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<https://doi.org/10.26661/2414-0287-2020-2-46-06>**IMPROVEMENT OF ACCOUNTING AND ANALYTICAL SUPPORT OF CURRENT BIOLOGICAL ASSETS OF CROP PRODUCTION****Proskurina N. M., Pushkar I. V.***Zaporizhzhia National University  
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**Key words:**

accounting in agriculture, crop production, biological assets, biological transformation cost, ABC-analysis.

Biological assets play an important role in ensuring the socio-economic development of rural areas. They are the resource base for the development of the productive forces of society, above all, the country's labour potential. Due to biological transformation, the organization and accounting of the resources are quite complex. The system of current biological asset management in plant production can function effectively only if it is provided with proper accounting and analytical support, which includes a set of measures aimed at accumulation of raw data, grouped in a specific sequence and systematized by methods and techniques of economic analysis. The article proposes tools to improve accounting and analytical support of biological assets, clarifies the goal and defines the tasks and main stages of analysis of current biological assets. The main issues of accounting for biological assets have been outlined. Organizational principles of analysis of current biological assets produce in crop production have been generalized and specified. Key lines, tasks and elements of accounting and analytical support for the effective management of agricultural enterprises have been identified. The lines-of-analysis of current biological assets of crop production with specifications have been formed. The ABC-analysis of biological transformation cost have been applied. The value of study results is in theoretical and methodological support and solution of practical issues related to the improvement of accounting and analytical support of current biological assets in crop production.

**УДОСКОНАЛЕННЯ ОБЛІКОВО-АНАЛІТИЧНОГО ЗАБЕЗПЕЧЕННЯ УПРАВЛІННЯ ПОТОЧНИМИ БІОЛОГІЧНИМИ АКТИВАМИ РОСЛИННИЦТВА****Проскуріна Н. М., Пушкар І. В.***Запорізький національний університет  
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облік у сільському господарстві, рослинництво, біологічні активи, витрати на біологічні перетворення, ABC-аналіз.

Біологічні активи посідають важливе місце в забезпеченні соціально-економічного розвитку сільських територій. Вони є ресурсною базою розвитку продуктивних сил суспільства, насамперед, трудового потенціалу села. Через біологічні перетворення організація обліку та аналізу таких ресурсів є досить складною. Система управління поточними біологічними активами рослинництва може ефективно функціонувати лише за належного обліково-аналітичного забезпечення, яке включає комплекс заходів, спрямованих на накопичення первинної інформації, згрупованої в певній послідовності та систематизованої з використанням способів і прийомів економічного аналізу. У статті запропоновано заходи для удосконалення обліково-аналітичного забезпечення біологічних активів, з'ясовано мету та визначено завдання та основні етапи аналізу поточних біологічних активів. Окреслено основні проблемні аспекти обліку біологічних активів. Узагальнено та уточнено організаційні засади аналізу використання поточних біологічних активів рослинництва. Визначено пріоритетні напрями, задачі та ключові елементи обліково-аналітичного забезпечення ефективного управління діяльністю сільськогосподарських підприємств. Сформовано напрями аналізу поточних біологічних активів рослинництва з деталізацією кожного напрямку. Проведено ABC-аналіз витрат на біологічні перетворення. Цінність результатів дослідження полягає в теоретико-методичному обґрунтуванні та вирішенні комплексу практичних питань, пов'язаних з удосконаленням обліково-аналітичного забезпечення поточних біологічних активів рослинництва.

**Statement of the problem**

Adaptation of national accounting standards to international standards, the process of integration of Ukraine into the world economic environment and the

need to improve the investment climate of Ukraine pose new challenges in accounting for primary economic sectors, in particular in agriculture. Current biological assets of crop production should draw particular attention as the system of accounting and analytical support for

agricultural business is under development. Natural features of the assets, as well as the imperfection of their accounting's and analysis` methodological support cause further improvement of accounting and analytical support of this type of assets in order to put the research results of Ukrainian agricultural businesses into practice.

