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CERTIFICATION OF COMPLIANCE WITH SUSTAINABLE DEVELOPMENT STANDARDS IN THE AGRICULTURAL SECTOR (THE EXAMPLE OF DINAK)[1]

Summary. Implementing a new mechanism for controlling carbon dioxide emissions related to producing and importing products to EU countries may pose a significant challenge to Ukrainian agribusiness. The article aims to examine scientifically one of the sustainability measurement systems implemented in the EU and to assess its adaptability for the use by the agribusinesses in Ukraine in the view of current martial law as well as during post-war reconstruction. Such systems support enterprises in preparing sustainable development reports and help to reduce risks associated with the export of agricultural products. The object of the present study is the system of sustainability measurement of the German company Dinak. The Dinak system specializes in comprehensive assessment of sustainability indicators of agricultural operations and carries out certification for compliance with sustainable development standards. Therefore, the Dinak toolkit is relevant for Ukrainian agricultural enterprises. The article provides a detailed account of the structure of the indicators for assessing the sustainability of agricultural operations using the Dinak system. This allowed to identify the strengths and weaknesses of this system using SWOT analysis in combination with the methods of induction and deduction, comparison and logical generalization. Improved knowledge of sustainability assessment systems such as as Dinak is important for Ukrainian agribusiness. A wide range of indicators of this system, which covers environmental, economic and social aspects of agricultural activity, allows to get a comprehensive understanding of the enterprise's sustainability level. In addition, the certification process for compliance with sustainable development standards can serve as an additional incentive for agribusiness entities to implement environmentally friendly technologies and socially responsible practices.

Key words: agribusiness, sustainable development, measurement of sustainability of agricultural operations, non-financial reporting, Dinak.

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Introduction and problem statement. Ukraine is the third largest importer of agricultural imports to the European Union, second only to Brazil and Great Britain. In January-October 2023, the volume of agricultural imports from Ukraine to the EU reached 12 billion 843 million euros. However, on October 1, 2023, the EU began implementing a new mechanism for controlling of carbon dioxide emissions related to producing and importing products to EU countries. This mechanism is called the Carbon Border Adjustment Mechanism (CBAM), and it obliges supplier companies outside the EU to calculate greenhouse gas emissions throughout the product supply chain. From January 1, 2026, this mechanism will be implemented permanently, and carbon emissions will be taxed based on the difference between the taxation of carbon emissions in the EU and the exporting country.

Thus, there is not much time left for Ukrainian agricultural producers to learn how to correctly measure their carbon emissions and the emissions of suppliers of inputs used to produce export products during the transition period. The ongoing full-scale Russian invasion of Ukraine complicates this problem.

Analysis of recent research and publications. Literature review confirms the complex nature of the problem. Foreign researchers have concluded that the ongoing combat activities, the construction of fortifications and significant damage to the infrastructure can lead to the abandonment of a larger amount of cultivated land and a further decline in agricultural production in Ukraine (Mkrtchian A., Müller D. [1]). Of course, in such conditions, the issue of increasing the competitiveness of Ukrainian agricultural products on international markets is key, and it can be solved, among other things, through the decarbonization of agri-food production and related activities, such as reporting about this sort of non-financial information. In particular, starting from the fourth quarter of 2023, supplier companies outside the EU are obliged to publish information on greenhouse gas emissions in a special CBAM register [2].

Non-financial information on agricultural production covers environmental, social, economic and governance aspects (Karaeva N. et al [3], Hryniv L. [4]). Moreover, measuring sustainable development at the enterprise level makes it possible to assess the state of sustainable development and climate sustainability at more aggregated levels, such as a country level or globally (Hayati D., Ranjbar Z., Karami E. [5]). The introduction of European sustainability reporting standards into corporate reporting can have a significant impact on the development of sustainable businesses and increase their social responsibility to society as a whole (Bezverkhyi K. [6]).

There is a large number of calculators for measuring environmental and social indicators that can be used by an agribusiness entity independently or in cooperation with consulting companies [7–13]. However, the selection of indicators and the establishment of respective threshold values should take into account the specifics of each country and its agricultural production system (Latruffe L. et al. [14]).

In Ukraine, there is no public strategy for measurement, preparation and publication of indicators of sustainable development in general and in the agricultural sector in particular. Only a few agroholdings prepare sustainable development reports, fulfilling the requirements of the stock exchanges where their securities are traded. All other agricultural business entities do not disclose non-financial indicators at all. The question remains open: How can advanced sustainability measurement and assessment systems be implemented in Ukraine in the way that stimulates local agribusinesses to disclose own sustainability activities and publish non-financial reports?

Non-disclosure of non-financial information deprives investors, consumers, and other interested parties of an objective assessment of compliance by an agribusiness entity e.g. with the principle of climate neutrality. It also deters the attraction of foreign investments, the development of new international partnerships, and the formation of a positive image of agricultural businesses.

