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APPLICATION OF ACCOUNTING FOR THE ASSESSMENT OF WAR LOSSES FOR AGRIBUSINESS ENTERPRISES OF UKRAINE

Purpose. *The military aggression of the russian federation against Ukraine led to the disruption of logistics processes and the destruction of the production capacity of the agribusiness. This study aims to describe an accounting toolkit to determine and evaluate the direct losses of agricultural enterprises due to the war.*

Methodology / approach. *This study is based on the use of Ukrainian regulatory documents. The authors of this study applied synthesis methods when summarizing information on estimates of war damage. They used analytical methods in monitoring the world and national experience of such assessment. The cost method was used during the approbation. It provided for the use of the estimate program "Building technologies: Estimate 8". Determining the volumes of repair and construction works was carried out in accordance with the State Construction Standards and Resource Elemental Estimate Standards of Ukraine. In addition, modelling, analogy and comparison methods were also used.*

Results. *In this study, the authors proposed a simple algorithm of actions, which allows for detecting direct damage by enterprises in a short time. The algorithm is based on the use of five accounting methods: (1) Inventory method, (2) Documentation method, (3) Evaluation method, (4) Accounts and balance method, (5) Reporting method. The specifics of the application of each method are described in detail, taking into account the requirements of accounting legislation for the recognition and assessment, and inventory of assets of agribusiness enterprises. Experimental calculations (using the example of damage to real estate as a result of hostilities) allowed us to conclude that the damage calculated by the individual (object-by-object) approach (USD 63.88 billion) is 30 % higher than the quick estimate of the World Bank (USD 50.4 billion) and 20 % higher than expert estimates made in Ukraine (USD 50.4 billion).*

Originality / scientific novelty. *According to the research results, a methodical algorithm to estimate direct war losses for Ukrainian agribusiness enterprises based on accounting methods has been proposed. Using accounting tools to evaluate the direct losses is essential for the following reason. Let's suppose that the accounting system does not confirm the data on direct losses. In this case, misunderstandings may arise between the participants of socio-economic relations, who operate with general (forecasted) figures. At the same time, verified accounting data on direct losses can be evidence in court and are the basis for receiving compensation or financial assistance.*

Practical value / implications. *The practical significance of the proposed methodical algorithm lies in the ability to systematically recognize and assess direct losses of agribusiness enterprises, taking into account the specifics of their assets, based on the accountant's professional judgment, without the involvement of outside experts.*

Key words: *accounting methods, accountant's professional judgment, consequences of war, inventory, direct losses, damage assessment, agribusiness enterprises.*

Introduction and review of literature. Agribusiness is a successful branch in the Ukrainian economy. In the entire recent history of Ukraine, it has never had a negative foreign economic balance of payments. However, the military aggression of the russian federation against Ukraine led to the disruption of logistics processes and the destruction of the production capacity of the agribusiness. Russian invaders deliberately mine fields, steal and undermine agricultural equipment, destroy agricultural infrastructure, rob grain stocks, and block Ukrainian Black Sea ports. With continued hostilities, it is difficult to assess the scale of destruction and damage. Therefore, it is important to fix and document them at this stage to receive international or state assistance later. In addition, the government calls on agricultural enterprises to record all the loss of property and the destruction of production infrastructure to form an evidence base for the crimes of russian troops in Ukraine.

According to the research, on the 181st day of Ukrainian resistance, the war cost Ukrainian farmers and agribusiness companies USD 23 billion in lost profits, destroyed equipment, and transportation costs [1]. However, the war continues, and therefore the direct losses of agribusiness are increasing daily.

Evaluation and fixation of business transactions in the enterprise is a function of accounting. In wartime, along with the usual operational processes, the accountant must carefully record the direct damage caused to agricultural enterprises as a result of the armed aggression of the russian federation. However, a centralized (with the participation of the Ministry of Finance of Ukraine or the Ministry of Agrarian Policy and Food of Ukraine) methodological support of such a process has not been developed yet, which creates certain difficulties and actualizes the scientific search for a solution to this problem.

Armed conflicts cause enormous damage to the environment. G. Mitri states that repetitive armed conflicts may be directly and indirectly responsible for severe biophysical modification to the environment. This makes the land more susceptible to degradation [2]. The researcher made such conclusions based on assessing the consequences of military conflicts in Northern Lebanon.

In 2020, the Conflict and Environment Observatory [3] published a report called "How does war damage the environment?" and summarized the main ways how wars and militarism damage the environment. Since the outbreak of hostilities in Ukraine, CEOBS has been actively monitoring the situation and regularly publishing reports on environmental damage. The report says: "The invasion of Ukraine has once again highlighted the threat posed by wars to the environment. The environment suffers before, during and after armed conflicts, as well as in situations of occupation" [3].