#### Analysis of recent studies and publications

Ukrainian scholars like V. M. Zhuk [6], L. P. Suk [11] and P.M. Kuzmowych [7] dedicated their research to the peculiarities of biological asset accounting. O. V. Bogdanyuk [1], T. I. Vovchuk [2], N. V. Golyachuk [4], L. M. Ryabenko [10] studied the issues of accounting and analytical support of biological asset management. N. V. Goncharenko [5] and I. D. Lazarishina [8] analyzed trends of further improvement of long-run biological asset management analytical support. Highly appreciating considerable scientific and practical achievements of Ukrainian scientists, one should admit that there remain a number of debating but relevant issues, which need further improvement. Underdeveloped accounting methodology, lack of clear methodology for biological assets and agricultural products` assessment at fair value, accounting and analysis of biological transformation cost of current biological assets in crop production are the key unsolved problems. The analysis methodology of this type of assets, taking into account their natural and economic features, needs to be examined in detail.

Table 1 – Definitions of “accounting and analytical support” concept

Author	Subject matter
Volska V. V. [3]	Process of collecting, preparing, registering and summarizing the accounting information of businesses taken together, depending on the statutory accounting system; conducted thorough analysis based on this information applying particular methods and techniques.
Golyachuk N. V. [4]	Business management information component, which allows to solve functional management tasks, provide management with complete and accurate information about business processes and public relations.
Iuzva R. P. [12]	Set of accounting and analytical processes integrated into accounting and analytical system aimed at meeting users` information needs relevant to specified goals, as well as regulatory, methodological, organizational, program, mathematical, technical and ergonomic support for the transformation of raw data into generalized.

The analysis of scientific research gives grounds to argue that the consensus on the concept`s interpretation has not been reached yet. Hence, on the one hand, accounting and analytical support is an activity related to data collection, registration, generalization, accumulation and transmission to interested consumers, and on the other hand, it is the process of providing managerial system with qualitative information. Thus, on the basis of the above-mentioned statements, it is possible to distinguish peculiar features of the studied concept: continuous process of accounting data processing and deep analysis; allows to solve functional managerial problems by transforming raw data into generalized; depends on the level of accounting and analytical experts` skills set; presented in the form of reports, analytical reviews, etc. for managerial decision-making.

Biological asset as an object of accounting for agricultural businesses is considered in Statement of Standard Accounting Practice 30 "Biological asset". According to this standard, biological asset capable of producing agricultural products and / or additional biological assets, otherwise generating economic benefits for a period not

#### Objectives of the article

The objective of the article is to prove theoretical guidelines and to develop practical recommendations to improve accounting and analytical support for current biological asset management as the basis for higher efficiency and effectiveness in agriculture.

#### The main material of the research

Agriculture faces many challenges caused by climate change, biodiversity loss, droughts, desertification, food prices rise and inefficient supply chains. The agrarian sector is becoming more knowledge-intensive, so the availability of high-quality and timely accounting and information support affects the efficiency in the agricultural sector and related industries. Nowadays, managerial system of effective crop production development requires qualitatively new level of accounting and analytical support. It should be based on comprehensive economic diagnosis of crop production`s current biological asset management. Analysis of asset application efficiency, biological transformation cost, rate of return and profitability are among the priorities to be taken into consideration.

Let us study the definitions of “accounting and analytical support” introduced by Ukrainian scholars (Table 1).

exceeding 12 months, as well as livestock, production and feeding is considered as current asset [9]. Issues of the long-term biological asset accounting have been thoroughly examined by Ukrainian scholars. The hot-button issues of current biological asset accounting in crop production remain unresolved, since this type of assets has a number of specific features. Methodology of fair value of current crop production biological assets assessment remains the topical issue, as well as displaying and disclosing information on biological assets and agricultural products in business reporting. There is no consensus on the cost of biological transformation of current biological assets in crop production. The issue of accounting and reporting of agricultural businesses` environmental performance, including the production of environmentally friendly biological assets and agricultural products, requires further analysis.

Methodology of biological asset analysis, taking into account their natural and economic characteristics, business trends in agricultural market needs to be considered in detail. With regard to the analysis management, some scholars [4, 5] distinguish two stages, namely: preparatory and basic aimed at reserves` identification. We agree with

I. D. Lazarishina [8], who states that, in accordance with traditional analytical process, the final stage of analysis should be carried out to generalize the results of analysis to meet consumer's needs and to provide a position paper. N. V. Goncharenko [5] proposes the methodology of biological asset analysis for both current and long-term biological asset in crop and animal production, as well as immature biological assets, namely: objectives and tasks of analysis; types and stages of analysis; indicators of biological assets analysis. We consider on the basis of "accounting and analytical support" nature that there is a need to clarify objective and tasks of analysis; to improve its analytical component by lines-of-analysis` diversification to ensure effective management of current biological assets in crop production. Therefore, the methodology study of current biological asset production`s efficiency by agricultural businesses should be conducted in the following areas:

- Assessment and economic analysis of current biological assets of crop production;
- Analysis of biological transformation cost;
- Environmental analysis of current biological assets of crop production.