Objectives of the article is to examine scientifically one of the sustainability measurement systems implemented in the EU and to assess its adaptability for the use by the agribusinesses in Ukraine in the view of current martial law as well as during post-war reconstruction. In general, such systems support businesses in preparing sustainable development reports and, thus, reduce risks associated with the export of agricultural products or access to external capital.

In this study, the authors review the sustainability measurement system of the German company Dinak[1]. A SWOT analysis helps to determine the strengths and opportunities this system has with respect to Ukraine's agribusiness. The underlying **hypothesis** is that such advanced systems can be used as a basis for the development of other, Ukraine- or region-specific systems of sustainability measurement and reporting; be itself implemented in Ukrainian agribusiness with some adaptation to local specifics of agricultural production and external conditions, such as martial law and risks associated with military activities caused by the Russian invasion; and it can also become an additional incentive for domestic agricultural enterprises to publish their non-financial information.

Results of the study. With regard to the level of achievement of UN Sustainable Development Goals, Ukraine is ranked 38th in the world, with an indicator of 76.52 points out of 100 points possible in total (Sachs J., Lafortune G., Fuller G., Drumm E. [15]). This ranking is based on assessing climate-smart practices in economic activity at the micro level.

In general, sustainable development is a managed development that involves managing economic, social, and environmental processes using a systemic approach

[1] The name of the company stems from the abbreviation in German, which stands for the German Institute of Sustainable Agriculture – Deutsches Institut fuer Nachhaltige Agrarkultur (DINAK).

and modern information technologies. Modern information technologies, particularly analytical and modelling tools, allow for quick and accurate assessments of various development strategies and their impact on the economy, society, and the environment.

Nicholas Georgescu-Roegen's research, which combines thermodynamics with environmental economics, shows that the economy's development must consider the limitations of natural resources and environmental factors (Pyrikov O. [16]).

A graphic representation of the relationship between production and consumption pressures on the environment illustrates the importance of balancing economic development and environmental sustainability (Figure 1).

Figure 1 shows that unwise production and consumption can lead to negative environmental impacts, which will backfire, creating a vicious cycle. This proves the need to manage these processes using sustainability measurement systems.

One of the successful examples of such systems is the one developed by the German company Dinak, a subsidiary of the agricultural consulting company IAK Agrar Consulting GmbH (which assesses economic and social sustainability using the Dinak system) and the engineering bureau INL (which assesses the environmental sustainability indicators of the Dinak system). The Dinak system is particularly relevant for a more in-depth scientific scrutiny, as it specializes in a comprehensive assessment of the sustainability indicators of agricultural operations and also serves as a basis for certification of agricultural enterprises upon their compliance with sustainable development requirements.

The requirements of stock exchanges, banks, and insurance companies to verify compliance with the criteria of sustainable development for the listing of companies' stocks before listings, providing loans and concluding insurance agreements reflect the growing attention paid to social responsibility and environmental sustainability. However, the measurement of sustainable development and the disclosure of non-financial information not only accompany access to capital but also contribute to the balanced development of the industry, ensuring the achievement of the strategic climate goals of the UN [17] and the European Green Deal.

The evaluation of the sustainability of agricultural operations using the Dinak system is based on a comprehensive analysis of about 30 environmental, economic, and social indicators.

The assessment is based on a wide range of data from different sources, such as the field register, accounting system, and financial reports. These data are needed for a reliable assessment of the real state of agricultural activity and its impact on the environment and society.

Actual data are processed using proven algorithms that allow determining the farm's level of compliance with reference criteria. The assessment results are summarized in a report sent to the assessed farm/enterprise. Thus, the enterprise receives an objective assessment of its level of sustainable development and can determine the goals and measures to improve its indicators in the future.

In the Dinak system, the process of assessing the sustainability of agricultural operations is subdivided into three main stages, each of which plays an important role in ensuring the assessment's objectivity and accuracy.

Stage 1. This stage includes establishing communication between the Dinak's evaluators and a farm's representatives and exchanging necessary information and documents regarding the evaluation.

Stage 2. Next, the analysis and assessment of agricultural operations are carried out according to a wide range of indicators. These indicators cover the farm's environmental, economic, and social aspects.

All values are scored from 0 to 1, where the range from 0.75 to 1 is classified as stable and is displayed in green on the chart. We further review these indicators in detail.

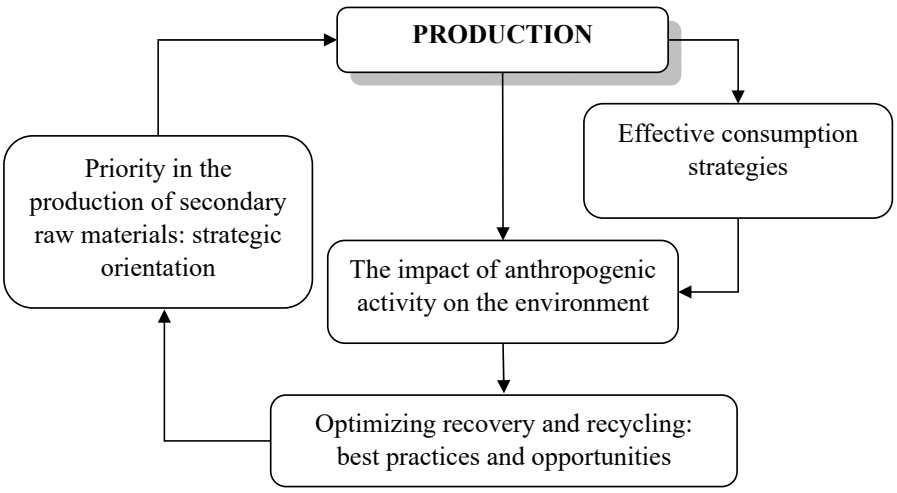

Figure 1. The impact of production and consumption on the environment: graphic representation and interaction