Agribusiness is based on the use of natural environment components – agricultural land, biological assets, and water resources. The damage caused by these components is direct damage to agricultural enterprises, so it must be recorded as a force majeure factor affecting economic activity.

Over the years of modern history, Ukraine experienced a second full-scale military aggression, which caused direct damage to business entities in all industries. However, after 2014, Ukrainian researchers almost did not study the problems of

assessing and fixing the economic consequences of hostilities in the Donbas. A few articles disclose the legal issues of property loss in occupied territories. As for the economic consequences, only N. Vygovska and A. Polchanov assessed Ukraine's losses of financial potential from the military conflict [4]. Before the full-scale war in scientific research, accounting became a means of measuring processes that are functionally not characteristic of it, but very important for society: sustainable development [5], capitalization of national wealth [6], interdisciplinary accounting research [7], visual accounts [8], competition [9], ensuring economic security [10]. In 2018, in the research of O. Gorai, the theoretical foundations and organizational and methodological provisions of the accounting of the consequences of hostilities and the occupation of state territories are substantiated [11].

More and more foreign researchers consider accounting as inseparable from business information systems [12; 13; 14]. At the same time, research by foreign scientists shows that accounting is a tool for measuring and assessing losses in various areas of economic activity. Research by M.-X. Wang et al. [15] is devoted to loss accounting of environmental pollution within Pearl River Delta region, South China. The work of Y. Feng et al. [16] is significant because it proposes different methods for calculating human and non-human damage caused by pollution. A decrease in the value of the assets of enterprises due to direct damage or destruction, as well as a decrease in expected benefits due to the deterioration of the external environment in which the business operates, are the consequences of the russian federation's armed aggression in Ukraine. Therefore, the issue of accounting approaches and procedures for assessing losses from asset impairment becomes relevant [17].

Y. Ishchenko et al. [18] state that managing the Ukrainian agricultural business in war conditions requires changes in accounting policies and taxation mechanisms. The researchers substantiated the expediency of liberalizing the requirements for primary accounting for a special period, which will allow adapting the documentation system to the specifics of the organization of economic processes under martial law. In their research, the property of enterprises is singled out as a specific object of accounting, which became unsuitable for use due to its territorial location in the zone of active hostilities, in the zone of temporary occupation, or other war-negative factors.

In wartime, there is necessary to introduce a regional policy coordinated with bodies of the State tax service concerning the application of accelerated depreciation rates in the territories where active military actions occur. Although the national accounting standard 7 "Fixed assets", allows doubling the depreciation rate and revising the useful life of fixed assets, it does not clarify the depreciation policy of wartime [19].

Therefore, an actual direction of scientific research is to reveal the possibilities of a wider application of accounting tools for assessing and accounting for the consequences of war. In particular, accounting tools should also be used to confirm the amount of direct losses caused to Ukrainian agribusiness by the war. Since the manipulation of unconfirmed amounts of direct losses for political or other purposes can lead to a decrease in trust in the country and other negative consequences described

in the research of P. Archel et al. [20].

The purpose of the article is to describe an accounting toolkit to determine and evaluate the direct losses suffered by agricultural enterprises due to the war.

Methodology. On February 2023, the total damage caused to Ukraine's infrastructure due to a full-scale russian invasion was USD 147,5 billion (at replacement cost). In particular, the direct losses caused to the agro-industrial complex and land resources increased by USD 2.1 billion. Currently, the estimate of losses in this area reaches USD 8.9 billion [21]. Scientists of the National Scientific Centre "Institute of Agrarian Economics" have developed a method to document and estimate the cost of these losses for individual enterprises of the agrarian sector. Therefore, the objectives of this study are as follows:

1) to offer the enterprise's accountant methods for:
   a) collection of information on every object's losses and general losses;
   b) writing off losses in accounting and tax accounting;
   c) fixing losses on state e-resources;

2) to ensure state management with the information on the volume of losses and an information base for the objective distribution of compensation/support;

3) to ensure the collection of evidence for litigation.

This study is based on the use of the following regulatory documents:

- Decree of the President of Ukraine "Question of the National Council for the restoration of Ukraine from the consequences of the war" dated April 21, 2022 No. 266/2022;

- Decree of the Cabinet of Ministers of Ukraine "On approval of the procedure for determining the harm and damage caused to Ukraine as a result of the armed aggression of the russian federation" dated March 20, 2022 No. 326;

- Regulation on the inventory of assets and liabilities, approved by the Ministry of Finance of Ukraine dated 02.09.2014 No. 879.

The authors of this study have practical experience in accounting, so they applied the accountant's professional judgment to identify opportunities for display direct damage in the enterprise's accounting system. In addition, modelling, analogy and comparison methods were also used.

