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SUSTAINABLE TRANSFORMATION OF ACCOUNTING IN AGRICULTURE

Purpose. The purpose of the article is to model the paradigm of accounting and reporting development in the context of the sustainable agricultural enterprise.

Methodology / approach. In the process of working on the article, general scientific methods and methodological techniques were used, in particular, monographic and system analysis (formation of accounting information to take into account sustainable development); methods of comparative analysis (when studying the transition from a traditional accounting system to sustainable accounting); grouping (for grouping accounting types by user groups and information); structural-and-logical compilation (when formulating the conceptual foundations of information to take into account sustainable development); modeling (when building a model of the concept of sustainable accounting and a map of internal and external stakeholders of the enterprise in terms of the level of influence, interest and direction of the formation and use of reporting information); process approach (when developing a paradigm for the development of enterprise reporting in the field of sustainable development); abstract-logical (theoretical generalization and formation of conclusions); graphical method (with a visual display of economic phenomena and processes in time and space); system-functional (to generalize the theoretical and methodological aspects of sustainable development accounting).

These methods were the methodological basis of the study.

Results. To determine the category of sustainability accounting and the concept of its reporting, the types of entrepreneurial capital were studied, and the characteristics of information that arises as a result of the implementation of economic, social, and environmental activities. In addition, the main users of information, their goals, and their needs were identified. As a result, management and financial accounting for sustainable development were highlighted. The functioning of the institution of sustainable development reporting of agricultural enterprises is based on its "paradigm" as a set of generalized ideas, hypotheses, and methodological approaches shared by the scientific community, acceptable to other institutions, and formalized in the form of scientific theories. In the case when, within the framework of existing theoretical postulates, a scientific institute cannot effectively solve the issues, there is a need to change its paradigm. The proposed paradigm of accounting and reporting will not only orient the development of accounting to the prospects for the transition of mankind to a harmonious economy but also facilitate the acceleration of this transition through the introduction of progressive accounting systems.

Originality / scientific novelty. Due to all findings and conducted research in modeling a new system of accounting and reporting for agricultural enterprises we could generate the definition of “sustainability accounting”, which, on the one hand, the segmental, and on the other – the organic component of the enterprise accounting system and the institution of accounting in socio-economic relations, which is organized at the request of the policy of sustainable development, has a corresponding theoretical, methodological and organizational methodological support and is identified in accounting policy, operational, statistical and financial reporting, which provides an
organizational and methodological focus on the construction of such accounting by enterprises.

**Practical value / implications.** The main provisions of the article are brought to the level of methodological generalizations and applied tools, the use of which allows adopting a new holistic concept for the formation of accounting and analytical support for the sustainable development of the institutional units of the agrarian sector. The recommendations outlined in the article are fully consistent with modern trends in the development of socio-ecological and economic relations in society, therefore, they can be used in the formation of modern institutional accounting methodology in the context of sustainable development.

**Key words:** accounting, sustainable development, financial accounting, management accounting, concept, information users, reporting.

**Introduction and review of the literature.** In the context of the integration of each country into the global space and with the transition to international accounting and reporting standards, many large agricultural enterprises practice the development of environmental and social policies, a comprehensive program for its implementation, planning of environmental protection, and social security measures, financial analysis, and environmental audits. However, the standards and rules that cover all components of accounting for environmental management and social activities (accounting for sustainable development) of agricultural enterprises: accounting for environmental and social assets, liabilities, results, and their reflection in environmental and social reporting, have not been developed yet.

Under modern conditions, the importance of social and environmental security is manifested in the expenditure of resources for the restoration and protection of the environment, for the satisfaction of social security at a decent level, which implies the need to reflect on these issues in accounting. The sustainable development of a country depends on taking into account environmental and social factors in all sectors of society. The increased attention to environmental and social problems entails an increase in the demand for information characterizing the state of the natural environment and the impact of human society on it. Information, which is the basis of scientific knowledge and practical activity, plays an important role in solving urgent environmental and social problems for society, the need to take them into account in economic forecasting and development.