Source: developed by the authors based on Pyrikov O. [16]

2.1. Ecology. *Humus balance* is an important indicator in the agroecosystem, as it plays a key role in the nutritional support of the soil and its structure. The method of humus units (Figure 2) allows to determine the effectiveness of agricultural practices in preserving and increasing the amount of humus in the soil. This enables agronomists and farmers to adjust their management methods in a timely manner to maximize the soil's potential and ensure the conservation of natural resources and sustainable production without harming the environment.

The optimal humus balance ranges from -110 to 150 kg/C/ha, which corresponds to 0.75 to 1 point in the green zone on the chart.

Nitrogen balance is one of the most important factors affecting crop yields. An optimal level of nitrogen helps plants develop and grow, providing them with the necessary nutrients for fruit formation. An excessive amount of nitrogen can lead to soil composting or contamination of water sources with emissions of nitrogenous compounds.

The optimal nitrogen balance is between -15 and 65 kg/N/ha, which corresponds to 0.75 to 1 point in the green zone on the chart. This range promotes healthy plant growth, increases yield, and ensures the ecological sustainability of crops.

Phosphorus balance. Phosphorus contributes to the formation of plants' root systems, increases resistance to stressful conditions, and improves the quality of fruits. A lack of phosphorus can lead to a decrease in productivity and a disturbance in the balance of plant nutrition, which can negatively affect agriculture.

The phosphorus balance scale is determined from -7.5 to 3 kg/P/ha, and the green zone of the chart corresponds to 0.75 to 1 point. In such conditions, plants can effectively use phosphorus for their life cycle, including photosynthesis, root system growth, and fruit formation.

The intensity of crop protection affects crop quality, human health and the environment. Effective plant protection methods help prevent the spread of diseases and pests, ensuring product quality and preserving soil fertility.

Water erosion is a severe threat to the sustainability of the agroecosystem, as it can lead to the loss of the fertile soil layer and the pollution of water resources. Effective measures to control water erosion, such as soil cultivation, considering its properties, terracing, planting cover crops, and planting protective forest strips, can significantly reduce the risk of this problem.

According to Dinak's calculations, the 4 t/ha water erosion value corresponds to the lower limit of 0.75 green zone points.

Crop production's energy intensity includes direct energy consumption (fuel, electricity) and indirect energy consumption (equipment, machines, and devices). Effective energy use in crop and livestock production helps reduce greenhouse gas emissions and contributes to the sustainable development of the agricultural sector.

The optimal energy balance ranges from 100 to 250 MJ/GE, which corresponds to 0.75 to 1 point in the green zone on the chart. Modern agrotechnical methods, including optimal fertilization, rational watering, and the selection of appropriate plant varieties, can help achieve such an energy balance.

Parsimonious use of energy helps reduce costs and the impact of agriculture on the environment.

The greenhouse gas (GHG) balance of crop production includes the following:

– Direct and indirect emission sources;

– Nitrogen oxide emissions from the soil;

– Carbon sequestration or release.

Monitoring GHG emissions allows to identify the largest sources of pollution and develop strategies to reduce them.

