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Sustainable Economic Development of Ukraine through the Agro-Sector Growth

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Abstract. The urgency of the research forms the complex of agricultural sector productivity problems, employment level reduction problems, low wages level, and land productivity reduction. The article is devoted to searching for agrarian sector development directions, which promotes steady economic development based on identified problems. The research aims to develop proposals for solving the main agro-sector problems, which contribute to sustainable economic growth. The article develops the methodology of analysis and uses statistical analysis, probability theory, and generally scientific methods of knowledge. The study brings evidence of the leading hypotheses proposed and the table in the "problem-solution" format. It is proved that the agriculture of Ukraine has a heavy influence on the economy and employment. Agriculture is characterised by instability, low wages, and increased land for growing plant products, while livestock farming is in decline. The following methods are used to solve the problems: market transformation on finished food-product, diversification of production, de-shadowing of the sector, agriculture automation increase, land reform controlling, stimulating farming state programmes. The originality of this study lies in the authors' sustainable development analysis methodology through the agricultural sector growth. The practical significance of the study lies in the possibility of implementing recommendations at the macro- and microeconomic levels. A further research field forms the automation processes in agriculture available to small and medium-sized farmers

Keywords: agriculture, automation, employment, land reform, export

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INTRODUCTION

For decades, Ukraine has been a key supplier of agro-industrial raw materials worldwide. But despite its enormous agro-industrial potential, Ukraine is not on the course to sustainable development. Moreover, for several decades Ukraine has turned from an industrial country into a backward one [1]. In these conditions, the sustainable development idea remains more an ideology than a research-to-practice concept. The Ukrainian literature compares sustainable economic development to the "philosopher's stone" that economists, country leaders, and citizens strive for [2]. The sustainable development strategy for today exists, it is formally developed, and the national policy makes decisions strives to implement it. The sustainable development concept is formed on three pillars: ecology, economy, employment [3-5]. Admittedly, the agricultural sector plays an indispensable role in meeting humanity's essential need – food. Still, it is also the component of strategic development. But beyond that, it is also crucial in sustainable economic development because it is a critical element in the economy, labour market, and resource potential.

According to the latest United Nations (UN) data, over the next 30 years, the world population will grow from the current 7.3 to 9.7 billion people, while food consumption on the planet, according to various estimates [6], will increase by 60-100%. In such circumstances, Ukraine may become a key player in the food supply. Being Europe's second-largest country, Ukraine accumulates a tenth of the world's black soil reserves, and 72.1% of the area consists of agricultural land. Agriculture now generates about 11% of Ukraine's GDP (gross domestic product) and about 17% of jobs, and farming exports nearly tripled between 2010 and 2020, reaching about 59% of the country's total exports [7]. Ukraine is currently one of the largest exporters of grain crops globally. However, these apparent successes trap Ukrainian farmers, who use only cheap raw materials to produce inefficiently. During 2015-2020, Ukraine's agricultural sector grew thanks to a 1.9-fold increase in sunflower production, a 1.7-fold increase in grains and legumes. But despite this, according to Food and Agriculture Organisation of the United Nations [8], Ukraine's land-use efficiency in terms of average grain crop yields is half what the United States of America and Western European countries have.

As a result, Ukrainian agrarians receive twice or thrice less revenue per hectare than their Western colleagues in terms of money. The main reasons are weak production technology and low added value of raw materials. Thus, unproductive agriculture, outdated technologies, the decline in employment, and land fertility do not allow the agricultural sector to become an essential component of sustainable economic development, which forms the main problem under study. Therefore, the relevance of this paper is to find the development vectors of the agro-sector, which contributes to the sustainable economic development of Ukraine. Considering the main determinants of sustainable economic development are economic infrastructure, population welfare, and ecology, the agricultural sector also affects these components of sustainable development.

Thus, *the purpose of this study* is to develop proposals to solve the primary agricultural sector problems that contribute to sustainable economic development.