The procedures and principles of inventory, documentation and also collection, storage, and distribution of information in a digitalized management environment are the base for the developed organizational and methodical foundations of accounting for the direct damage caused to agricultural enterprises due to the armed aggression of the russian federation.

The results of this study were tested in practice at enterprises that are members of the Agrarian Union of Ukraine and the Association of Farmers and Private Landowners of Ukraine.

Results and discussion. The second year of the full-scale war of the russian federation against Ukraine continues, which has brought enormous damage to a business, especially to the subjects of the agricultural sector. For an agricultural enterprise, losses caused by hostilities can be divided into two types:

a) direct losses – the amount of complete/partial destruction, damage, theft of property, stocks, work in progress, capital investments and other assets (accounting objects). To assess such losses, accounting tools are used;

b) indirect losses/lost profit – the amount of damage from the complete/partial exclusion of the production of ordinary economic activities, including land use and loss of productivity of biological assets. Analytical and statistical methods are used to estimate such losses.

In Ukraine, the monetary valuation of enterprise property (and therefore its losses) is the prerogative of independent appraisers, whose activities are regulated by the Law of Ukraine "On valuation of property, property rights and professional appraisal activities in Ukraine," dated 07.12.2001 No. 2658-III. This law defines the legal basis for property valuation, property rights, and professional valuation activities in Ukraine, its state and public regulation, ensuring the creation of a system of independent property valuation to protect the legitimate interests of the state and other subjects of legal relations in matters of property valuation, property rights and using its results.

However, the power of independent appraisers is not enough to assess all scales of losses, both in the agribusiness sphere and in other spheres of the economy. In addition, the issue of paying for their services will immediately arise, placing an additional burden on the shoulders of business entities. Therefore, involving the accounting community in calculating the losses caused to agricultural enterprises by the war seems appropriate. Arguments in favor of this approach are given in Table 1.

Table 1

The organizational basics for the agricultural enterprises' damage assessment: comparison of advantages and disadvantages

Approaches / Potential of specialists	Valuation	Benefits	Disadvantages
Accounting approach The number of accountants is over *500.0 thsd people*	- at historical cost; - at fair value	- mass application; - short deadlines; - minimum costs	- personnel training; - the complexity of the market assessment
Expert approach The number of evaluators is *4.2 thsd people* The number of experts is *0.3 thsd people*	- at market value	- professionalism of personnel; - market assessment	- at the expense of the victim; - limited opportunities in terms of time and scope; - complexity

Source: developed by the authors.

Practice shows that the accounting approach can be applied in shorter terms and, practically, at every enterprise. In addition, the accountant is the first to determine losses using the primary inventory method as soon as the territory has been liberated, and the company independently determines the possibilities of resuming its activities. This practice (of post-war inventory) is already taking place today at the enterprises of Lyman in the Donetsk region.

Assessing losses is more complex than determining the actual availability of property or other assets. For this, it will be necessary to conduct certain professional training among accountants. However, according to our calculations, the financial costs of the professional development of accountants are still lower than the costs of independent appraisers' services. So, in wartime conditions, the accounting approach to accounting for enterprise losses is an alternative that can help solve urgent issues of restoring the viability of the business and the state's economy. Today, accountants of agricultural enterprises need methodical support and clarification on assessment, accounting, and documentation of direct losses. Therefore, this study is designed to solve this problem.

Evidence collected and documented by agricultural enterprises will later be used to recover from the aggressor country under "Russia will pay" project, relevant court decisions and other equity initiatives. Several state e-resources have already been launched, designed to record the direct material damage caused: destroyed, stolen and damaged property. Among them:

- the project "Russia will pay", developed by KSE jointly with the Office of the President of Ukraine and the Ministry of Economy of Ukraine;
- a resource for documenting war crimes and crimes against humanity, created by the Office of the Prosecutor General together with Ukrainian and international partners;
- special chatbot Tribunal.ua;
- e-resource "Support";
- a joint platform for collecting evidence of war crimes;
- the only national portal for collecting facts about human rights violations.

To establish the facts of loss, theft, damage or destruction of the property of an agricultural enterprise as a result of hostilities on the territory of Ukraine, an inventory must be carried out. As in other well-known cases, the rules for appointing an inventory commission and conducting an inventory are unchanged. However, below will be disclosed the features of the inventory as a method of accounting, which arise only in the case of fixation and documentation of direct losses.

First of all, to identify direct losses as a result of the war, an inventory should be carried out as soon as possible from the moment property damage was caused by the military actions with video, photographic recording and documentation of the facts revealed. The inventory commission consists of enterprise employees (engineer, agronomist, mechanic, accountant and other specialists) with special knowledge to assess the property's condition that has suffered destruction or damage. To determine the amount of damage, witnesses who are not employees can be involved in the inventory commission of enterprises (for example, employees of the State Emergency Service, representatives of local authorities, police officers, and fellow villagers). Witnesses consent to participate in the inventory by indicating personal data and affixing their signatures to the inventory materials.