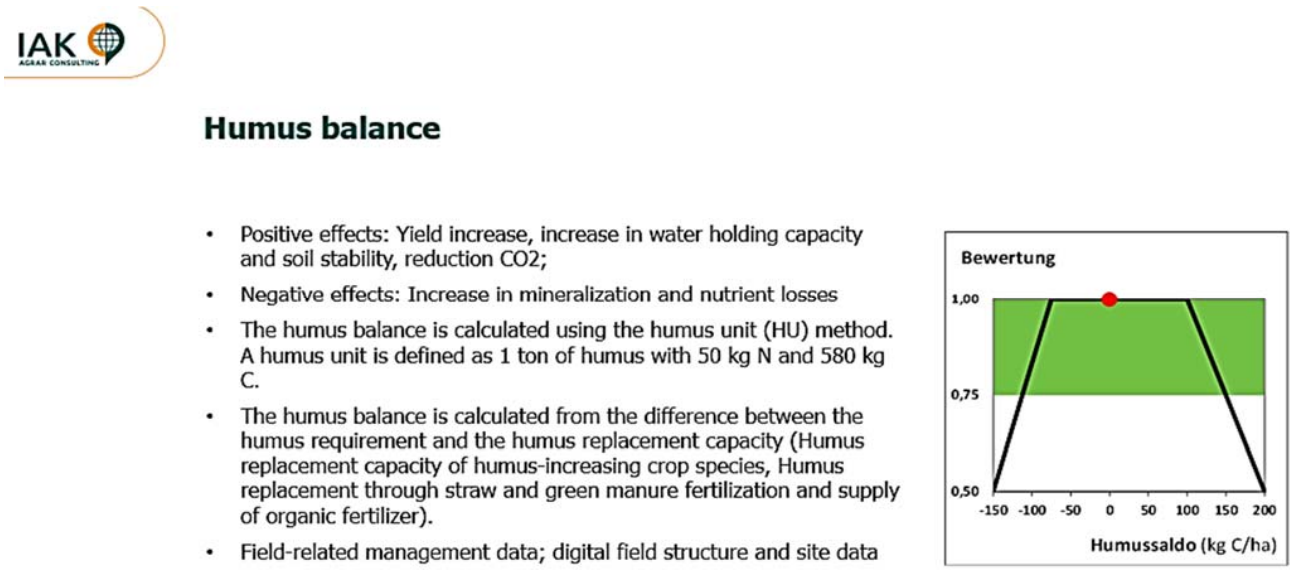

Figure 2. Assessment of humus balance in Dinak

Source: [13]

Dinak estimates that the best greenhouse gas balance for crop production is between 15 and 40 kg CO2eq/GE, corresponding to 0.75 to 1 point in the green zone on the chart.

The enterprise can achieve such a balance by implementing effective agrotechnological practices, such as reducing nitrogen fertilizers, storing carbon in the soil through green manure or agroforestry, and using alternative energy sources.

Proper management of greenhouse gases helps preserve biodiversity, reduce the risk of climate change, and increase the resilience of agroecosystems.

Biodiversity potential is assessed using 11 sub-indicators that show the diversity of living organisms in specific areas of impact. It helps to understand the level of biological diversity and take measures to preserve and support it.

Dinak's biodiversity potential score of 0.81 indicates a high level of diversity of flora and fauna, which may include various species of plants, animals and microorganisms.

Preservation and maintenance of biodiversity are key tasks for sustainable development, as they contribute to the balanced functioning of ecosystems, soil health, regulation of climate change, and improvement of the quality of life in rural areas. To preserve and restore biodiversity, enterprises should protect natural lands, create nature reserves, support ecologically clean agriculture, and reduce the loss of natural environments.

Effective feeding of animals with nitrogen and phosphorus involves analyzing the intake of nitrogen and phosphorus during feeding and their use in the production of products. Analysis helps to rationalize the use of nutrients to ensure high-quality products.

The Dinak method evaluates the nitrogen and phosphorus feeding efficiency of cattle, showing that the best range is between 90 and 120%, which corresponds to a score of 0.75 to 1 point in the green area of the chart. This indicates the effective use of nitrogen and phosphorus in feeding animals. That is, animals effectively absorb nitrogen obtained from feed during their growth for the production of meat or milk.

The optimal level of nitrogen and phosphorus efficiency in feeding cattle is achieved through the rational use of fodder, optimization of rations, and implementation of effective manure management systems. This contributes to reducing unproductive nitrogen and phosphorus losses in the environment, which is important for preserving the quality of water resources and preventing pollution of water ecosystems.

Energy intensity of animal husbandry. To evaluate this indicator, the technological modules of animal husbandry are studied, and the value of 80 MJ/kg eP corresponds to 0.75 points, which is the lower limit of the green zone on the chart.

The GHG balance of animal husbandry covers the measurement of CO2 emissions from direct and indirect energy use, as well as emissions of CH4, N2O, and NH3. These volumes affect air quality and climate change. Therefore, their assessment helps determine ways to reduce the negative impact of animal husbandry on the environment. The volume of emissions of 40 kg CO2eq/kg eP corresponds to a score of 0.75 and certifies the lower limit value of the green zone on the chart.

Animal welfare is assessed using sub-indicators of housing environment, animal performance, health and behavior, which helps to take measures to ensure their comfort and health.

According to Dinak's measurement, the optimal level of animal welfare is between 75 and 100%, corresponding to scores from 0.75 to 1 in the green zone on the chart. The farm's ability to meet the highest standards of animal husbandry allows it to ensure product quality, achieve food safety for human health and the sustainability of agricultural systems as a whole.

2.2. Economy. The Dinak system measures also several economic indicators of sustainable development.

Exhaustion of the service limit of long-term capital. This indicator shows the limit up to which debt service is sustainable for the enterprise in the long term. A value of 80% corresponds to 0.75 points in the green zone of the measurement chart.

Cash flow margin provides information about the internal financial strength of the enterprise and indicates what percentage of sales can be used to repay debts, pay dividends or invest. Values from 5 to 17% correspond to an estimated 0.75 to 1 point, indicating a stable development level.