To achieve the purpose, it is necessary to solve the following *tasks*: to justify the dependence of the economy's sustainable development on the agricultural sector's development; to identify the main agricultural development issues; to determine the agricultural sector's importance in employing the population; to determine the capital investment in technology for the development of the agricultural sector; to investigate the current state of agricultural land in Ukraine; to develop and substantiate the main development vectors of the agro-industrial sector to increase economic sustainability.

LITERATURE REVIEW

The sustainable development issues in Ukraine have been the subject of research and discussion by scientists, politicians, practitioners, and public members since 1992. But these studies and discussions consider various aspects of this complex issue [2]. According to most modern researchers, innovation and technological support are the main drivers of sustainable development [4; 9; 10]. Such a development strategy is also applied to the agricultural sector, namely the agricultural industry in Azerbaijan [11]. In addition, critical strategic vectors for the country's sustainable development are land fertility preservation [12] and effective management. To date, the food market in Ukraine is unstable, and the agricultural business environment is unfavourable for sustainable development, especially in the livestock industry [13; 14]. Under such conditions, most Ukrainian researchers, scientists, and experts believe that the agricultural sector requires structural changes. Therewith, there are three sustainable development models of agro-industry in world practices, which partly take place in Ukraine.

The first model is the Japanese and Chinese, under which a farmer works on small plots of land (up to 2 ha). Such farms are similar in Ukraine. Therefore, they can be considered as small businesses. The second model, the European one, is built on 10-150 hectares farms. The analogue of such formations in Ukraine is farming. The third model, American, where the size of farms is considerable, is in the range of 1-2 thousand hectares. Agricultural holdings represent such farms in Ukraine, and they cultivate more than half of the agricultural land [15]. The main issue of agricultural development in Ukraine is that being the primary industry that provides jobs for the rural population, it is necessary to stimulate the importance of the first two models. But it is also essential to stimulate the third model, which can introduce

expensive technologies of agribusiness automation, increasing agricultural production volume. Moreover, land reform, which Ukraine passed in 2021, while formally aimed at developing small and medium-sized farms, constitutes a regulatory framework for developing agricultural holding. In turn, big businesses will push out small and medium businesses, which may become the basis not for sustainable economic development but for a solid crisis.

Notably, the model of economic formations alone will not provide the growth of economic indicators, social development and will not improve the environmental situation in the country. It requires a comprehensive application of changes in the development of competitive agrarian production so that the agricultural sector can provide state food security and good living standards for the population [16]. Therewith, it is impossible to solve the problem with land reform alone; it is necessary to change both the agricultural industry management concept and the national policy to support agribusiness. Researchers have sufficiently investigated the issue [13; 17; 18], considered individual agricultural industry problems. But the general problem of agro-industrial development in the sustainable economic development context is understudied, which forms the originality of this study. For the first time, the study developed a methodology for the sustainable development analysis, which is based on four determinants: economic, social, environmental, and technological.

MATERIALS AND METHODS

The empirical analysis of this study is carried out based on the State Statistics Service of Ukraine statistical data [7]. In addition, to highlight the main problems, many expert opinions on the main problems and the methods of their solution were investigated. Finally, the application of general scientific cognitive methods allows confirming the united development concept of agriculture based on the current state and problems under study. The development vectors are chosen considering sustainable economic growth, which balances technical, economic, social, and ecological development. Through the grouping of information, data for the current state analysis of the agro-industrial sector and its importance in economic development are obtained. The synthesis of facts and information published by agricultural experts allows identifying and summarising the main problems and finding alternative solutions in the scientific literature. The inductive method is used to find problems based on the analysis results, and the deductive way – to find solutions to these problems. The study is based on four hypotheses, which form the main tasks and objectives as follows:

– hypothesis 1: agriculture has considerable importance in the economy and is a sustainable development tool;

– hypothesis 2: the unsustainable development of agriculture is determined by the asynchrony of agricultural production;

– hypothesis 3: employment in the agricultural sector is decisive for sustainable economic development;

– hypothesis 4: the capital investment growth in agriculture contributes to the productivity growth of the sector.