In wartime, it may be impossible to issue an order to create a commission or appoint an authorized person. In this case, an enterprise representative can document and form evidence based on the facts of causing direct property damage to an

agricultural enterprise. The representative of the enterprise can be: an initiative employee of the enterprise; a person residing in the territory where the enterprise is located; or another person.

In an emergency threatening health, life or property, the head or representative of an agricultural enterprise must contact the State Emergency Service. After the completion of the work of the employees of the State Emergency Service, it is necessary to make a copy of the act confirming the occurrence of an emergency and damage or destruction of property.

The inventory is carried out following the Regulation on the inventory of assets and liabilities, approved by the Ministry of Finance of Ukraine dated 02.09.2014 No. 879 (after this, the Regulation No. 879). However, in the case of documentation of direct losses, the inventory provides for the implementation of video and photographic fixation of the destroyed or damaged property of an agricultural enterprise.

In the case of registration of the results of the inventory of destroyed, damaged fixed assets, in addition to the inventory descriptions of non-current assets, it is recommended to draw up an Act of Inspection of Fixed Assets. The aggressor must base the manager's decision regarding the date of the inventory on the certainty (assumption) of the subsequent non-repetition of direct damage (after the liberation of the territory, cessation of shelling, etc.). At the same time, photo and video recording, drawing up acts, certificates or other documents regarding destruction, damage, or loss of property must be carried out as soon as possible from the moment of damage.

In addition to the described actions, the manager or representative of the agricultural enterprise should apply to the law enforcement authorities with a statement about the crime and provide evidence of the property destruction. After that, he should get an extract from the Unified Register of Pretrial Investigations.

All collected inventory materials are documentary evidence of direct damage to the agricultural enterprise and are subject to uploading to information bases of state e-resources. Each e-resource has its algorithm of actions (step-by-step instructions) for those who upload data on recorded damage facts. If the agricultural enterprise has its official website or profile on social networks, it can publish the collected evidence. Also, the enterprise can post links to publications by mass media or government agencies, where there is photo or video evidence of damage or destruction of its property. If an agricultural enterprise is obliged or voluntarily prepares and publishes a Management Report, then information on the facts of direct losses from damage caused to it must be published in the "Results of activity" section and taken into account when forming the "Risks" section.

In Ukraine, the mechanism for determining the amount of damages from theft, shortage, and destruction (damage) of material assets (except for precious metals, precious stones, and currency values) is regulated by the Procedure for determining the amount of damages from theft, shortage, destruction (damage) of material assets, approved by the Cabinet of Ministers of Ukraine dated 22.01.1996 No. 116. However, in other countries, the amount of damages may be determined by conducting an independent valuation following international or national valuation standards.

Now the assessment of losses is a relevant issue not only for individual enterprises, but also it is an important task for all state and public institutions of Ukraine. The experience of such an assessment is important for the further development of scientific and methodological approaches to the assessment of damage from wars in the world.

The World Bank with the Government of Ukraine and the European Commission conducted the first official assessment of Ukraine's losses from the war in August 2022. The internationally recognized methodology Damage and Loss Assessment (DaLA) [22] was used to assess the damages and needs of Ukraine, which provides a comprehensive assessment of damages and needs for restoration. The report "Ukraine Rapid Damage and Needs Assessment – August 2022" was based on data as of June 1, 2022, collected in the period from May 30 to July 30, 2022 [23].

The report calculated the need for recovery for USD 349 billion, in particular for the restoration of the infrastructure, production and social sector, which is 1.5 times the GDP of Ukraine in 2021. Taking into account the consequences of the war from February 24 to June 1, 2022, the direct damage caused to the sectors covered by the RDNA was estimated at the level of about USD 97 billion [23], and total losses amounted to USD 252 billion.

In February 2023, the World Bank presented an updated report "Ukraine Rapid Damage and Needs Assessment: February 2022 – February 2023" – RDNA2, in which total losses are rapidly approaching USD 300 billion (Table 2).

Table 2

Assessment of the damage and needs for restoration: calculations of the World Bank, the Government of Ukraine, the European Commission and the United Nations

Indicator	June 1, 2022	February 24, 2023
Damage caused (direct damage), billion USD	97	135
Total losses*, billion USD	252	290
The need to restore the infrastructure, production and social sector, billion USD	349	411

Note. *This refers to the aggregate amount of losses caused by the disruption of economic flows and the functioning of production cycles, as well as the additional costs associated with war.

Source: [23; 24].