Return on equity capital is determined by the ratio of profit to the enterprise's equity, which reflects the level of its attractiveness to investors. According to the Dinak methodology, the sustainable indicator corresponds to a 6 to 12% value.

Return on assets indicates profitability and describes the profit ratio to the debt and equity capital involved. This indicator reflects the percentage of profit in the capital invested in the enterprise. A value of 5% corresponds to the lower limit of sustainable development of 0.75 points, and starting from 11%, 1 point is applied – the upper limit of the zone of sustainable development.

Relative factor remuneration expresses the level at which the company's revenue remains sufficient to pay for the used production factors: labor, land, and capital. The sustainable indicator corresponds to the value of 90%.

Net investment rate is an indicator that shows the increase in the value of the enterprise's assets compared to the value reduced by depreciation and disposal. Evidence of sustainable use of assets is the value of 90% (0.75 points). Starting from 110%, 1 point is assigned to indicate the upper level of sustainable development.

The equity ratio is used to determine the financial stability of the enterprise. The higher the equity ratio, the more capital the enterprise has to e.g. overcome a crisis. Starting from 30%, 1 point is applied in the green zone on the evaluation chart.

Return on sales is calculated by dividing the operating result by the operating income. The higher its value, the more efficiently the enterprise works and the safer it can survive crises with reduced producer prices. The level of 2% corresponds to 0.75 points, and starting

from 6%, 1 point is applied in the green zone on the evaluation chart.

Risk management. Identification, assessment, management, and control of possible sources of uncertainty help reduce the risks' impact on the enterprise's financial stability. Risks and the use of risk management tools are determined using a questionnaire. A sustainable level of the indicator starts at the value of 50%.

Compliance means that the enterprise follows legal norms and instructions. A compliance management system is a set of measures taken within the compliance framework, as well as their coordination and improvement. A questionnaire is used to assess the share of fulfilled compliance requirements. The level is considered stable/sustainable if this share is more than 50%.

2.3. The social sphere of sustainable development includes several aspects.

Wage and Salary. Fair remuneration should motivate employees. According to the Dinak approach, the salary level is considered as stable if it ranges from 85% (0.75 points) to 115% of the average hourly wage or more (1 point). At the same time, such assessment takes into account the employee's educational and qualification level.

Working time. Irregular working hours reduce productivity and harm employees' health. This problem is inherent in agriculture, especially during the sowing or harvesting period. According to the Dinak method, working more than 50 hours a week is evidence of unsustainable enterprise development.

Education and Training contributes to the technical and social progress of the enterprise, thus increasing its competitiveness. According to the Dinak approach, the sustainable development indicator is achieved at the value of 1.25 points, corresponding to the lower limit of the green zone of the chart.

Share of females. Women are under-represented among workers in the agricultural sector, while mixed teams are considered an effective source of good work atmosphere. Dinak suggests evaluating the number of female employees relative to the total number of employees. At the same time, the number from 30 to 70% is recognized as a stable level.

Gender equality in remuneration. Gender-neutral pay is considered an important prerequisite for equality. The ratio of average hourly wages between women and men is calculated to depict gender equality in remuneration. The enterprise calculates this indicator if at least two men and women with the same qualifications work to ensure a meaningful result. A value from 0 to 4% is considered constant in the green zone of the chart.

Vacation days used. Vacation is an integral part of work, as it help to restore labor resources. In the Dinak system, if the number of used vacation days per employee per year is more than 25 days, then this indicator corresponds to a sustainable level of development.

The age structure is determined by the enterprise's employees' average age based on their birth year. This indicator makes it possible to assess the balance between young specialists who can bring new ideas and energy and experienced employees who have deep knowledge and experience. An age structure analysis can indicate potential risks, such as loss of experience due to the retirement of skilled employees. The enterprise also considers this indicator when developing programs to support the career growth of the workforce. The optimal age is considered to be from 30 to 50 years.

Occupational health and safety. This indicator is defined as the number of accidents at the enterprise. Accidents due to safety violations are given more attention. 2 accidents per year per employee are considered acceptable.

There is an urgent need to reduce the number of accidents and incidents of safety violations to ensure a healthy and safe work environment for employees, as this affects their physical and psychological health, motivation, productivity, as well as the enterprise's costs for compensation for injuries and lost working time.

Social obligations refer to the enterprise's sense of responsibility to society. Here, the assessment is carried out using a questionnaire, which allows one to assess the enterprise's social activity during the reporting period: voluntary road maintenance, voluntary creation of nurseries and flower strips, and participation in village development projects.

Dinak presents the result of the sustainable development assessment in two formats: in the form of a figure with indicators in percentages and the form of a chart with indicators in points. Each of these formats can provide helpful information for analysis and decision-making.

Figure with indicators in percentages. This format of graphical presentation of the results of the sustainable development assessment allows to understand what share of the total assessment each aspect of sustainable development represents. Percentage indicators enable users to compare the results in different areas and determine further priority measures. For example, suppose the indicator of economic sustainability is 60%, and environmental sustainability is only 20%. In that case, this may indicate the need to improve environmental indicators to achieve a more balanced development.