Besides, the methodology should be based on comprehensive approach to ensure business strategic goals` implementation.

Analysis of agricultural businesses` biological assets is mostly results in study of crop production dynamics. At the same time, scholars pay a little attention to their application effectiveness` study. Therefore, it is impossible to identify material, financial and labour reserves of the results` improvement. The main areas for improving efficiency of crop production`s development management and application of its current biological assets are to increase its production volumes and to ensure its rational cost level. To ensure the complexity of the analytical component of current biological asset production management in crop production it is relevant to specify the objective and tasks of analysis. We think that the major objective of current biological assets of crop production is to provide managerial system with analytical information relevant to the target utility criteria.

Agricultural performance is estimated by the system of indicators. Economic studies reveal indicators that characterize study objects according to situation or effectiveness assessment criteria. The index acts as a value, criterion, parameter, level, measurer or indicator. It allows to evaluate the object and its adjustments as the basis for the assessment of economic development, growth, rise or contraction [1]. Environmentally balanced and responsible agricultural business entails agricultural production amid both soil fertility preservation and maintenance of natural environmental processes. Agricultural companies must seek profit but not by running down land resources and natural ecosystems. Thus, the tasks of current biological asset analysis in crop production have been defined. In our opinion they should include:

- Assessment of current biological asset availability to agricultural companies;
- Biological transformation cost analysis;
- Quality study;
- Assessment of production`s environmental determinants;
- Analysis of funding sources` structure of current biological asset in crop production;
- Estimation of trends and reserves of higher efficiency of biological asset in crop production.

It should be noted that to make analysis more efficient one should balance threats identified by the economic analysis.

Analytical information base is integral to the development of biological asset analysis` methodology in crop production taking into account their natural and economic characteristics, agricultural market environment. Therefore, we have formed the lines-of-analysis of current biological asset in crop production with specification (Fig. 1).

First, it is comparative analysis. Horizontal analysis allows to examine dynamics of current biological asset in general and its distinct types over time, to determine its general trends. Vertical analysis is used for making conclusions about current biological asset`s structure redistribution. The results of analysis are applied for asset structure assessment and its efficiency management.

Gross output in crop production depends on the completion of cultivation areas plan and crop yield. Let us study the accounting categories for cultivation areas to characterize total crop: planted, productive spring, produce and real produce. The acreage analysis is based on crop classification, i.e. groups with different qualitative characteristics. In addition, it is good practice to analyze distinct produce output per 1 UAH of certain current biological asset to characterize the rate of return on each type of current biological asset.

Biological transformation cost is a separate component of current biological asset analysis. General indicators of the efficiency of biological transformations tangible cost are material productivity, materials-output ratio and material costs to cost price ratio. Labour productivity in crop production is characterized by the system of direct and indirect indicators. Direct indicators entail production of certain types of agricultural produce (natural units) per 1 man-hour; direct labour cost (man-hour) for 1 ton produce (characterize labour-output ratio); gross crop production output cost per 1 man-hour; gross agricultural output cost per annual average employee. Indirect indicators of labour productivity include labour costs per 1 ha produce (man-hour); load of cultivation area per average annual worker. Rate of return of biological transformation, rate of return of current biological asset in crop production and growth rate of agricultural produce to biological transformation cost ratio are among general indicators significant in the process of biological asset of crop production analysis.