To prove these hypotheses, the authors apply the methodology developed based on the strategy for Ukraine's sustainable development until 2030 [19] and the concepts of sustainable development based on economic, social, and environmental development. But given the intensifying interest in the technological component of the agro-sector, authors of this paper allocate technology as the fourth important determinant, which stands apart from the economy because it affects not only the production but also the employment structure and the environment. Statistical and mathematical analysis methods are used to conduct empirical research. Horizontal and vertical analysis allows determining the dynamics and structures of agro-industrial development. Regression analysis (particularly the Pearson coefficient) defines the relationship between the indicators and demonstrates which factors influence the research object. Its high value, more than 0.9, indicates the close relationship, which allows concluding on the mutual influence of certain phenomena on each other. The negative value indicates a direct proportional impact of indicators; the value less than 0.3 suggests that the indicators are practically unrelated. The method of probability theory (the standard deviation) is used to analyse the synchronicity of agroindustrial production. It shows the average deviation of indicators for a certain period compared to the average indicator for the period under study. The variation coefficient was applied to demonstrate this value not in monetary values but as a percentage.

RESULTS AND DISCUSSION

In the empirical study of sustainable economic development, authors will determine the agricultural production value in the total country's added value. According to the State Statistics Service of Ukraine data [7], the total value added in 2020 was 145.5 bn, while the agricultural production added value was 15.7 bn (Table 1).

***Table 1**. Added value of agricultural production in Ukraine*

Indicators	2015	2017	2018	2019	2020	Pearson's coefficient
Gross value added, $mln	74,752	91,192	108,168	144,372	145,546	0.99
Gross value added of agriculture, $mln	10,611	10,993	12,939	15,045	15,726	
% of gross value added	14.2	12.1	12.0	10.4	10.8	

***Note**: The statistics data are converted into dollars using the dollar exchange rate as of January 1 of the understudy year*
***Source**: Ministry of Finance of Ukraine (2021) [20]; State Statistics Service of Ukraine (2021) [7]*

According to Table 1, the agricultural production share in the economy has decreased by 3.4% over the last five years, which is a rather considerable indicator, demonstrating a gradual loss of agricultural importance in the economy. However, in 2019 there was a rapid increase in value added – by 33%. Therewith, the increase in the agricultural production value was only 16%, which indicates the asynchronous development of agriculture and the economy, and the activation of other economic sectors in 2019. But in 2020, value-added growth across all industries was 0.8%, while the agribusiness sector grew by 4.5%. Moreover, the Pearson coefficient, which demonstrates the close relationship between agribusiness and the economy, is quite strong – 0.99. Thus, the hypothesis can be confirmed that even despite the instability of the agro-industrial sector, it is still an essential component of Ukraine's sustainable development. But the agricultural industry's importance in the country's GDP gradually gives way to other economic sectors. Here authors will consider the reasons for the uneven agricultural production. For this, one should analyse the agrarian production structure and calculate the average statistical deviation and the coefficient of variation, which demonstrate the production uniformity for five years (Table 2).

***Table 2**. Agricultural production structure of Ukraine*

Indicator	2015	2017	2018	2019	2020	Standard deviation, mln	Coefficient of variation, %
Plant growing, $mln	20,045	17,397	18,973	22,730	19,165	1,963	10
Cereals and legumes, $mln	8,557	7,197	8,087	10,115	8,412	1,059	12
Technical crops, $mln	6,605	6,055	6,831	8,221	6,574	814	12
Potatoes, vegetable, and melon food, $mln	3,422	2,895	2,900	3,281	3,193	235	7
Fruit and berry crops, grapes, $mln	655	517	614	615	543	57	10
Fodder crops, $mln	447	347	347	364	329	46	13
Other crop products, $mln	359	386	195	135	114	127	53
Livestock, $mln	6,364	5,084	5,088	6,003	5,617	563	10
Farm animals (breeding), $mln	3,104	2,529	2,602	3,129	2,972	283	10
Milk, $mln	2,094	1,660	1,606	1,813	1,668	198	11
Eggs, $mln	863	653	671	817	760	91	12
Wool, $mln	2	2	2	2	2	0	18
Other livestock products, $mln	300	240	207	242	216	37	15