Chart with indicators in points. This type of graphical presentation of the assessment results makes it possible to assess each indicator in detail on the scale. This helps to identify specific strengths and weaknesses in different aspects of sustainable development. For example, an optimal indicator of nitrogen balance and a suboptimal phosphorus balance may indicate the need to improve methods of fertilizer application.

After carrying out a sustainability assessment, Dinak company provides the customer with a report that reflects all aspects of the assessment, including environmental, social and economic indicators. In addition, the company offers recommendations for improving the enterprise's sustainable development level. These recommendations may include specific measures aimed at reducing the negative impact on the environment, improving working conditions and

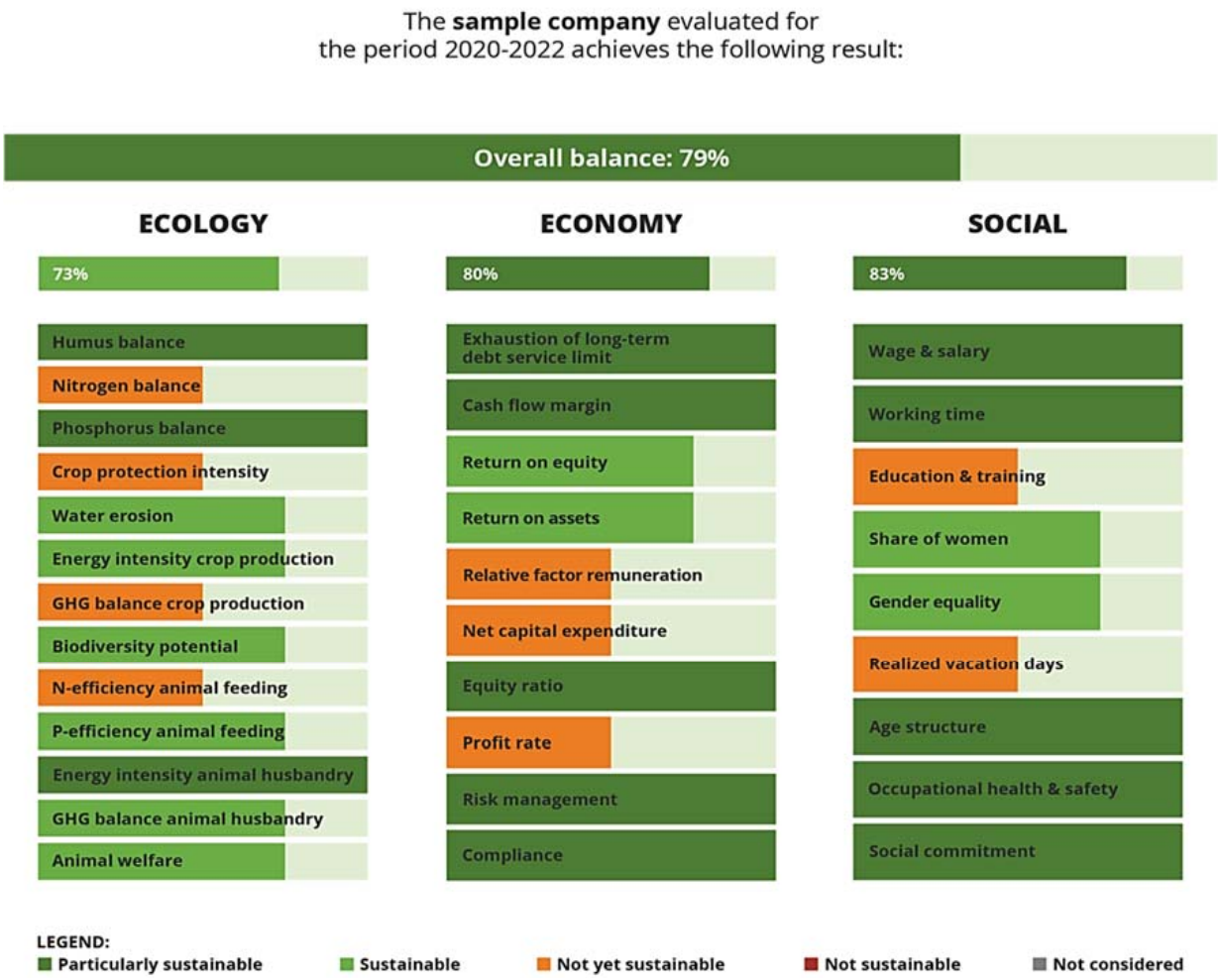

Figure 3. The result of the sustainability assessment in Dinak. The range of sustainable development is from 75 to 100%

Source: [13]

social standards, and increasing the economic efficiency of the enterprise.

Stage 3. Upon completing the assessment and verifying the compliance with sustainable development standards, the enterprise receives a certificate confirming its use of sustainable agricultural practices. The enterprise can use such a certificate for concluding contracts with banks and insurance companies as it increases their trust in the enterprise and contributes to the possibility of raising funds for the development of the enterprise, often at more favorable conditions.