It is difficult to overestimate the importance of accounting and analytical support of the reporting management system for the sustainable development of an agricultural enterprise. These two objects are interconnected. The effectiveness of the company’s management is largely determined by the reporting and the quality of its accounting and analytical process of information support. The importance of sustainable development reporting is increasing with the transition to a new economy – “knowledge economy” or “accounting 4.0”. Requirements for accounting and analytical support of agricultural enterprises’ sustainable development reporting in the knowledge economy are determined by a new, qualitatively higher level of management and decision-making, the choice of sustainable development targets, the emergence of new accounting objects, the disclosure of information about which in the global information environment will ensure the company’s transparency and
The problem of the study of accounting and analytical support for reporting sustainable development of agricultural enterprises is characterized by the following important aspects related specifically to sustainable development, such as the concept of accounting for environmental development, the nature of sustainable development management reports, the needs of stakeholders in sustainable development reports, the information content of sustainable development reports, directions and ways of disclosing corporate reporting on sustainable development, the role of accountants in the field of corporate social responsibility as a factor of sustainable development, professional and accounting standards for the formation of reporting on corporate responsibility in the context of economic, environmental and social activities. In addition, the complex process of summarizing the previous aspects, fundamental research, and regulatory documents related to sustainable development, actualize studies where the content, disclosure, reporting, adjustment, and others differ depending on the economy.

Domestic scientists and practitioners around the world at different times have contributed to the formation of the legal, organizational, methodological, economic foundations for the formation and actualization of agricultural enterprises’ sustainable development: I. Zamula [1], A. Kireitseva, I. Zamula [2], V. Zhuk [3], O. Sokil [4], N. Bulavinova [5], S. Legenchuk [6] and other. However, the studies are still not completed and require improvement by the challenges of the present sustainable existence of the three main components of the dynamic environment: economic, social, and environmental.

The works of subsequent scientists researchers are devoted to the generalization of the methodological foundations of the formation of the concept of accounting for sustainable development: M. Bennett, P. James [7], R. Burritt [8], S. Schaltegger, R. Burritt [9–11], O. Sokil [12], V. Zhuk [13], O. Pasko [14–16], I. Zamula [17], A. Bahar [18] and other. However, the development of the study of accounting for agricultural enterprises’ sustainable development (environmental and social) is just beginning to gain popularity in the scientific community of individual countries.

The works of many scientists are devoted to the problematic aspects of accounting and analytical support for the formation of sustainable development reporting and through their improvement, among which special attention deserves improvements (some of them in agriculture): B. Ballou [19], O. Sokil [20], I. Makarenko [21], O. Pasko [14–16], K. Rahman, M. Bremer [22], S. Azam [23], V. Hyk [24]. Despite a large number of publications on this topic, the problems of accounting and analytical support for the formation of reports on the sustainable development of enterprises remain completely unresolved.

The purpose of the article is to model the paradigm of accounting and reporting development in the context of the sustainable agricultural enterprise. This goal is achieved by solving the following tasks: 1) transformation of the traditional accounting system into sustainable development accounting for agricultural enterprises; 2) study of the constituent parts of agricultural sustainable development
accounting; 3) modeling sustainable development reporting for agricultural enterprises including the interests of stakeholders.

Results and discussion. Transforming traditional agricultural accounting systems into sustainability accounting. The World Commission on Environment and Development regulates that balanced development takes into account an aggregate asset that is constant or increasing over time. This asset is made up of industrial capital (cars, factories, roads), human capital (human health, knowledge, and skills), and environmental capital (forests, air, water, and soil quality). The country must consume an amount of the asset that does not reduce the total stocks of potential [25]. But, in our opinion, the main capital objects for accounting for sustainable agricultural development are entrepreneurial, financial, human, social, and environmental, the clear definition of which requires thorough research.

Some scholars argue that natural capital is based on physical reserves and estimates of profits or rents earned using world prices and local costs [26; 27]. This definition is not comprehensive because it does not take into account all the characteristics of natural capital, particularly agricultural. Natural capital is not man-made but differs greatly from the state of nature as a result of human intervention. It can be decomposed into human capital and natural capital proper [7]. This definition is not exhaustive from the point of view of the concept of sustainable development of agriculture, since it does not fully reflect its content.

Other scientists have thoroughly investigated the essence of natural capital and came to the conclusion that natural capital is reserves consisting of life-supporting systems, biodiversity, renewable and non-renewable resources that are used by people or are of interest to them [25; 27].

Entrepreneurial capital is an entrepreneurial idea, a method, and means of manufacturing raw materials or finished products, a way of imparting new properties and quality characteristics to a product – all that is commonly called “know-how” [28], that is, they are assets that are directly or indirectly accounted in the production of goods or the provision of services to make a profit.

Financial capital should be understood as cash and other financial assets that are accumulated by a business entity to make a profit and/or ensure a continuous production process [29]. Social capital is the potential of mutual trust and mutual assistance rationally formed in interpersonal relationships, acting as such a specific category of resources as non-economic capital [30]. Human capital is a form of investment in a person, his/her general and special education, the accumulation of health from birth to working age, migration and economically important information, in certain spiritual stability and intellectual mobility [31].

Thus, the results of the activity of five capitals (entrepreneurial, financial, human, social and environmental) can be correlated and generalized, respectively, into three types of accounting, embodying the general system of economic accounting for sustainable development of the agricultural enterprise (Figure 1).