***Note**: The statistics data are converted into dollars using the dollar exchange rate as of January 1 of the understudy year*
***Source**: [7; 19]*

According to Table 2, it can be seen that plant products have an advantage in agriculture. As of the year, plant products form 77.3% of all agricultural production. In its turn, the most considerable indicators are grain and leguminous plants production – 34% of total farm production, technical crops – 27%, potatoes, and vegetables – 13%. Among livestock products, meat production prevails – 12%, dairy products – 7%. The dynamics of all types of production characterised by instability. The highest instability level is in wool production (the variation coefficient is 18%), feed crops – 13%, grains, industrial crops – 12%, eggs – 12%. Since grain production and technical crops are essential in agriculture, it can be stated that the deviation from the average of 12% is quite a considerable factor, which determines the agricultural production asynchrony. But the particular instability of the agro-industrial sector can be determined not by production but by the export of products. Therefore, the export dynamics of agricultural products can be compared with the general export indicators in the country as follows (Table 3).

***Table 3**. Agricultural exports*

Indicators	2015	2017	2018	2019	2020
Export, $mln	14,563	17,757	18,612	22,144	22,179
Agriculture export, $mln	8,795	10,324	11,097	14,192	13,071
Livestock products, $mln	823	1,109	1,211	1,277	1,188
Crop production, $mln	7,971	9,216	9,886	12,915	11,883
% of livestock exports	5.7	6.2	6.5	5.8	5.4
% of crop exports	54.7	51.9	53.1	58.3	53.6
% agriculture exports	60.4	58.1	59.6	64.1	58.9

***Note**: The statistics data are converted into dollars using the dollar exchange rate as of January 1 of the year under study*
***Source**: [7; 19]*

Table 3 demonstrates that vegetation products dominate exports. As of 2020, $11.8 billion of plant products were exported, and 2019 was more productive as the value was $12.9 billion. Livestock products exports account for 5.4% of total exports, and plant products – 53.6%. Overall, agribusiness exports account for 58.9% of total exports. But this indicator is not characterised by stability, which is clearly presented in Figure 1.

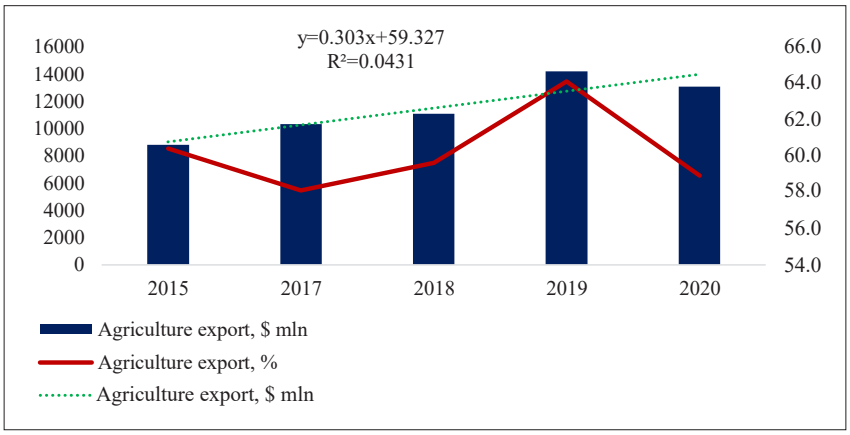

***Figure 1**. Agricultural export dynamics and its share in total export in Ukraine*

Figure 1 demonstrates that the approximation coefficient is 0.04, which indicates a severe instability affecting the total export indicator and, as a result, the country's economic development. Thus, the hypothesis that the asynchrony of agricultural product supply considerably impacts the economy can be confirmed. Still, a greater level of asynchrony is recorded in exports rather than in production, which is associated with the competitive market features. Sustainable economic development is a concept that determines several components, not only the development of the economy. In particular, an essential sustainable development element is the population's well-being, which is expressed by the possibility of having a stable job and getting a high wage. Below the study considers these indicators in Table 4.

