81	28.58	8.61
2006	23.94	27.32	8.82
2007	20.05	22.33	2.12
2008	19.02	20.60	-2.65
2009	20.79	22.67	6.94
2010	19.17	19.334	5.25
2011	17.75	17.77	-3.64
2012	18.19	19.06	-0.24
2013	16.87	19.64	-0.02
2014	16.39	17.46	-1.44
2015	17.04	19.04	0.54
2016	17.81	19.64	-1.45
2017	16.86	18.78	-0.81
2018	17.61	19.69	2.10
2019	18.13	19.54	2.85
2020	18.23	19.25	1.41
2021	15.88	17.57	1.14

**Source:** OECD monitoring data (Producer support (PSE)...., 2000-2021)

If the excess of the income of agricultural producers from the sale of products, valued at world prices, over the consumed resources at the same prices in the OECD countries on average for 2000-2020 was 20.6%, in the EU – 22.5%, then in Ukraine – only 1.4%. Grain export prices from Ukraine are currently almost 10% lower than the world average.

With the existing economic relations, the lion's share of net income from the sale of agricultural

products of agricultural producers through the price mechanism flows into intermediary structures, in particular export-oriented transnational companies, which narrows the opportunities to form sources of investment financing. In these conditions, agricultural producers try to achieve cost recovery by maintaining relatively low levels of wages for workers and rent rates for used land plots of citizens, who bear the main burden of distorted economic relations. In

the conditions of the war, price gaps in economic relations increased. With the world price of wheat at \$340 per 1 ton, its purchase price in the ports of Ukraine is \$220, and from commodity producers in the Cherkasy region – \$140 per ton (Financial results before taxation..., 2010-2021). A similar pricing practice on the markets of agricultural products, which is widespread in Ukraine, does not meet the goals of agricultural development or national security, and therefore needs to be corrected.

8.0 provided in the state budget for 2022 billion hryvnias, but in reality, 4.6 billion hryvnias are insufficient to support farmers. Given world practice, this level of state support for agriculture in Ukraine (\$14 per 1 ha of land) does not have a significant positive value. If this situation continues, existing and new threats to the state's economy and society will intensify.

In connection with the above, in Ukraine, similar to the practice of OECD members and other countries, measures should be taken to form an agricultural policy that would provide the necessary support and stimulation of investments in agriculture (Zakharchuk, Kisil, Nechytaylo, 2022). This provision must be enshrined in national legislation. It is advisable to supplement the national economic development strategy and the state regional development strategy with provisions on agricultural policy, investment support, and its priorities, monitoring system, and indicators. The goal of this policy

should be not only to increase budget funds for the support of agriculture but also to ensure an increase in the income of business entities. The formation of an effective agricultural policy and giving it an investment-oriented character should be considered one of the most important tasks of the state agrarian policy in conditions of instability.

When forming the national agricultural policy, it should be taken into account that, despite the complexity and insufficiently favourable conditions, the trend of the dynamics of capital investments in agriculture has been upward for a long time. This should be expected in the future as well. Given this, as well as taking into account the growing global and national demand for agri-food products and certain positive changes in the dynamics of capital investments for 2021, it was found in their previous forecast made in January 2022, that at the prices of the previous year could amount to 72 billion UAH (Kisil, 2022). However, the risks of the war fundamentally changed the investment situation. According to the optimistic and realistic scenarios of the forecasts, it was found that capital investments in the agriculture of Ukraine in 2022 before the previous year can be 40 or 32 percent, respectively. At the same time, their value in 2022 in the prices that are compiled may be: according to the optimistic prognosis – 31 billion UAH, and realistic one – 24 billion UAH (Table 7).

**Table 7.** Forecast of capital investments in the production of agricultural products of Ukraine for the period until 2030

Year	Capital investments of the corresponding years according to the scenarios forecast					
	optimistic			realistic		
	Change (+, -) before the previous one year, %	billion UAH	billion USD	Change (+, -) before the previous year, %	billion UAH	billion USD
2021 (fact)	+23.5	68	2.5	+23.5	68	2.5
2022	-5.5	31	1.1	-6.5	24	0.9
2023	+20	37	1.4	+20	29	1.1
2024	+30	48	1.8	+30	37	1.4
2025	+35	64	2.3	+35	50	1.8
2026	+40	90	3.3	+40	70	2.6
2027	+30	117	4.3	+30	91	3.3
2028	+25	147	5.4	+25	114	4.2
2029	+20	176	6.4	+20	137	5.0
2030	+15	200	7.3	+15	158	5.8

**Source:** the calculations of the executors given the data presented in Figures 1-3 and Tables 1, 2, 6 of this article, and the authors' expert predictions regarding investment conditions for the development of agriculture in the future. The basis for calculations was: capital investments (2010-2021); capital investment indices (2011-2021)