Environmental capital is a conditional component of the enterprise value, which consists of assessing the harmfulness of actions or counteractions to environmental
protection and affects the return on total capital and the ratio of profitability and risk in the process of enterprise development [32].

Figure 1. Formation of accounting information for sustainability accounting of the agricultural enterprise

Source: authors’ own elaboration.

All information coming from the five types of capital should be sorted by types of accounting using methods by their functionality to generate reliable and impartial information for external and internal users. The proposed distribution of information, the purpose of which is to minimize the receipt of incorrect or distorted data, requires clear regulation. There is no hesitation that it depends on the agricultural company which categories of presented information will work best for it. Therefore, the recommendations for reporting are to keep the coverage as wide as possible. To search for a combination of formation and submission of the necessary reporting information, you may need a matrix for assessing the sustainability of an enterprise, illustrating its capabilities in the direction of ensuring and promoting sustainable development (Table 1).

Table 1

Matrix for assessing the prospects of the enterprise’s agricultural transition to sustainable development

<table>
<thead>
<tr>
<th>Capital</th>
<th>Three types of states in which the company manifests itself</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>As a business</td>
</tr>
<tr>
<td></td>
<td>As a place of development, research, learning</td>
</tr>
<tr>
<td></td>
<td>As a member of a community or society</td>
</tr>
<tr>
<td>Entrepreneurial capital</td>
<td>Rational use of property</td>
</tr>
<tr>
<td></td>
<td>Advantages in development, research, study</td>
</tr>
<tr>
<td></td>
<td>Promoting the improvement of public relations, information, and advocacy activities</td>
</tr>
<tr>
<td>Financial capital</td>
<td>Save money. Using a progressive costing system</td>
</tr>
<tr>
<td></td>
<td>Competitions at the international/regional level</td>
</tr>
<tr>
<td></td>
<td>Modernization of risk management</td>
</tr>
<tr>
<td>Human capital</td>
<td>Attracting and retaining qualified staff</td>
</tr>
<tr>
<td></td>
<td>Providing an experience for students and graduates; expanding employment opportunities for graduates</td>
</tr>
<tr>
<td></td>
<td>Education and training of employees even after employment</td>
</tr>
<tr>
<td>Social capital</td>
<td>Ensuring skillful management of activities</td>
</tr>
<tr>
<td></td>
<td>Anticipating opportunities for growth and self-improvement of employees</td>
</tr>
<tr>
<td></td>
<td>Active participation in external social development programs</td>
</tr>
<tr>
<td>Environmental capital</td>
<td>Efficient use of resources</td>
</tr>
<tr>
<td></td>
<td>Introduction of new means of saving natural resources</td>
</tr>
<tr>
<td></td>
<td>Preservation and improvement of the environment</td>
</tr>
</tbody>
</table>

Source: authors’ own elaboration.

Even if the elements of the matrix from Table 1 on determining the scale of action on the formal accounting process of an enterprise take place over a certain...
period, then analyzing the whole picture of consistency makes sense in a global context to identify the risk for the agriculture.

The concept of generating accounting information for sustainable development of agriculture makes it possible to establish that such accounting, in contrast to the traditional financial accounting system that generates financial flows and stocks through reporting on financial condition and profitability, additionally provides an opportunity to obtain information that can be considered in three different dimensions:

1. Time of formation of information – in this dimension, information can be provided on a specific date about the status of assets and liabilities, or, within a certain period, for example, their movement for a certain period;

2. Place of formation of information – what kind of information is included in the financial reporting (internal and/or external);

3. Information ownership – information influences the formation of economic, social, or environmental results, disaggregated by five types of capital.

The traditional accounting system of the agricultural enterprise does not take into account not only the social and environmental aspects of the formation of a general system of accounting for sustainable development but also the factors of external influence of information. To eliminate these shortcomings, the authors proposed the concept of transition from the traditional agricultural accounting system to accounting for agricultural enterprises’ sustainable development (Figure 2).

![Figure 2. Model of transition from the traditional accounting system to sustainability accounting of the agricultural enterprise](image)

*Source: authors’ own elaboration.*

The aforementioned transition concept requires readjustment and adaptation, including the implementation of the following measures for agricultural enterprises:
1. Transformation of the statement of financial performance (statement of comprehensive income), requiring additional information on the costs and benefits associated with economic, social, and environmental activities.

2. Extension of the standard classification by groups of income and expenses (profit and loss) to cover external losses and benefits for the environment, society, and the economy, not taken into account by traditional accounting.