***Table 4**. Employment in agriculture in Ukraine*

Indicators	2015	2017	2018	2019	2020	Pearson's coefficient
Employed population, thousand people	16,443.2	16,156.4	16,360.9	16,578.3	15,915.3	0.92
Employed in agriculture, thousand people	2,870.6	2,860.7	2,937.6	3,010.4	2,721.2	
Employees, thousand people	5,930	5,844	599.5	6,369.6	6,213.7	-0.14
Employees in agriculture, thousand people	569.4	558.1	545.7	535	499.9	
% of employment in agriculture	17.5	17.7	18.0	18.2	17.1	
% of employed workers in agriculture	9.6	9.5	91.0	8.4	8.0	

***Source**: [7]*

The Table 4 demonstrates that agriculture employs 17.1% of the country's population, which is quite a high indicator, confirming this industry's importance for population employment. In particular, it is essential for rural employment, which comprises entrepreneurs and owners of the agricultural business. Importance of the hired employees is much less in the employment rate of hired employees – 8%. Employment dynamics analysis indicates an uneven performance; in particular, the highest number of employed people was in 2019 – 3 million people, and in 2020 – about 9% of people lost their jobs. In general, however, the decline in employment in agriculture is logical, as the automation level of agricultural processes increases every year. The high correlation level between total employment and employment in agriculture at the level of 0.92 confirms the sector's importance in employment, thereby supporting Hypothesis 3. Present-day agriculture in Ukraine is not an economic sector that can provide a sufficient wage level. The average monthly wage in the agricultural sector was $469.3 in 2020 (Table 5). However, in 5 years, the wages level in agriculture increased 2.5 times, which influenced the populations interest towards work in this industry.

Table 5. *Average wages in agriculture in Ukraine*

Indicators	2015	2017	2018	2019	2020
Average monthly salary, $	185.6	257.4	317.7	442.9	469.3
Average monthly salary in agriculture, $	146.4	219.5	270.9	373.7	395.0
% of average wages in agriculture	78.9	85.3	85.2	84.4	84.2

***Source**: [7; 19]*

According to 2020 data, the average agricultural wage of people is 84.2% of the national average wage. Meanwhile, the peak of wage growth in agriculture was observed in 2017-2018, after which the wage level in agriculture declined compared to other economic sectors. At present, agriculture automation is considered the cornerstone of its future development, as lower labour costs lead to lower production costs, which allows signing more export contracts (Table 6).

Table 6. *Capital investments in agriculture in Ukraine*

Indicators	2015	2017	2018	2019	2020	Pearson's coefficient
Total capital investment, $mln	12,085	16,249	20,743	26,328	20,575	0.79
Capital investments in agriculture, $mln	1,334	2,328	2,369	2,495	2,052	
% of capital investment in agriculture	11.0	14.3	11.4	9.5	10.0	

***Source**: [7; 19]*

Table 6 demonstrates that $2 billion was invested in agriculture in 2020, accounting for 10% of all capital investment in the country. However, the investment indicator in agriculture has an unstable trend; in particular, capital investment in the industry is disproportionate to production, as indicated in Figure 2.