The rapid assessment was carried out in a short time frame to ensure that the assessments were up-to-date, and extensive efforts were made to improve the accuracy of the information that was collected, analyzed and verified as much as possible. Given the ongoing nature of the conflict and the lack of access in temporarily non-government-controlled territories, data collection was mostly carried out remotely, but was verified using factual information. Given these limitations, the authors of the report cannot guarantee the absolute accuracy of the data included in this work [23; 24].

The DaLA methodology was developed by the United Nations Economic Commission for Latin America and the Caribbean in 1972. In the future, it was improved to obtain the most accurate assessment of damage and losses due to disasters. It is a flexible tool that can be adapted to specific types of disasters and the requirements of

public ownership. The DaLA methodology bases its estimates on the overall economy of the affected country. It uses the national accounts and statistics of the country's government as input data to estimate damages and losses [22]. The accounting and financial reporting data are one of the sources of national accounts, so we can say that the World Bank's rapid assessment is based on accounting data.

On May 16–17, 2023, at the summit of the Council of Europe, it was announced the creation of an international register of damages caused by russia to Ukraine since the beginning of the full-scale invasion. This register was created in accordance with Resolution CM/Res (2023)3 on the establishment of the Extended Partial Agreement on the Register of Damages Caused by the Aggression of the russian federation against Ukraine, adopted by the Committee of Ministers of the Council of Europe on May 12, 2023 [25].

In Ukraine, the procedure and methods of assessing damage and losses from the war are defined in a number of regulatory documents, and are also raised in scientific publications and widely discussed in professional circles. Today, there are many estimates and analysts who reveal different versions of such estimates. In general, these assessments are similar in their methodology to the "Ukraine Rapid Damage and Needs Assessment – RDNA2" conducted by the World Bank. A summary of some of them is given in Table 3. The estimates refer to the period 2022–2023. Although they are not object-specific, they are still more specific and relate to certain types of damage. Most of the analysis can be found on the damage caused by the explosion of the Kakhovka hydroelectric power station of Ukraine.

Some Ukrainian expert assessments coincide, and some significantly differ from the conclusions of the World Bank (Table 4). This indicates the objective complexity of such an assessment and the high probability that the real value indicators of damage are much higher than any estimates made to date.

So, currently, in the expert environment of Ukraine, the data of a quick assessment are used, which we can call a generalized assessment (global / generalized approach). That is, all the above calculations are generalized and in the case of a detailed assessment of damages (object-by-object approach), their amount will be much higher. We made this conclusion by applying the technique we developed for recording and assessing direct damage to a specific enterprise that suffered from a fire. The fire occurred in a restaurant in Odessa in October 2022. The damage from the fire, which we calculated, is UAH 18.6 million and concerns 692.3 sq. m of premises. During the assessment, the cost approach was applied, which involved the calculation of the new replacement value by the method of direct reproduction in modern prices for material resources. The cost of repair and restoration works is calculated using the estimate program "Construction Technologies: Estimate 8", which is recommended by the Ministry of Development of Communities and Territories of Ukraine and meets the requirements of regulatory documents in construction. The calculation of the volumes of repair and construction works was carried out in accordance with the State Construction Standards and Resource elemental estimate standards for a specific type of work according to the rules for calculating the volumes of works.

Special knowledge in the field of construction, economics, and finance is required to carry out a high-quality object-by-object assessment. To carry out such an assessment, court experts, appraisers, and estimating engineers are involved. At the same time, accounting provides the information base for calculations.

Table 3

Assessment of damage caused by the war: calculations of individual ministries, experts in Ukraine

Type of damage	The institution that determined	Estimated amount of damage, billion USD
Direct damage was caused to the infrastructure of Ukraine [21]	Kyiv School of Economics	147.5
Damage caused to the environment and ecosystems (more than 2,500 documented damages) [26]	Ministry of Environmental Protection and Natural Resources of Ukraine	54.7
Damage caused to the environment due to the explosion of the dam of the Kakhovka hydroelectric power station of Ukraine [27]	Ministry of Environmental Protection and Natural Resources of Ukraine	4.0
Direct losses (losses of the housing and communal sector, energy, agriculture, transport, ecology and industry) due to the explosion of the Kakhovka hydroelectric power station of Ukraine [28]	Ministry of Economy of Ukraine Kyiv School of Economics	2.0
Damage to the energy system of Ukraine (excluding the Kakhovka hydroelectric power station of Ukraine) [29]	United Nations Development Program and the World Bank	10.0
Damages to the fishing industry of Ukraine as a result of the destruction of the Kakhovka hydroelectric power station of Ukraine* [30]	State Agency of Land Reclamation and Fisheries of Ukraine	0.3
Damages to State Property of Reclamation Systems and Channels* [31]	Ministry of Agrarian Policy and Food of Ukraine	4.1–4.4
Direct and indirect losses of the Ukrainian agricultural sector from the explosion of the Kakhovka hydroelectric power station of Ukraine [32]	Ministry of Agrarian Policy and Food of Ukraine.	10.0

Note. *Amounts in UAH converted into USD at the official exchange rate as of August 2, 2023 (36.5686).