3. Expansion of the balance sheet (statement of financial position), taking into account the entire range of assets, including intangible assets such as brand value, human capital, or reputation about permanence, and hidden liabilities, including those associated with permanence risks.

Restructuring the statement of financial performance of the agricultural enterprise (statement of comprehensive income) will lead to the emergence of a derivative agricultural accounting system. This system should take into account the internal financial flows associated with the implementation of economic, social, and environmental obligations. The costs and benefits that have already been accounted in determining the bottom line require reorganization in the chart of accounts, for example, previously hidden links to generating environmental costs or hidden savings. To achieve this goal, the authors propose the use of “internal accounting of agricultural enterprises’ sustainable development”, designed to detail the information generated by the existing traditional accounting system, and re-presented in the context of the elements of constancy of current costs associated with the corresponding social and environmental income (in terms of income or expenses management accounting).

Internal sustainability accounting is an integral part of the overall sustainability accounting system and a source of information for internal users: owners or management personnel, and therefore can constitute a commercial business secret.

The introduction of new accounts to summarize external losses and benefits for the environment, society and the economy requires a reorientation of the existing chart of accounts. While internal sustainability accounting records information related to financial flows and it is already recorded somewhere in the financial statements of an enterprise, there is a possibility that information related to revenues and expenses of external influences has not been taken into account yet. The solution to this problem is the use of “external sustainability accounting of the agricultural enterprise”.

**Concept of sustainability accounting in agriculture.** Above, the authors have developed two approaches to solving the problem of determining the conceptual conditions of accounting for sustainable development, including the formation and differentiation of external and internal accounting for sustainable development of agriculture, which are the objects of interest of various users of information. Addressing the issues of different stakeholders requires individual approaches to accounting. Some accounting systems can provide general information to all interested parties, and some – to a certain circle, depending on the nature of the information and user rights (Table 2).
According to Table 2, each type of accounting can be presented both in monetary and physical terms. As for financial accounting, its usual personification is the value expression of indicators, but this does not exclude the possibility of presenting information in physical terms. This is confirmed by the usual statutory and regulatory reporting through the notes to the annual financial statements. In turn, management accounting provides information in most cases in physical terms. After preliminary axiomatic statements, it can be generalized that each of the traditional types of accounting can be presented in the form of indicators both in kind and in value terms. The indicators of internal and external accounting for sustainable development are similarly comparable. However, several differences characterize information and its ownership according to the traditional agriculture and ecological-social accounting system:

- from a material point of view, sustainable development accounting differs significantly from traditional accounting. Sustainable development accounts for environmental and social impacts, while traditional accounting is monetary;
- environmental, social and monetary information is often obtained from different sources;
- environmental information is needed for various purposes by a wider range of stakeholders than monetary information;
- information about the environment has different quantitative indicators of quality and quantity (for example, kilograms) compared to financial information (for example, value-added in monetary terms).

### Table 2

<table>
<thead>
<tr>
<th>Users of information</th>
<th>Traditional accounting information</th>
<th>Sustainability accounting information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Financial accounting</td>
<td>Managerial accounting</td>
</tr>
<tr>
<td></td>
<td>Monetary indicators</td>
<td>Natural indicators</td>
</tr>
<tr>
<td>Buyers and customers</td>
<td>■</td>
<td></td>
</tr>
<tr>
<td>Suppliers</td>
<td>■</td>
<td></td>
</tr>
<tr>
<td>Employees</td>
<td></td>
<td>■</td>
</tr>
<tr>
<td>Society</td>
<td>■</td>
<td></td>
</tr>
<tr>
<td>Government organizations, funds</td>
<td>■</td>
<td></td>
</tr>
<tr>
<td>Owners</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Potential investors</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Other users</td>
<td>…</td>
<td>…</td>
</tr>
</tbody>
</table>

■ – full interest and full access to information  
◘ – partial interest and partial access to information

*Source:* authors’ own elaboration.
However, there are several obstacles preventing enterprises from introducing environmental accounting [33; 34; 35]:

- expenses are subject to deduction from net profit only after they have been incurred. As a result, there is no incentive to take into account obligations, including environmental ones;
- as investors are closely monitoring the amount of profit per share, businesses are postponing measures that could lead to a decrease in profits;
- excessive complexity of allocating the costs of environmental protection measures in terms of total costs;
- lack of specific recommendations for providing information on environmental protection activities and the organization of environmental accounting at enterprises.

Typically, traditional accounting and sustainability accounting in agriculture are recognized as two different categories of “sub-accounting”. But this is not an obstacle to their integration, as information from both categories of accounting can be combined through a separate analysis of environmental performance indicators for use by internal and external users. External and internal accounting for sustainable development is combined through environmental performance indicators, which require the integration of these two systems [36; 37].