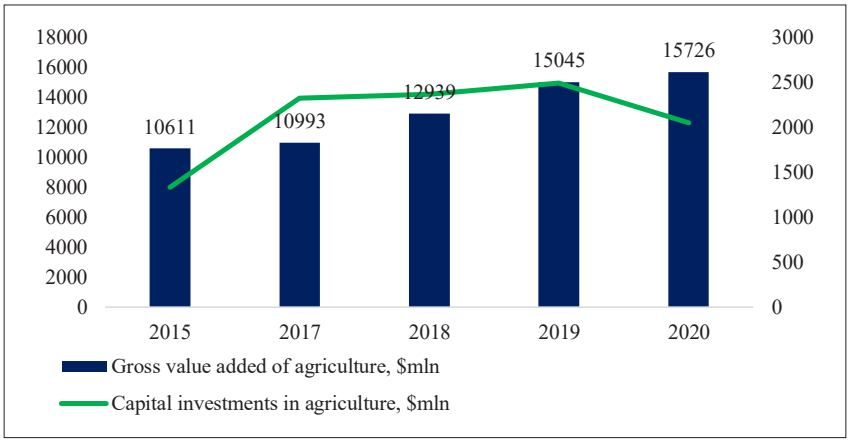

***Figure 2**. Comparison of capital investments in agriculture and its production*

The Pearson coefficient for these indicators is 0.47. Thus, the hypothesis that capital investment increases agricultural productivity is not confirmed. It is because capital renewal occurs through the purchase of machinery, which does not affect the production volume, but rather reduces the production cost. The environmental component is an essential part of sustainable development. Its main task is to form a national policy that will ensure the use of the country's resources in the long term (Table 7).

Table 7. *Agricultural land components of Ukraine*

Indicators	2015	2016	2017	2018	2019
Agricultural land, thousand hectares	41,507.9	41,504.9	41,489.3	41,329	41,310.9
Arable, thousand hectares	32,541.3	32,543.4	32,544.3	32,698.5	32,757.3
Hayfields, thousand hectares	2,406.4	2,402.9	2,399.4	2,294.4	2,283.9
Pastures, thousand hectares	5,434.1	5,430.9	5,421.5	5,282.6	5,250.3
Fallows, thousand hectares	233.7	230.6	229.3	190.5	166.7
Perennial plantings, thousand hectares	892.4	897.1	894.8	863	852.7

***Source**: [7; 19]*

According to the study results, it is clear that the agro-industrial land is exploited less every year. As a result, less and less land is used for hayfields; the cultivated area increases. Thus, the study identified a set of problems, which allows proposing solutions. Firstly, authors summarise the data in Table 8.

***Table 8**. Agricultural sector problems and methods of their solution to ensure sustainable development*

Problem	→	Solution
The importance of agro-industry in the economy is decreasing	→	Increase of production not only of raw materials but also of finished products; agro-sector de-shadowing
Unstable production processes	→	Increasing automation of production processes; production diversification
Decreasing employment in agriculture	→	Incentives for small and medium-sized farmers; land reform and control of its implementation
Low wages	→	Improving skills through the automation of processes, which increases wages
Insufficient level of capital investment	→	Financing of small and medium-sized businesses
Decrease in the land fertility	→	Land reform and control over its implementation

***Source**: authors' development*

Based on the results presented in Table 1, the agribusiness industry's importance in the economy is gradually decreasing. Despite this, according to the Minister of Agrarian Policy and Industry of Ukraine [21], the current indicators are not maximum. Agro-industry can work much more productively and has massive potential for growth. To bring this agriculture to a new level, it is necessary to develop industry by raw materials production and the finished food-product production. A vital part of sustainable development is also the shadowing of agriculture. According to experts, 30-40% of the land is cultivated without paying taxes. The scheme for forming such a market makes provision for the land received for personal development to be leased [22]. Based on the results presented in Table 2, there is empirical evidence that agricultural production is unstable. Yu. Kuznetsova [23] and S.E. Pogodiaev [24] consider the agricultural production stability through the lens of eliminating sharp declines and fluctuations year by year with minimal adverse effects. The following sustainability criteria meet these definitions: growth in production; uniform production flow without interruptions by years; provision of planned yields under any weather conditions; provision of planned gross yields; the ability of agricultural systems to withstand adverse weather conditions; ability to diversify production [18].