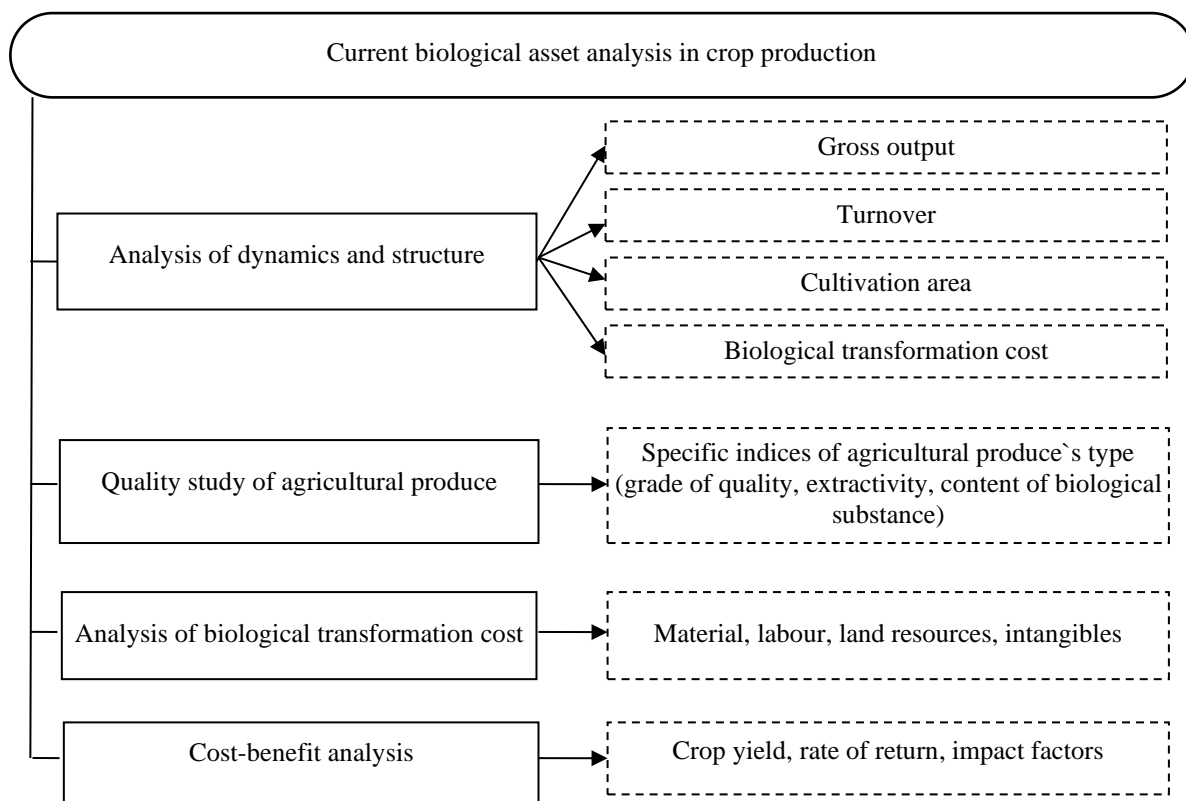


Fig. 1. Specification of lines-of-analysis of current biological assets in crop production [developed by authors]

The main method to increase agricultural produce is higher crop yield. To apply the method companies implement a set of tools to boost fertility, as well as intensive technologies of crop production, etc. Average crop yield by aggregate homogeneous crops, i.e. cereals, vegetables or feed crop depends on cultivation area structure's adjustment. To analyze this impact factor, crop yield index for actual cultivation area and conventional crop yield per 1 ha are applied. Multiple complicatedly interrelated technological and natural determinants affect crop yield indicators, namely soil quality, crop quality, cultivar, crop rotation, seeding rate and quality of seeds or planting stock, fertilizers and methods of fertilizer application. When analyzing these factors' impact on crop yield, more sophisticated methods like regression-correlation analysis than the method of comparison are used.

Nowadays when managing business costs companies often apply ABC-analysis. This method is easy to use, but a powerful analytical tool to reveal costs of special focus. ABC-analysis is based on the Pareto principle, which states that control over a small number of elements enables control over situation in general. The general algorithm of ABC-analysis includes the following stages: 1) specification of analysis objects; 2) specification of analysis parameter; 3) ranking of study objects in descending order; 4) specification of A, B and C groups. Thus, management should identify these small values, only then it is possible to quickly impact total amount in accordance with the set goal. The sum method is applied in the article to select nomenclature groups of ABC-analysis, the advantage of which is its flexibility. Let us conduct ABC-analysis to identify the expenditure, which is of great importance and the priority areas for cost price reduction (Table 2).