Source: compiled by the authors.

The total area of damaged or destroyed real estate in Ukraine as of June 2023 is 87 million sq. m [33]. So, if we extrapolate our calculation to the entire volume of damaged objects, the amount of damage will be USD 63.88 billion (Table 5).

We add one important caveat to such calculations. We prepared the damage estimate for a partially damaged building; therefore, the specified amount is only an approximate minimum for the total volume of losses in Ukraine. However, this rather conditional result is 20 % higher than the existing expert estimates [21; 33] and almost 30 % more than the calculations of the World Bank [24]. In our opinion, the evaluation

results prove the importance of specifying and applying an individual approach.

Compensation for losses caused to the enterprise is carried out taking into account the actual costs of the enterprise for the restoration of damaged or new material assets and the cost of their restoration. In Ukraine, during the period of martial law and state of emergency, if the enterprise does not have the opportunity to contact independent appraisers, it can independently calculate the amount of damages. When determining the size of direct losses from damage, or destruction of fixed assets, one should proceed from the probable financing for the restoration of a specific object, taking into account the current market prices on the date of determining the losses.

Table 4

Total damage, losses and needs by sector: a comparison of national and global estimates, billion USD

Indicator	World Bank Report [24] (February 2023)	Kyiv School of Economics [21] (April 2023)
Direct damage caused to the infrastructure of Ukraine, including:	134.7	147.5
Residential buildings (the number of damaged objects of the housing stock exceeds 163 thsd. The total area of damaged or destroyed objects is 87 million sq. m, or 8.6 % [33])	50.4	54.4
Infrastructure	-	36.2
Enterprise assets	-	11.4
Education (3.2 thsd educational institutions)	4.4	9.1
Agriculture and land resources	8.7	8.9
Energy	10.6	8.3
Forest	-	4.5
Vehicles	35.7	3.1
Trade	10.9[1]	2.6
Culture, tourism, sports	2.6	2.2
Health care	2.5	2.7
Utilities	4.6[2]	2.7
Digital infrastructure	1.6	0.6
Administrative buildings	-	0.5
Social sphere	0.2[3]	0.2
Financial sector	0.0	0.04
Other damages	2.4[4]	-

Notes. [1]Including industry. [2]Includes water supply and drainage (2.2) and municipal services (2.4). [3]In the social protection sector, household income losses are estimated at USD 61.5 billion, which were not included to avoid double counting for other sectors. [4]Irrigation and management of water resources, environmental protection (0.4); nature management and forestry (1.5); response to emergency situations and civil protection (0.2); justice and public administration (0.3).

Source: compiled by the authors.

When determining the size of direct losses from the destruction (damage) of stocks, the market price for the relevant assets on the date of determining the losses should be used. Let's suppose stocks are suitable for use, but their quality

characteristics have deteriorated. In that case, they are reflected in accounting and reporting at the lower of two estimates: original cost or net realizable value. According to paragraph 25 of the National Accounting Standard No. 9 "Inventories", inventories are recorded at net realizable value if their price has decreased or deteriorated, become obsolete, or otherwise lost their originally expected economic benefit. For example, such a situation is possible when the grain is clogged.

Table 5

Calculation of probable direct damage caused to real estate objects as a result of hostilities

Indicator	Value
1. Approbation of the developed methodology	
1.1. The area of the affected real estate object	692.30
1.2. The estimated amount of damage from the fire, UAH	18 589 341.20
1.3. The amount of damage per 1 sq. m area, UAH	26 851.57
2. Extrapolation of the result to the total area of damaged real estate	
2.1. The total area of real estate damaged or destroyed by the war in Ukraine (July 2023), million sq. m [33]	87.00
2.2. The total amount of damage from damaged or destroyed objects, billion USD (2.2 = 1.3 x 2.1 x official USD exchange rate as of June 1, 2023)	**63.88**

Source: authors' research.

In accounting, the write-off of destroyed fixed assets is reflected as follows: the debit of the account "Depreciation of fixed assets" and credit of the account "Fixed assets" (for accumulated depreciation); the debit of the account "Writing off non-current assets" and the credit of the account "Fixed assets" (for the residual value). The write-off of destroyed stocks is reflected in accounting as follows: the debit of the account "Deficits and losses from damage" and credit of the account "Inventory".

After recording the information about the damage caused to the state e-resources (publication of the information), the enterprise reflects the debt for the damage caused by the debit of the account "Calculations for the compensation of the damage caused" and the credit of the account "Income of future periods". After receiving compensation for losses, the enterprise will have to recognize income by debiting the "Deferred income" account and crediting the "Reimbursement of previously written off assets" account (current assets) or the "Other income" account (non-current assets). Until the courts establish the fault of the russian federation, the sums of losses charged to the enterprise's expenses are shown simultaneously on the off-balance sheet sub-account "Unreimbursed shortages and losses from damage of valuables".