Directing the agricultural management policy to solve the problem in this area will stabilise the farm production and form its sustainable importance in the country's economic development. An essential component in solving this problem is the production process automation, which will improve logistics, information collection, data processing, and company activities simulation depending on weather conditions. Some experts believe that the launch of the agricultural land market is an influential factor in the near Ukrainian reality. Evidently, Ukraine's place in the global food market will only increase [25]. Other experts, on the contrary, believe that the launch of the market will create non-competitive conditions for small and medium-sized farming. In particular, this is due to the following reasons:

– small farmers do not have enough finances to purchase land, and bank lending provides a rate of 12% – which further aggravates the problem;

– there are problems with the documentation of land through the high cost of notary services; consequently, many lands are not properly registered, which creates the issue of land grabbing and raiding [26].

To solve the issue, it is necessary to create conditions to stimulate the purchase of land by small farmers [27], which can be solved with the help of the Partial Credit Guarantee Fund in agriculture [28]. In addition, securitisation, which allows lenders to convert illiquid assets into liquid, profitable securities, is now considered an alternative financing tool. Such a system aims to reduce risks for agribusiness creditors, but in the definitive version, the benefits are accrued to the agribusiness producer [29]. Analysis of employment in agriculture confirms the sector's importance for population employment, especially the rural population, but the employment rate of people in agriculture is decreasing every year. Digitalisation of all agricultural production processes is recognised as the future trend. McKinsey [30] estimates that by 2030, the number of farming jobs in developed countries will decrease by 15-35% due to automation. It is possible that the industry could go without human resources at all. For example, in 2017, an experimental farm in Britain managed to grow and harvest crops with no human involvement [31].

Combine harvesters already know how to work the fields without drivers, and programmes have been trained to make the best decisions on agricultural operations. Signals from sensors about soil chemistry, wind, sun intensity, moisture, operations per square meter of field, plant parasites, and diseases are collected and

processed using unique algorithms. As a result, the farmer receives recommendations on fertilisers, pesticides, personnel work quality, the necessary work plan, yield estimates, and even best prices for contracting. The farmer's approved decisions then go to the input of the self-directed farming equipment software. The entire workforce is connected into a single system where each worker's work and corresponding financial results are visible. The workforce of the agricultural sector can be formed not by low-skilled personnel but, on the contrary, highly qualified in the field of intelligent technology, which with the use of their developments and robotics, can bring the agricultural industry to a new level. It will also change the salary level in the industry, which is going to be higher than the usual IT (information technology)-sector wages. If today the agricultural worker's wage level is 84% of the average one, it will be ten times higher with automation of processes. Practice in Britain has shown that this is already a reality, and farming is increasingly like a computer game [31]. A study by the World Economic Forum [32] points to a list of technologies that will shape the future of the agribusiness sector over the next 12 years. Each development will bring tremendous benefits to farmers globally:

– produce condition monitoring technologies that will save 20 million tonnes of food from loss;

– mobile services will create $200 billion in profits and reduce drinking water losses by 100 billion cubic metres;

– big data analytics will create over $70 billion in profits for farmers and increase production by 150 million tonnes;

– Internet-of-Things for supply chain tracking will reduce production losses by 35 million tonnes;

– blockchain for record-keeping will reduce production losses by 30 million tonnes;

– precision agriculture will reduce costs by $100 billion, increase production by 300 million tonnes, and reduce water use by 180 billion cubic feet;

– alternative energy would create $100 billion in profits, add 530 million tonnes of production, and reduce water use by 250 BCF;

– genetically modified foods, biologically active technology, and land quality management would generate $250 billion in profits for farmers.

But such a future is unrealistic for economic conditions in the short term. According to well-known researchers O. Prysyazhnyuk and M. Plotnikova [33], the availability of natural and labour resources, significant intellectual potential, real financial capabilities of the state, and a favourable foreign economic environment provide the conditions necessary for sustainable development agricultural development. The authors believe that a high employment level in agriculture is an important aspect of the country's sustainable development. At the current development stage, it is necessary to ensure an increase in production, which will contribute to improving the level and life quality of the population [34]. Thus, the main state development dilemma arises, which can take one of the following two routes: by automating agriculture, increasing its productivity but also reducing the level of employment, or by maintaining and increasing the level of rural employment by encouraging the development of small and medium-sized businesses. Today, automated control of agricultural processes occurs only on 3% of the land, and such technologies are used only by large agricultural holdings. It is necessary to create affordable financing for farmers to bring these technologies to a more progressive level. Future research will aim to find a harmonious solution to the agricultural sector development through the automation of processes, but not to the detriment of employment.