Dinak certifies the quality of agricultural products and confirms the enterprise's compliance with sustainable development standards using the sign/seal "Sustainable agriculture" (Figure 5).

The certificate's validity period is three years, which indicates constant control and periodic inspection of product quality for compliance with the established standards of sustainable development.

An overview of the Dinak's sustainability indicators is complemented by its SWOT analysis (Table 1). The strengths and opportunities of this system enable agricultural enterprises of Ukraine to determine the ease and usefulness of its application for evaluation of the results of implementation of environmentally friendly technologies and socially responsible practices.

Undoubtedly, such systems as Dinak should and can be adapted to the specifics of agricultural production in Ukraine so as to assess possible risks and opportunities in the conditions of external military aggression. This way the conducted SWOT analysis generally supports the hypothesis of this study.

Conclusions. Assessing the level of sustainable development in the agricultural sector allows users to identify production methods that contribute to resource conservation and reduction of negative impact on environment. This is also important from the point of view of access to international markets of goods and services because the EU as one of the major importing regions continues to strengthen its decarbonization and innovation requirements toward value chains.

Achievements in ecological production and compliance with social norms, which are assessed using sustainability measurement systems and presented in non-financial reporting, should be recognized as a

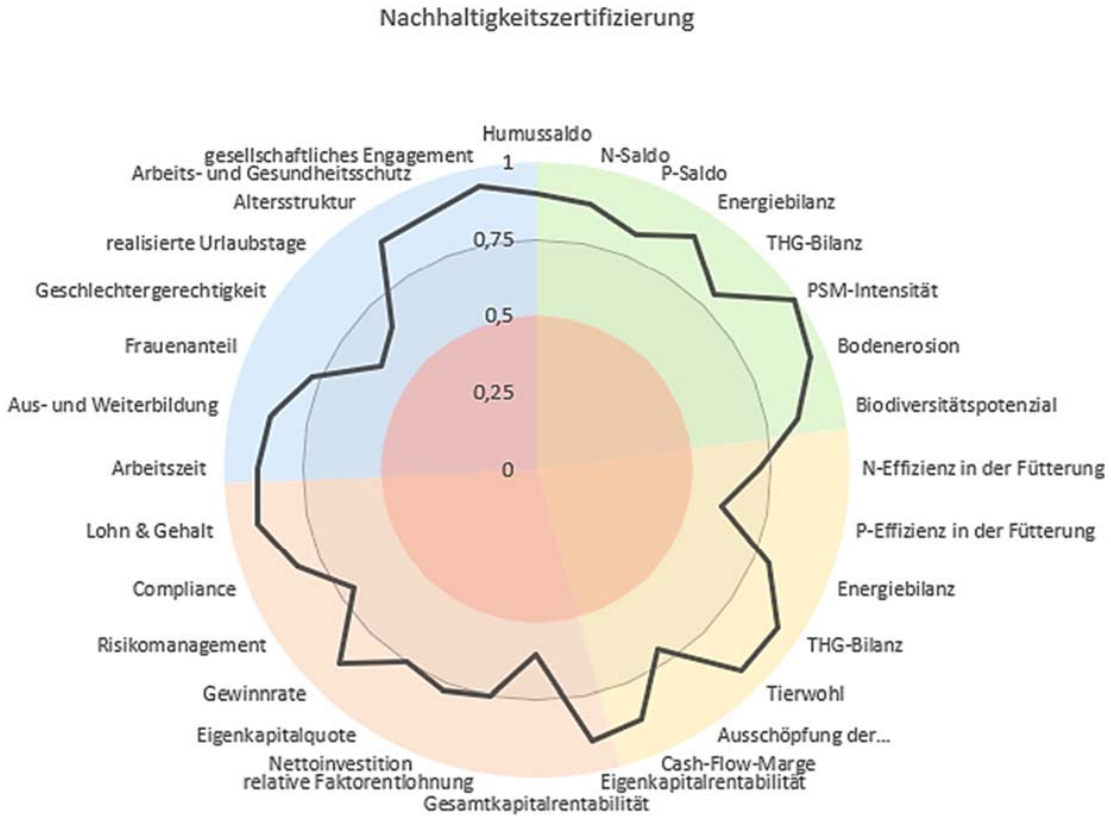

Figure 4. The result of the sustainability assessment in Dinak. The range of sustainable development is from 0 to 1 point

Source: [13]

Table 1

SWOT analysis of the Dinak system

Strengths: High level of competence in technological expertise. Assessment of sustainable development using qualitative, quantitative and cost indicators. Application of questionnaires for in-depth analysis. Use of a wide range of statistical data. Narrow specialization in measuring sustainable practices in agricultural production. Providing a report and certification for compliance with sustainable development standards. Good reputation in the consulting services market.	**Weaknesses:** Limited access (demo version, short-term access) for interested non-client users to "get the feeling" of the system.
Opportunities: The estimate's accuracy is increasing due to new customer data. Attracting new customers through investments in developing and expanding the range of services. Software updates. Establishing partnerships and concluding strategic agreements to enter new sales markets. Creation of a network for sharing experiences of sustainable practices among clients.	**Threats:** Growing competition from companies offering similar products or services on the market. Frequent and ongoing changes in EU legislation related to the EU Green Deal. Changes in client sentiment regarding the need for sustainability assessment. Introducing new measurement technologies may require significant capital investments in research, e.g. data collection, and development. Limited sales markets for consulting services in regions with low purchasing power.