Thus, the results of this study prove that accounting methods provide a full assessment and documentation of direct losses of agribusiness as evidence of the crimes of the russian occupiers on the territory of Ukraine. The scheme of application of methods and tools available to accountants for determining direct losses is presented in Figure 1. Our proposed developments have been widely discussed in scientific circles and have caused a number of discussions. Representatives of the evaluator community advocate the expert basis of the evaluation methodology. Scientists and the professional public are proposing easier-to-use methods that would be based on an

accounting methodological basis.

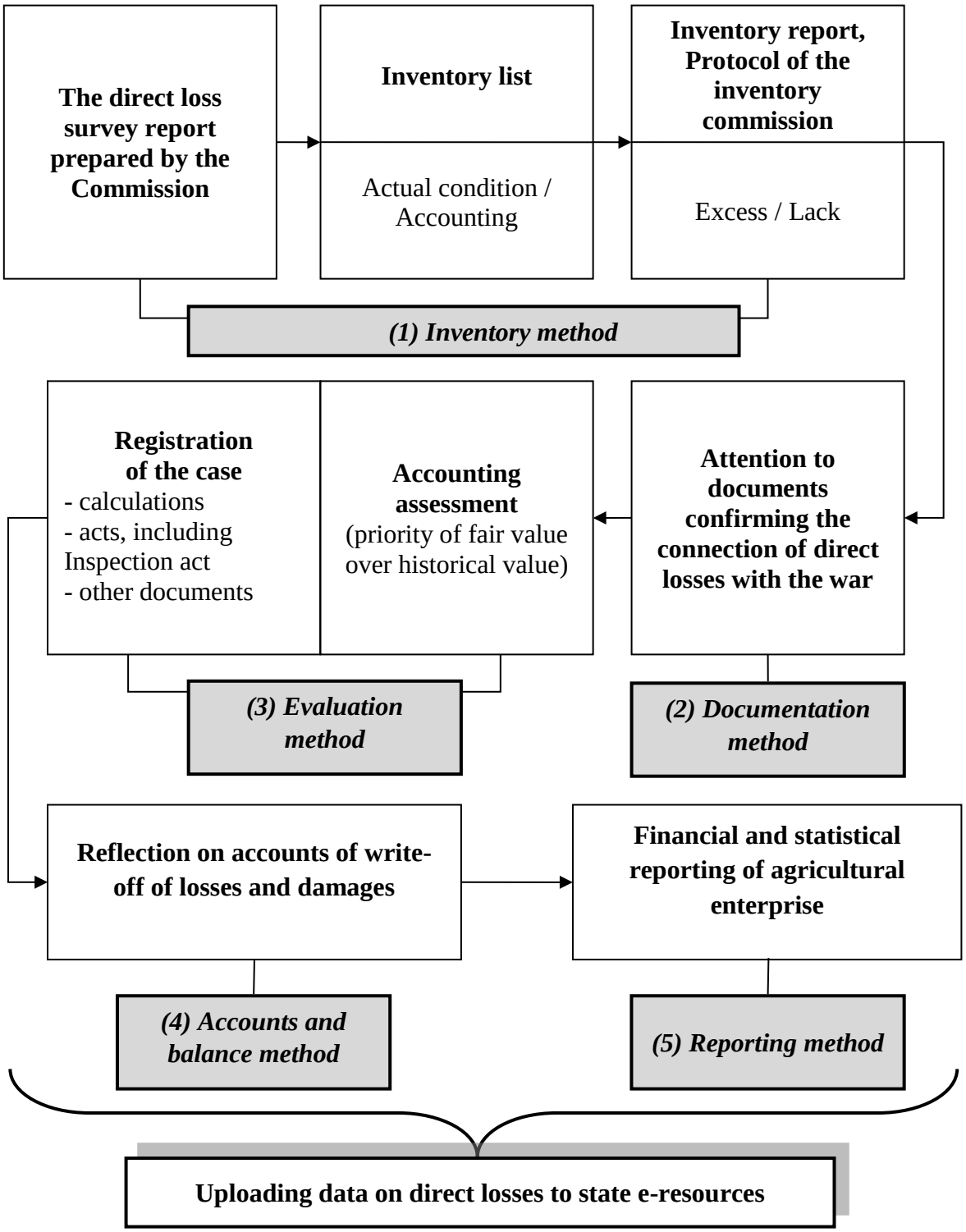

Figure 1. Accounting tools for determining direct losses due to war

Source: developed by the authors.