The features of internal and external accounting of agricultural enterprises’ sustainable development can be characterized as follows:

1. Internal accounting for sustainable development is designed to collect information on the activities of environmental and social systems, expressed mainly in physical terms, for internal use by the owners and administrators of the enterprise. Such information complements and expands the normal management accounting system. Methods for measuring the impact of production activities of an enterprise on the environment are the basis for making rational management decisions. In the last decade, various methods have been developed to calculate emissions of pollutants and damage to environmental capital. Therefore, internal sustainability accounting is a prerequisite for any environmental and social management system.

2. An analog of the usual financial accounting system, or rather its extension, is external accounting for sustainable development, the information of which is intended for external users interested in overcoming environmental and social problems, namely, the general public, the media, shareholders, environmental (or social) foundations, non-governmental organizations, etc. Over the past ten years, leading businesses have published separate external environmental reports, thereby ensuring public scrutiny of their environmental and social impacts. Many of these reports are issued annually and contain information on emissions of pollutants, etc.

Traditional accounting systems and differentiated environmental and social sustainability accounting systems handle information caused by environmental and social issues and can be integrated into corporate sustainability accounting [38]. The definition of sustainability accounting in agriculture is that it is a type of accounting that addresses:

- activity and its variations;
registration, analysis of transactions, and reporting;
environmentally-related financial implications and environmental implications of a particular economic system [39].

Such an approach to defining sustainable development accounting can neutralize the need to integrate monetary and environmental issues. But there is a second definition of it, which embodies a broader content than internal accounting for sustainable development and includes both monetary and non-monetary measures for the formation of internal reporting [40]. In addition, the International Federation of Accountants (IFAC) defines sustainable accounting as “... managing environmental and economic performance through the development and implementation of appropriate environmentally-related accounting systems and practices. This may include reporting and auditing in some companies, and environmental management accounting usually includes life cycle costing, full cost accounting, benefit assessment, and strategic environmental management planning” [41]. From this definition, it is clear that IFAC does not see an analytical distinction between monetary and non-monetary aspects of environmental and social management accounting. In IFAC terminology, these two aspects are called Environmental Management Accounting [7].

The main difference between the two points of view is that M. Bennett and P. James in the definition of accounting for sustainable development additionally include material flows that have an impact on the environment, expressed in physical units [7]. Consequently, this accounting is purely monetary, but rather an information system of natural and monetary units. A logical continuation of the concept of sustainable development accounting is the allocation of auxiliary systems, derivatives of the traditional accounting of the so-called systems 1.0–3.0 (Figure 3).

**Figure 3. The concept of generating information for sustainable development accounting in agriculture**

*Source: authors’ own elaboration.*

Consequently, management accounting for sustainable agricultural development
includes environmental and social-oriented aspects and results of the impact on the environment (social) environment in value and natural terms for making internal management decisions. In turn, financial accounting for sustainable agricultural development includes environmental monetary aspects as well as physical measures of environmental impacts for reporting purposes to external stakeholders. This second category of accounting system should include accounting relationships with specific external stakeholders, whether their informational interest is financial, social, or environmental.

The prerequisites for structuring sustainable agricultural development accounting information are the need to integrate environmental, social, and financial issues into one category; the conceptual division into internal and external accounting is based on the fact that the level of detail and aggregation of information and the degree of confidentiality differ between the needs of management and other interested parties; traditional accounting in physical units existed even before the development of accounting systems based on sustainable development. For example, performance characteristics, expressed in physical units, have long been used in most conventional management accounting systems.

A reasoned comparison of the advantages and disadvantages of different approaches to the definition of sustainable agricultural development accounting allows us to form a common understanding of it. This will facilitate its communication and lobbying among managers and other interested parties. The author proposes to carry out the convergence of views by comprehensively detailing the characteristics of the definition of accounting for sustainable development in the context of monetary and natural definitions in orientation to the past and the future (Table 3).

Sustainability Accounting in Agriculture (SAA) is a combination of value and in-kind accounting, and, if necessary, the result of the integration of environmental, social, and financial components of activities. Therefore, a definition of SAA is proposed as a general category, which includes both Sustainability Monetary Accounting (SMA) and Sustainability Natural Accounting (SNA), as shown in Table 3.

SMA includes a standardized system of financial and management accounting, which measures the value of the interaction of the ecological environment, society, and the enterprise. SMA is a system for recording the results of economic activities in monetary terms related to the environment and social environment. It is a tool for strategic and operational planning, provides a basis for decision-making, is a means of achieving desired goals or objectives, and acts as a control and reporting tool.