CONCLUSIONS

According to the study results, it is possible to determine the main development directions of the agro-industry sector in the context of sustainable development based on current problems. Despite the agricultural sector instability, defined by the current state analysis result, it is still an essential sustainable development component. But the importance of agro-industry in the country's GDP gradually gives way to other economic sectors. To solve this problem, it is necessary to redirect the agricultural strategy from raw material to finished product production. Also, it will be essential to establish control over land use in this context and introduce tools for the sector's de-shadowing. Agricultural production is characterised by unstable production. The most unstable sectors are wool. The production of cereals and industrial crops is also characterised by asynchrony. To solve the problem, it is necessary to bring production to a new technological level and implement diversification strategies to smooth out productivity jumps.

Agriculture is essential in employment, mainly rural work, but it is characterised by a gradual decline in labour use due to production process automation. To date, the labour cost in the agricultural sector is below the average wage in Ukraine. To solve this problem, it is necessary to have a mechanism to stimulate industry automation by financing small and medium-sized farming and controlling the land reform so that the rural population develops agriculture rather than transferring land to large agricultural holdings. Today, experts insist that IT and agribusiness uniting is essential for agricultural development, so capital investments in agribusiness are insufficient. However, the current situation shows that capital investments do not contribute to industry development. To change the situation, state funding programmes, which will ease the acquisition of new technologies by large agricultural holdings and medium and small farmers, are needed. The environmental issue of devastation and decreasing land fertility is solved by land reform

controlling, particularly ensuring that land is not leased out on a short-term basis but is carefully used as a long-term asset that contributes to sustainable economic development. The research's practical value lies in the possibility of implementing the recommendations at the macro and microeconomic levels. Further research forms the automation processes in agriculture that small and medium-sized farmers can access.

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Сталий економічний розвиток України крізь зростання сільськогосподарського сектора

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Анотація. Актуальність дослідження зумовлена комплексом невирішених досі проблем продуктивності агропромислового сектора, зниженням рівня зайнятості, низьким рівнем заробітної платні та зниженням продуктивності землі. Стаття присвячена пошуку напрямів розвитку агропромислового сектору, які пропонуватимуть сталі рішення, базуючись на зазначених проблемах. Мета статті полягає в розробці рішення основних проблем аграрного сектору, які сприятимуть його довгостроковому сталому розвитку. У статті розробляється методологія аналізу та використовуються статистичний аналіз, теорія ймовірності та загальні методи наукового пізнання. У статті висунуто низку гіпотез, пов'язаних з розвитком аграрного сектору, та наведено таблицю у форматі «проблема-рішення». Доведено, що сільське господарство України знаходиться під сильним впливом економіки та зайнятості населення. Сільське господарство характеризується нестабільністю, низьким рівнем заробітної платні та збільшенням площі земель, відведених під рослинництво з одночасним зменшенням площі земель для тваринництва. Запропоновано такі методи для вирішення зазначених проблем: трансформація ринків готових продуктів харчування, диверсифікація виробництва, детінізація сектору, підвищення автоматизації сільського господарства, контроль земельної реформи, державні програми зі стимулювання сільського господарства. Новизна дослідження полягає у розробленій авторами методології аналізу сталого розвитку крізь призму зростання аграрного сектора. Практична цінність дослідження полягає у можливості імплементації рекомендацій на мікро- та макроекономічному рівнях. Подальше вивчення формує автоматизацію процесів у сільськогосподарській галузі, доступну дрібним та середнім фермерам

Ключові слова: сільське господарство, автоматизація, земельна реформа, експорт