Table 2 – ABC-analysis of biological transformation cost in crop production at PJSC “Sonyachne 2007” (2017-2018s, mean value) \*

Expenditure	Total, thsd. UAH	Share volume, %	Share on an accrual basis, %	Group
Mineral fertilizers	2896,2	21,5%	21,5%	A
Other direct costs	2527,45	18,8%	40,3%	A
Fuels and lubricants	2381,3	17,7%	58,0%	A
Other material costs	1699,4	12,6%	70,6%	A
Seeds and planting material	1558,15	11,6%	82,2%	A
Depreciation on fixed assets	1097,65	8,2%	90,3%	B
Labour expenses	773,65	5,7%	96,1%	B
Third-party payment	353,85	2,6%	98,7%	C
Social payments	174,6	1,3%	100,0%	C

\*calculated by authors on the basis of PJSC “Sonyachne 2007” reporting

The ABC-analysis proves that almost 60% of biological transformation cost is for mineral fertilizers, fuels and lubricants. Therefore, the expenditures have to be the object of operational analysis and undesirable deviation control provided by a responsible person. Other material costs and seeds and planting material cost are also

significant expenditure. This biological transformation cost deserves management consideration as well. Group B expenditure, such as depreciation and labour expenses, occurs in a small proportion – 14% and requires current analysis. The results of ABC-analysis are presented in Fig. 2.

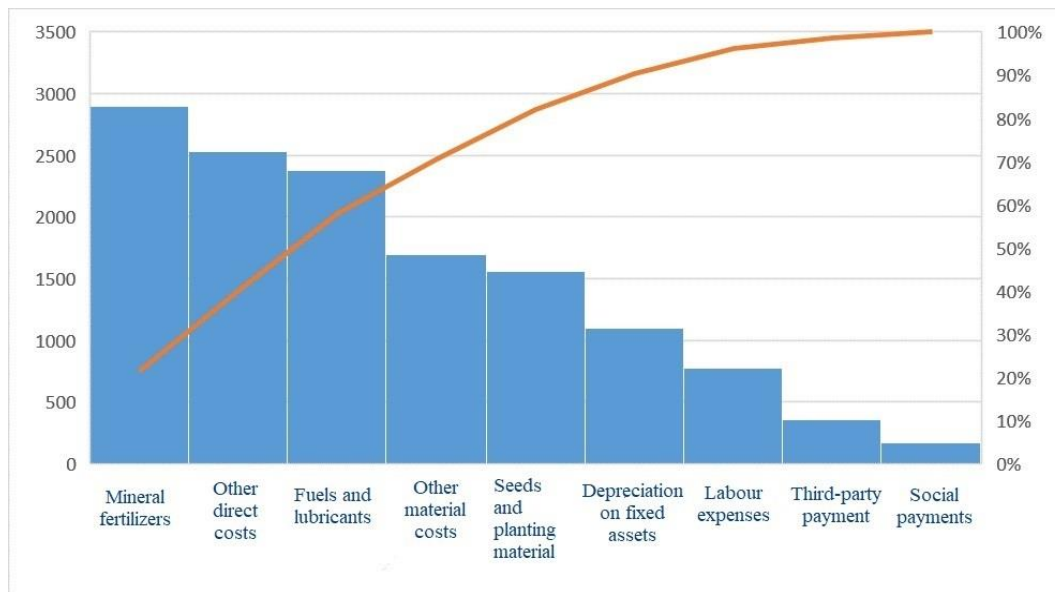


Fig. 2. ABC-analysis of biological transformation cost in crop production at PJSC "Sonyachne 2007" (2017-2018s, mean value) \*

[calculated by authors on the basis of PJSC "Sonyachne 2007" reporting].

However, the above mentioned cost grouping precludes the possibility of each crop expenditure estimation. A more detailed expenditure analysis for each crop produced at the studied company is needed to identify the most important expenditure separately for each type of current biological assets in crop production and to mark priority areas for operational control at agricultural enterprises.

### Conclusions

The nature of the "accounting and analytical support" concept and its features have been studied in the article. It has been determined that the effectiveness of informed managerial and investment decision-making for current biological asset depends on the accounting and analytical support's quality and timeliness taking into account crops, their transformation and produce features. Natural and economic characteristics of current biological assets in crop production have been considered, as well as an agricultural market environment to specify the goal and

tasks of their analysis. Lines-of-analysis of current biological assets in plant production with specification have been suggested: analysis of dynamics and structure, quality analysis; analysis of biological transformation cost; efficiency analysis, the ABC-analysis of biological transformation cost. It has been proved that the peculiarity of current biological asset produces efficiency analysis in crop production is biological transformation cost analysis. Hence, ABC-analysis has been applied. The results have revealed the expenditures as the object of operational analysis and undesirable deviation control provided by a responsible person of a company. Implementation of the defined lines-of-analysis will contribute to control effectiveness to improve managerial efficiency. In this context, the prospects for further analysis are the development of the forms of managerial reporting according to the proposed lines-of-analysis in order to build an analytical component of current biological asset management of crop production on the basis of efficiency and quality.

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