SNA also acts as an information inventory for making internal management decisions. However, unlike SMA, the focus is on the company’s environmental and social impact on the environment, expressed in physical terms. The SNA tools are designed to collect information on environmental and social impacts in physical units, primarily for internal management use. Accordingly, the SNA performs the following functions:
• as an analytical tool designed to identify environmental and social strengths and weaknesses;
• as a decision-making tool related to identifying the impact on the environment and social environment;
• as a measurement tool that is integral to other environmental measures such as eco-efficiency;
• as a meter of direct and indirect control of environmental consequences;
• as a catalyst, providing an active position for internal and external communication;
• as one of the means of achieving and promoting sustainable development of society as a whole.

Table 3

Matrix of characteristics of sustainability accounting

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Sustainability Accounting in Agriculture (SAA)</th>
<th>Sustainability Monetary Accounting (SMA)</th>
<th>Sustainability Natural Accounting (SNA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short-term focus</td>
<td>Long-term focus</td>
<td>Short-term focus</td>
</tr>
<tr>
<td>Focus on the past</td>
<td>Accounting for social and environmental expenditures (variable costing, absorption pricing, ABC method, etc.)</td>
<td>Accounting for expenses and income for the use of social, human, and environmental capital</td>
<td>Accounting for the movement of inventories and material values</td>
</tr>
<tr>
<td>Focus on the future</td>
<td>Environmental and social operational budgeting and budgeting of environmental and social capital in monetary terms</td>
<td>Long-term planning of social and environmental expenditures in value terms</td>
<td>Budgeting the physical component of the environment (budgeting based on the ABC method)</td>
</tr>
<tr>
<td>Special information</td>
<td>Environmental and social expenses of future periods</td>
<td>Assessment of investments in environmental and social projects. Manufacturing Life Cycle Budgeting and Target Pricing</td>
<td>Response environmental impacts (subject to short-term restrictions on activities)</td>
</tr>
</tbody>
</table>

*Source: authors’ own elaboration.*

Another determinant of the classification of sustainable agricultural development accounting is time. Environmental and social problems are predominantly long-term. Considering this, accounting systems and corresponding analysis tools can be grouped as a retrospective – looking to the past (for example, the analysis of economic activity), and with a focus on the future (for example, budgeting). The adoption of internal management decisions, regardless of the duration of action, is accompanied by the accumulation of both regular information
(general accounting systems that regularly generate information for management) and special information (specific accounting methods that create information as a basis for making specific decisions) [8]. To visualize the characteristics of sustainable agricultural development accounting, the authors compiled a matrix in which the above approaches to the SNA and SMA are correlated with different types of management decisions (Table 3). The data in Table 3 indicate a wide coverage of SAA of different approaches, the choice of which is carried out depending on the context of the decision, the goal, and the level of management.

The structure of the integrated SAA model presented in our study can be used in the broader context of environmental and social accounting. Accordingly, sustainable development accounting can be classified according to the following criteria:
• At the place of formation and provision of information: internal and external.
• According to the form of the information provided: monetary and natural.

The carried out research allows forming a comprehensive concept of sustainability accounting (Figure 4).

Figure 4. A comprehensive model of the concept of sustainability accounting in agriculture

*Source: authors’ own elaboration.*

Paradigm modeling of sustainable agricultural development reporting. Studies of work in the field of sustainable development reporting [6; 42; 43; 44; 45] allowed us to establish criteria for the internal and external benefits of the implementation, preparation, and publication of reports on the sustainable development of enterprises. These advantages and disadvantages, of course, are not final, but their impact may be
different on the external and internal environment of the enterprise (Figure 5).

Figure 5. Map of internal and external stakeholders of the agricultural enterprise by the level of impact, interest, and direction of generation and use of sustainable development reporting information

Source: authors’ own elaboration.

The developed map of stakeholders is the basis for the formation of a mechanism for agricultural accounting and analytical support for reporting sustainable development and the formation of a system of priority interests of interested information users and their harmonization with the interests of other strategically important stakeholders. Managers or top managers of enterprises are the final chains in the process of generating financial and non-financial reporting, who are entrusted with the management process for generating sustainable development reporting.

Some scientists define the management process as the activity of the subject of management to coordinate the joint work of the organization’s personnel to achieve its goals, which is the unity of three components: content, organization, and implementation technology. The management process includes certain categories: managing and controlling systems of the organization, management functions, management methods, management decisions, communications, and leadership [46]. From the point of view of agricultural enterprises’ sustainable development and
reporting, the management process should cover not only all processes before the formation of the sustainable development report, but also be continuous and with feedback: content (tasks) – planning – organization – implementation – evaluation – content (tasks). This is the methodology of the process of accounting and analytical support for sustainable development management.