According to the realistic scenario of the forecast, investment in agricultural development in 2023-2030 will be affected by factors of instability and investment risks, the mitigation of which will largely depend on the course of the war, the possibilities of its completion, and the reduction or complete elimination of other risks. It should be expected that

in 2024-2025, the investment risks associated with the war will significantly weaken. Most of the other negative investment factors that took place until 2022 may persist. Investment activity can also be restrained by low domestic demand and difficulties with exports, a sharp increase in the price of resources, political instability, regular elections, corruption,

insufficient amounts of state support for commodity producers, high credit rates, and other factors. Under the conditions of the functioning of the full land market, part of the investment resources of agribusiness will be diverted to purchase land plots. There will remain investment risks, insufficient capital protection mechanisms, and the influence of large agribusiness on decision-making regarding the use of budget funds for its benefit. The possible lack of transparency in the allocation of budget funds will deter investment support for small and medium-sized agribusiness. In a period of instability, one should not count on a significant attraction of foreign investments and stock market resources to agriculture. The lowest point of the investment decline will likely occur in 2022-2023.

Investments in agriculture will be facilitated by: the priority of agriculture in the investment cycle of Simon Kuznets, possible reduction of war risks, the effect of the post-crisis "surge" of investments, strengthening of international support for Ukraine's security, reduction of threats of the COVID-19 pandemic, rising prices for the main types of agri-food exports, etc. Given that the demand for investment goods falls during the period of investment crises, in 2022-2023 there will be no significant increase in the prices of investment goods, and the growth rate of resource prices will be lower than the corresponding indicator for agricultural products. The increase of investments in agriculture will likely become possible already in 2023-2024. In 2025-2030, we should expect active post-war reconstruction of the economy, weakening of the cumulative effect of negative investment factors, and average growth rates of investments for the development of agriculture.

Taking into account the growth trends of capital investments in agriculture during periods of past investment crises, the forecast for 2025-2030 predicts a cyclical change in their growth rates in the range from 20 to 40% with a further gradual decrease to 15% in 2030 p.

The data of the forecast of capital investments in agriculture, shown in Table 7, show that after the decline in 2022, the volume of capital investments will increase in the following years and, under optimistic and realistic scenarios, will amount: to 52 and 43 billion UAH in 2025; 2030 – 165 or 135 billion hryvnias. If additional investment risks or advantages arise in the forecast period, the indicators of the forecast of capital investments for the production of agricultural products will be different.

In conditions of instability, it is most important to ensure the needs of agricultural producers in investment loans from commercial banks. With the provision of 20-25% of the total volume of capital investments according to the real scenario of the forecast, the need for loans in 2023 will be 5-6 billion UAH, in 2025 – 10-11 billion, and in 2030 – 27-34 billion UAH. However, interest rates on bank loans for investment projects in this period will in most cases exceed their rate of return, therefore, given the efficiency, their implementation will become

impractical. In this regard, for the specified investment needs of agribusiness, especially small ones, it is advisable to gradually increase the filling of the state program "Affordable loans 5-7-9", which in 2022 provides for investment loans of only 0.9 billion UAH or other special programs with credit support.

Therefore, investments in agriculture determine not only its pace of development but also the entire economy. The state of investment in agriculture is unstable, although the dynamics of investments for these purposes are growing at a moderate pace. The activation of the process of investing in the development of agriculture is restrained mainly by external factors, among which the most influential is the military factor. The nature of the future investment development of agriculture in conditions of instability will largely depend on the elimination of war risks, the creation of a favourable investment climate for private investments, the introduction of responsible investments in compliance with the principles of inclusiveness in approaches to balancing economic relationships between participants in investment projects and based on capital efficiency indicators.

Many researchers study the theoretical, methodological, and practical aspects of investing in the development of the economy in periods of instability, which due to various reasons is constantly manifested in individual states, in particular in Ukraine, or groups of states. Common to all studies is the conclusion that instability negatively affects investment activity in all sectors of the economy. And this paid attention to N. Büttner, M. Grimm, and S. Soubeiga (2022), who, using the example of B. Faso, found that instability, especially caused by armed conflicts, causes a decrease in investment and a decrease in the level of efficiency. N. Akbar, K.R. Paltasingh, and A.K. Mishra (2021) investigated how public policies encourage private investment in agriculture in India. It was found that the small agricultural producers of India do not have enough funds for agricultural activities. The effectiveness of alternative government expenditures for the support of agriculture and the promotion of private investments was evaluated. It was concluded that irrigation subsidies strongly stimulate private investment in agriculture, both in the short and long term. Factors driving private investment in agriculture include institutional credit, favourable terms of trade for producers, and optimistic expectations of future food demand. The authors recommend that politicians better orientate and rationalize state agricultural support programs, cancel unproductive subsidies for fertilizers and electricity, and direct the freed funds to state investments in India's agriculture.