As we can see, today, various international and Ukrainian analysts and government representatives indicate different amounts of direct losses caused to Ukrainian enterprises, including agricultural companies. These amounts are quite different. Of course, in wartime, it is difficult to estimate these losses because the

situation is changeable. Following the example of the accountants of Spain, described in the research of P. Archel et al. [20], the authors of this study tried to explain the method of collecting and recording data for the assessment of direct losses of agribusiness in the accounting system.

Accounting institute provides understanding and control in the socio-economic environment, processing and interpreting information about the facts and phenomena of the enterprises' activity. The transformation of facts and phenomena of activities of enterprises is carried out with the help of specific legal norms, methods, principles and professional judgments of accountants. Therefore, the results of this study enrich economic science at the applied level – by identifying accounting tools for verification of direct losses of agribusiness. This study considers the requirements of Ukrainian legislation in the accounting field. However, accountants of other countries can use the results of this study because accounting methods are generally accepted and constitute a theoretical component of any accounting system.

When conducting this study, the authors followed the following principles:

1) the research results should be clear to the target consumer (accountant) and easy to apply;

2) the proposals contained in this study should effectively solve the problems faced by agricultural enterprises in wartime;

3) the research results should be acceptable for application in other countries where agribusiness may suffer losses due to the war.

The topic of this study is quite specific and new, so further discussions regarding the practical experience of Ukrainian accountants described in this article is considered a promising direction for future research.

Conclusions. Monitoring of global estimates of the extent of losses and the cost of reconstruction and recovery in Ukraine indicates that this amount has reached USD 411 billion. Such estimates are gradually losing their relevance, as they relate only to the one-year period of the war [24]. This number is increasing daily as the war continues. This figure is general and is used at the country level. However, each business entity must provide documentary evidence of these losses to receive compensation or financial assistance.

This article summarizes the global (quick assessment by global institutions – World Bank, United Nations and European Commission) and object-by-object (expert and accounting assessment by national institutions) approaches in the methodology of assessing business losses from the war. The advantage of the object-by-object approach tested in this article is that: the evaluation is carried out by a wide range of specialists (appraisers, forensic experts, auditors, accountants of enterprises); the methods are based on international accounting and financial reporting standards; calculations of lost profits can be made on the basis of both financial and statistical reporting; control over the quality of work is carried out by an independent audit and/or professional public organizations of manufacturers.

This approach is more reliable, accurate and complete. While the global approach (quick assessment of global institutions) gives a general, rather conditional and, as

shown by the calculations in the article, a lower estimate of losses. In particular, as evidenced by the results of the approbation of the approaches, the calculated probable direct damage caused to real estate because of hostilities amounted to USD 63.88 billion. At the same time, the World Bank's quick assessment of this parameter of damage is USD 50.4 billion. Therefore, the cost of the damage according to the object-by-object assessment is 30 % higher than the global (quick) assessment. That is why it is important to promote an individual (object-by-object) approach and its further generalization at the state level, for making decisions by global institutions regarding compensations and reparations.

However, these conclusions may be valid subject to the following caveats. It is necessary to understand that the calculations are generalized and reliable to the extent that the information base used is reliable. However, the information base used is partly not official data, but expert assessments. In the calculations, the applied cost approach and the use of other approaches can lead to radically different results.

A caveat regarding the use of the results of the article is that the cost of damage is calculated by constructing an estimate of costs for the restoration of partially damaged real estate. That is why the results of a mass object-by-object assessment can be much higher, taking into account the number of completely destroyed objects.

The presented research results are only the authors' position, which is based on expert knowledge and analysis of available source data regarding the size of Ukraine's losses from the war. The war is ongoing, so it must be recognized that any calculations until its end are incomplete and subjective. However, in this publication we have shown that the generalized rapid assessment approach used by the World Bank cannot be taken as a basis for the development of compensation mechanisms. The discrepancy between generalized and object-specific approaches can only grow.

In this study, the authors proposed a simple algorithm of actions, which allows for detecting direct damage by enterprises in a short time. The algorithm is based on the use of five accounting methods: (1) Inventory method, (2) Documentation method, (3) Evaluation method, (4) Accounts and balance method, (5) Reporting method.

The use of accounting tools to evaluate the direct losses is essential for the following reason. Suppose the accounting system does not confirm the data on direct losses. In that case, misunderstandings may arise between the participants of socio-economic relations (a similar situation is described in the research of P. Archel et al. [20]. In addition, the results of this study may be helpful for accountants in other sectors of the economy, and accounting data on direct losses can be evidence in court. However, such data must be correctly collected and recorded, which is an important task for an accountant.

Prospects for further research are clarification of the function of accounting in the assessment of indirect losses from the war. After all, due to the military actions in Ukraine, most enterprises lose the potential of their activities every day. Estimating such losses is important for understanding the total amount of losses.

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