The process of forming integrated (non-financial) reporting is a process that has a completion. This process includes two stages: 1) preparation of a methodological base for the formation of an integrated report; 2) organizing the collection of information [47]. In our opinion, the methodology of the process of accounting and analytical support for reporting the sustainable development of agricultural enterprise is cyclical and contains a preparatory stage and a phase of organizing and reporting the sustainable development of an enterprise, followed by verification, disclosure, analysis of stakeholder feedback.

Thus, after studying scientific developments in the field of research on sustainable development reporting and observation, there is a need for a graphical reflection of the management system of accounting and analytical support for the formation of reporting on the sustainable development of the agricultural enterprise (Figure 6).

Figure 6. Management support system for the reporting formation of sustainable development of agricultural enterprise

Source: authors' own elaboration.

M. Koryagin and P. Kutsyk in their monographic research consider the “paradigm shift of financial statements” – the transition from the totality of financial and non-financial statements to the paradigm of integrated accounting statements and the gradual process of its finalization and formation. The main idea of drawing up integrated reporting by effectively combining internal information resources is to bring together in a single report the information necessary for making strategic
management decisions, in particular, in terms of management, value creation, and preservation and management of the strategic stability of the enterprise [48].

A similar thought is shared by S. Adams and R. Simnett, noting that integrated reporting is a new reporting paradigm, holistic, strategic, adaptive, meaningful, and relevant to different time dimensions [49]. Consequently, the main feature of the new paradigm of sustainable agricultural development reporting is the orientation of the accounting and analytical process towards eco-social and economic factors creating the added value of the enterprise, as a result of which sustainable development reporting is more appropriate for stakeholders and other users.

Stakeholders, of course, have their vision and require not only reporting on financial results but also non-financial ones, which leads to the formation of a group of factors influencing the analytical processes of reporting sustainable development. That is, the role of perception of non-financial information is determined and a management system for analytical activities is formed.

As noted by L. Donaldson and J. Davis, relationships with stakeholders are “the most important asset that managers must manage, which is the ultimate source of organizational wealth” [50]. It is these relationships between groups and individuals interested in the activities of a particular enterprise that are explored by stakeholder theory, based on which the vision of the stakeholders of the past, present, and future results of the enterprise is formed. From the point of view of any party, the enterprise considers the totality of interests and relations of other parties, and external stakeholders with their vision are the legislators of the strategy for the formation of sustainable development reporting.

It is interesting for further research to identify three strategies for the formation of agricultural enterprises’ non-financial reporting [51; 52; 53; 54]:

1. An arbitrary form, which in practice is the most common form of a report, is intended for external users and does not require a social audit.
2. Comprehensive reports:
   - a comprehensive report using the Triple Bottom-Line method;
   - a comprehensive report on the London Benchmarking Group;
   - a comprehensive report on the corporate citizenship group method.
3. Standardized reports (according to Sunshine standards; GRI; AA1000; SA8000).

The enterprises’ sustainable agricultural development reporting is developed according to any strategy that is equally subject to internal verification and external assessment by specific stakeholders. Large and medium-sized companies can afford to be verified by external auditors. For small and micro-enterprises, the very desire and awareness of the formation of sustainable development reporting is a shift in the information and innovation process.

The modern concept of accounting tends to neglect the environment and social issues, which leads to its inefficiency since the use of resources is about maximizing their value in the long term associated with the activities of the enterprise.

The sustainable development reporting process is based on generally accepted
and specific principles, which differ in part from the principles of financial reporting defined by national accounting regulations (standards). Consequently, the reporting of agricultural enterprises’ sustainable development is derived from the financial reporting, slightly modified and expanded.

Integrated reporting enables corporate enterprises to provide insight into the relationship between organizational strategy, management, financial performance, and the social, environmental, and economic context of operations. There is no standard format for an integrated agricultural report, therefore the International Committee on Integrated Reporting has formulated the basic principles that should guide its preparation. However, problems remain associated with the development and implementation of integrated reporting in practice [55]. The very definition of the limits of measurement of indicators of eco-social and economic activity in the framework of sustainable agricultural development is the main task of future scientific and methodological developments and standards.

Other scholars in the study of non-financial reporting pay attention to the combination of accounting and analysis of social reporting, which it considers non-financial. In addition, it defines the main tasks of social accounting – collection, processing, the transmission of information about the economic, environmental, and social state of the enterprise, its employees and stakeholders, and analysis – comparison of actual and planned indicators of non-financial reporting; factoring and SWOT analysis over several years; providing suggestions for the use of certain indicators in a particular enterprise [56]. Based on the combination and interdependence of accounting and analysis of non-financial reporting, we visualized the vector of implementation of sustainable development reporting within the framework of enterprises’ goals (Figure 7).