Source: developed by the authors

Figure 5. DINAK quality mark "Sustainable culture of agriculture"

Source: [13]

competitive advantage of agribusiness when entering international financial and product sales markets.

Knowledge and experience of implementation of sustainability assessment systems such as Dinak is very important for Ukrainian agribusiness. A wide range of indicators of this system, which covers ecological, economic and social aspects of agricultural activity, allows to get a comprehensive understanding of the enterprise's sustainability level. In addition, the certification process for compliance with sustainable development standards can serve as an additional incentive for agribusiness entities to implement environmentally friendly technologies and socially responsible practices. In turn, disclosing non-financial indicators in sustainable development reporting can increase the transparency of Ukraine's agricultural sector and attract international investments in the development of green technologies to improve the competitiveness of domestic enterprises in the international markets of goods and services.

Now, when the leading trading partner of Ukraine – the European Union – is increasing the requirements for product manufacturers in terms of decarbonization, energy saving and innovation, Ukrainian agricultural enterprises should be ready to demonstrate their compliance with these requirements.

The study of sustainability measurement systems, such as Dinak, should be recognized as a promising area of scientific research. In-depth studies in this area contribute to the creation of institutional foundations for sustainable development, including but not limited to the development of markets for sustainable finance and related services, such as country-, region-, sector- and enterprise-specific sustainability consulting, measurement and reporting systems. From the practical perspective, such studies help Ukrainian enterprises to monitor, control and report on compliance with European sustainability standards, which is particularly important in the view of Ukraine's EU integration and access to international funds for sustainable reconstruction investments.

Among other things, sustainability measurement and reporting can help to avoid costs such as the EU's import carbon tax, which is currently in a transitional phase until 2026. In this context, Ukrainian agricultural producers would have to speed up in engaging in sustainability measurement and reporting if they would want to be prepared for competition on the EU markets. As part of such preparation, it is vital to use international experience to raise the awareness of issues of sustainable development among agricultural enterprises in Ukraine.

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СЕРТИФІКАЦІЯ ВІДПОВІДНОСТІ СТАНДАРТАМ СТАЛОГО РОЗВИТКУ В АГРОСЕКТОРІ (НА ПРИКЛАДІ DINAK)

Анотація. Впровадження нового механізму контролю викидів вуглекислого газу, які пов’язані з виробництвом та імпортом продукції в країни ЄС, є серйозним викликом для українського агробізнесу. Крім того, впровадження українськими аграрними підприємствами практик вимірювання сталого розвитку є важливим індикатором для інвесторів та міжнародних партнерів в контексті післявоєнної відбудови аграрного сектора. Метою дослідження є науково-обґрунтована експертиза однієї з систем вимірювання сталого розвитку, впроваджуваних у ЄС, та оцінка її можливостей для використання агробізнесом України у період воєнного стану та післявоєнної відбудови. Без використання таких систем підготовка звітності сталого розвитку ускладнюється, що, в свою чергу, створює ризики для експорту аграрної продукції у близькому майбутньому. Методологічною основою дослідження є SWOT аналіз в поєднанні з методами індукції та дедукції, порівняння та логічного узагальнення. Об’єктом дослідження є система вимірювання сталого розвитку німецької компанії Dinak. Розкрито вплив виробництва та споживання на навколишнє середовище, що обумовлює необхідність вимірювання та контролю еколого-економічних аспектів аграрного виробництва. Компанія Dinak не лише спеціалізується на комплексній оцінці показників стійкості сільськогосподарських операцій, але й проводить сертифікацію на відповідність сталому розвитку. Завдяки цьому інструментарій Dinak є актуальним для українських аграрних підприємств. У статті детально описано етапи та структуру показників оцінки стійкості сільськогосподарських операцій за допомогою системи Dinak, що дозволило

авторам виявити сильні та слабкі сторони цієї системи. Доведено, що досвід функціонування таких систем оцінки сталого розвитку, як Dinak, має велике значення для українського агробізнесу. Широкий спектр показників цієї системи, який охоплює екологічні, економічні та соціальні аспекти сільськогосподарської діяльності, дозволяє отримати комплексне розуміння рівня сталого розвитку підприємства. Крім того, процес сертифікації на предмет відповідності стандартам сталого розвитку може слугувати додатковим стимулом для суб'єктів агробізнесу впроваджувати екологічно чисті технології та соціально відповідальні практики.

Ключові слова: агробізнес, сталий розвиток, вимірювання стійкості сільськогосподарських операцій, нефінансова звітність, система Dinak, стала культура сільського господарства.