Ukrainian scientists pay special attention to the problem of instability and measures to intensify investment activity. R.S. Chorny, N.P. Chorna and I.I. Berdei (2018) suggested creating favourable conditions for investment attraction given instability, although their proposals for lobbying the interests of investors are debatable. I.S. Kramarenko (2016) substantiated that: economic instability leads to a



decrease in the volume of attracting foreign direct investments; to bring the national economy out of the crisis and its further stable development, a scientifically based investment policy of the state and regional authorities should be implemented; to intensify investment activity, it is most important to create a favourable investment climate and attract foreign investments. Studying the problems of attracting investment resources to the economy of Ukraine, Yu.B. Kolupaev, S.S. Zalyubovska, and I.O. Melnychuk (2018), concluded that revitalizing the economy, in particular, investment activity, and improving social conditions can only be done by activating entrepreneurial initiative, creating a competitive environment, and stimulating the economy.

The authors generally share the results of the above-mentioned studies, although they concern the entire economy and do not take into account the specifics of agriculture. Regarding the attraction of foreign investments, it should be taken into account that this task is not set in most countries of the world, since in the absolute majority the subjects of investments in agriculture are national commodity producers united in infrastructure projects. The capture of a significant part of the export-oriented segments of the agricultural infrastructure of Ukraine by transnational corporations gives rise to their monopolization, disruption of economic relations, and the unprotected state of agricultural producers in the product markets, as well as a shortage of their sources of financing investments.

Several authors investigated the relationship between investments in the development of the agricultural sector of the economy and its performance indicators. In particular, M.V. Donckta, P. Chanb, and A. Silvestrinic (2021) used the example of 189 countries of the world to study the long-term dynamics of the relationship between investments and added value in agriculture. It is impossible to carry out a similar study on the example of one country due to the small sample of analysed indicators. In this regard, the authors of this study on the conditions of Ukraine for the first time proposed an approach to the correlation-regression analysis of the relationship between capital investments in agriculture and the gross regional product.

Investigating the investment aspects of land use in conditions of financial instability, N. Gvozdei (Gvozdei, 2022) concluded that the main condition for conducting expanded agricultural production in conditions of instability is credit support for agricultural producers. The results of these studies confirm this conclusion since credit support for agricultural agro-producers in conditions of instability and limited possibilities of state and regional budgets remains the main mechanism of their support. Although this support is currently mainly provided for the formation of current and not investment costs of agricultural producers.

Some authors have studied separate component problems of investment activation: V.V. Lavruk and L.M. Budnyak (2020) identified the peculiarities

of the dynamics of capital investments by types of economic activity in Ukraine; V.G. Chernyshev, D.V. Okara, and I.L. Kovalyov (2020) found out that the phenomena of instability in investment have distinct regional features, one of the strategic priorities of the development of Ukraine in the conditions of globalization and taking into account the key trends of the world economy should be to increase the importance of regions in attracting and increasing investments; S.M. Bortnik (2022) substantiated the conclusion that small and medium-sized entrepreneurship is the social basis of economic reforms and the basis of economic stabilization in the post-war period and also revealed its functioning features, advantages, and weaknesses; N.O. Yurina and D.V. Gormai (2013) studied the impact of small entrepreneurship on the economic growth of Ukraine and found that small entrepreneurship contributes to the activation of investment activities and the development of the state's economy. Such scientists as M.D. Bilyk and T.O. Bilyk (2012) found atypical structural shifts in investments and financial results of large, medium, and small, in particular micro, enterprises. The results of research conducted on the economy of the state generally coincide with the corresponding conclusions of the authors of the article on agriculture.

Forming an effective agricultural policy and giving it an investment direction should become one of the most important tasks of the state. Similar conclusions were obtained by R.S. Chorny, N.P. Chorna, and Burdei I.I. (2018). Having studied the possibilities of intensifying investment activity in Ukraine in conditions of economic and political instability, they found that as a result of destabilization processes at the macroeconomic level in the state, it is necessary to develop and implement several complex measures to overcome the crisis based on investments.

In comparison with other works, the research carried out by the authors highlighted for the first time such little-studied aspects of investing in the development of agriculture as the quantitative relationship between capital investments in agriculture and the gross domestic product of the state, reflected in the analysed correlation-regression models by the indicators of the statistical sample of the gross regional product for a series years; assessment of the dynamics of capital investments by quoting their actual and forecasted indicators in the prices of the last year of their analysed series; the duration and features of the actual and projected investment cycle of Simon Kuznets for the conditions of Ukraine. Taking into account the latest changes in investing in the development of agriculture, the periods during which its nature changed, as well as the main factors of these changes, were identified.