Figure 7. Development paradigm of enterprises’ sustainability reporting in agriculture

Source: authors’ own elaboration.
The separation of non-financial from financial reporting in agriculture is constantly carried out thanks to the introduction of new classification signs and the corresponding types of accounting and analysis in the aspect of the responsibility of sustainable development. Additional classification criteria include the goals of the enterprise and the measure of their compliance with the norms of social responsibility. Vector SD of Figure 7 covers the use of all types of accounting and analytical support for eco-social and economic development.

The functioning of the institution of sustainable agricultural development reporting is based on its “paradigm” as a set of generalized ideas, hypotheses, and methodological approaches shared by the scientific community, acceptable to other institutions, and formalized in the form of scientific theories. In the case when, within the framework of existing theoretical postulates, a scientific institute cannot effectively solve the issues, the necessary change in its paradigm. The new paradigm should not only orient the development of accounting to the prospects for the transition of mankind to a harmonious economy but also facilitate the acceleration of this transition through the introduction of progressive accounting systems.

Some agricultural manufacturers are not aware of the purpose of the formation and presentation of non-financial information, and sometimes they are not able to reflect it through:

1. Lack of research on sustainable development in general and reporting in particular;
2. Attention of researchers and stakeholders in the study of the role of accounting and analytical support of corporate social responsibility and the provision of sustainable development reports only for large enterprises;
3. A limited conceptual framework for reporting on sustainable development, which narrows the characteristics of accounting in the context of principles, procedures, reports, benefits, indicators of sustainable development;
4. Neglect of social and environmental conditions of management, and focus on economic results;
5. Isolation of the analysis of key success factors in the formation of competitive advantages;
6. Insufficient level of qualifications of personnel in the formation of sustainable development reports.

Conclusions. Based on our research, we characterized the management system for accounting and analytical reporting of sustainable development of an agricultural enterprise as registration, generalization, transformation, and transmission of information on the eco-social and economic state, internal and external influence of the enterprise into command information for appropriate actions and decisions of stakeholders. This purposeful programmable or secondary control system should be aimed at achieving the final goal (generating sustainable development reporting) using the methodology for managing accounting and analytical support for generating sustainable development reporting in a deterministic or arbitrary program/regulation mode. Management of the system of accounting and analytical support for the
formation of reporting of sustainable development of the agricultural enterprise and its components and processes to increase the efficiency of the enterprise’s functioning occurs even at the stage of awareness of eco-social responsibility, global planning of economic activities, creation of an enterprise, formation of a production base, development, formation, and functioning. Efficiency management is determined by the adequacy of the system of accounting and analytical support for reporting sustainable development.

Using the hermeneutic research method, the concept of sustainable development reporting and its alternatives (non-financial reporting, social reporting, corporate social reporting), and our observations, we have formed a characteristic of the paradigm of agricultural enterprises’ sustainability reporting as a system for generating information in three options:

1. “Report on sustainable development of the enterprise”, which is an appendix to the financial report and is characterized by the preparation of a separate report according to the selected and generally accepted system or standard.

2. An “alternative sustainability report” is characterized by the publication of a separate or short sustainability report. An example would be an environmental report, social report, corporate responsibility report, corporate social responsibility report, etc.

3. An “enhanced financial statement” is a “taxonomy of financial reporting” or an extension of conventional financial and economic information with the social and environmental performance of small and micro-enterprises. This type of reporting is the best alternative to the preparation of comprehensive financial reporting for sustainable development.

The entire system of generating and servicing reporting will be carried out by “Sustainability Accounting in Agriculture”, on the one hand, the segmental, and on the other – the organic component of the enterprise accounting system and the institution of accounting in socio-economic relations, which is organized at the request of the policy of sustainable development, has a corresponding theoretical, methodological and organizational methodological support and is identified in accounting policy, operational, statistical and financial reporting, which provides an organizational and methodological focus on the construction of such accounting by enterprises.

The following developments are of practical importance: the conceptual foundations for the development of sustainable accounting are formulated, which are based on the growing functionality of managerial and financial accounting under the new economic conditions; a paradigm for the development of sustainable development reporting is proposed, which is based on the synergistic interaction of a map of stakeholders’ interests in the goals of the functioning of an agricultural enterprise under modern conditions and the scientific definition of future changes in accounting and analytical support for business operations in accordance with the requirements of sustainable development policy.

Prospects for further research are the formation of a sustainable development
accounting methodology with the definition of goals, objectives, objects, subjects, methods, functions, and key aspects of such accounting. Also, future practical research will be devoted to the standardization of accounting and analytical support, in particular, the methodology for reporting the sustainable development of enterprises by their size and specialization.

References


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