### ► Conclusions

Investments are the most important factor in the growth of the Ukrainian economy. In agriculture, they determine more than 90% of changes in output

and profit, and in the state – 50% of gross domestic product. Due to instability, the investment potential in 2010-2021 was imperfectly used in the amount of UAH 11 billion per year on average.

Agricultural enterprises do not have sufficient sources of financing capital investments. In their structure, almost 90% is occupied by their sources, the other part is loans, and there are practically no borrowed funds. The conditions for the development of small agribusiness are particularly unfavourable. Its share in capital investments for 2016-2020 decreased from 44 to 32%. Support and stimulation of small agribusiness investments should be one of the most important tasks of the agricultural policy of the state.

Significant differences in investment support for the development of agriculture in the regions. The lowest amount of capital investment in 2021 was in Odesa (898 hryvnias/ha), and the highest was in the Ivano-Frankivsk region (4751 hryvnias/ha). Over the past 5 years, there has been a significant investment decline in the southern and eastern regions, which causes instability and negatively affects the security of the state. Priority measures are needed to support investments in agriculture in regions freed from occupation and affected by war.

The insufficient level and instability of investment in the development of agriculture in 2010-2021 take place even with the current favourable phase of the Simon Kuznets investment cycle for agriculture, which began in 2009-2010 and will end in 2024-2025. After that, the Food Industry will become an investment priority. Therefore, national agribusiness should develop new investment strategies and

integration projects with the production of export-oriented food products.

Insufficient investment activity and instability are largely caused by inappropriate agrarian policy, which does not promote investment. Forming an effective agricultural policy and giving it an investment direction is one of the most important tasks of the state economic policy.

It should be expected that the volume of capital investments in 2023-2030 will be affected by factors of instability and investment risks, the mitigation of which will depend on the course of the war, the possibilities of its end, the formation of an appropriate agricultural policy and Ukraine's acquisition of EU membership. According to a reasonable forecast, capital investment in agriculture during this period will grow by an average of 26-27% per year, and under optimistic and realistic scenarios in 2025 will be 52, respectively, and 43 billion UAH, and in 2030 – 165 or 135 billion hryvnias.

It is advisable to continue the results of these studies in the direction of substantiating proposals for the formation of investment-oriented agricultural policy in conditions of instability, conducting investment activities of agribusiness based on ESG principles. It is also advisable to carry out a scientific substantiation of the strategy and programs of investment support for the development of agriculture in the system of the national economy, as well as the priority of investment development of small agribusiness, exemplary investment projects for their dissemination in business practice, forecast of capital investments, etc.

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## Стан і перспективи інвестування розвитку сільського господарства в умовах нестабільності

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► **Анотація.** Для досягнення позитивних зрушень в економіці та соціумі необхідно постійно активізувати інвестиційний процес у сільському господарстві, яке впливає на розвиток більшості видів економічної діяльності в державі. Мета статті – дослідити тенденції кількісних і якісних змін в інвестиціях на розвиток сільського господарства України в умовах нестабільності. У дослідженні використано методи: діалектичний, абстрактно-логічний, кореляційно-регресійний, стратегічного планування, проектного аналізу, табличний, графічний та прогнозування. За результатами досліджень, здійснених з використанням методів кореляційно-регресійного аналізу, виявлено, що капітальні інвестиції у сільське господарство в умовах нестабільності були найважливішим чинником зростання не лише товарної продукції і прибутку в сільському господарстві, а й валового внутрішнього продукту держави. Проаналізовано динаміку інвестицій і джерела їх фінансування, які в Україні тривалий період нестабільні. Виявлено значну диференціацію рівнів інвестування розвитку сільського господарства регіонів. Зроблено висновок щодо циклічного характеру інвестиційних процесів у агропродовольчих секторах економіки та їх інвестиційної привабливості, з'ясовано періоди його сприятливої і несприятливої для сільського господарства фаз. Досліджено ефективність капіталу в сільському господарстві, яка в умовах циклічності інвестиційних процесів, пов'язаних з інвестиційною привабливістю, змінюється. З метою створення умов для досягнення сталого розвитку сільського господарства обґрунтовано необхідність формування інвестиційно спрямованої сільськогосподарської політики на засадах, випробуваних світовою практикою. Наведено результати прогнозу капітальних інвестицій у розвиток сільського господарства в умовах нестабільності на період до 2030 р. Результати досліджень мають практичне значення для формування інвестиційно спрямованої інвестиційної політики держави, інвестиційних стратегій агроформувань і розвитку економіки держави в умовах нестабільності

► **Ключові слова:** капіталовкладення в сільське господарство, нестабільність, динаміка інвестицій, джерела фінансування інвестицій, циклічність інвестиційних процесів, ефективність інвестицій, інвестиційна політика