



Information systems for cost control of current biological assets of crop production

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Abstract

The economic events of recent years caused by the effects of the pandemic have contributed to rising farm costs. Determining the unit cost of current biological assets of crop production and detailing these costs by major categories is one way to optimize them and increase the efficiency of the main activities of the producer. It requires formation and implementation effective cost control mechanisms in crop production. The purpose of this study is development of scientifically sound proposals and recommendations for controlling the cost of current biological assets of crop production, identifying priority cost items at each stage of cost formation. The main standards for accounting for current biological assets of crop production in Ukraine are IAS 41 "Agriculture" and NP (S) FA 30 "Biological assets". Control is regulated by the company's accounting policy. It has established that it is possible to determine the actual cost of agricultural products only at the end of the year. Currently, in Ukraine there is no legal act that would give the right to reduce the time of determining the actual cost of agricultural products. To determine the financial result, there is a method of

sequential closing of accounts of different types of agricultural production. In order to improve the system of control over the value of current biological assets of crop production in agricultural enterprises, it is proposed to strengthen internal control by means of information systems and technologies. Control of costs that form the cost of crop production should be carried out both at the planning stage and during the execution of works and at the stage of their completion.

Keywords: Control; Cost; Accounting; Current Biological Assets of Crop Production; Costs; Internal Cost Control System; Information control systems.

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Introduction

The crop production is an important area of agricultural production. To meet the food needs of the population, crop production must ensure an adequate level of average annual gross harvest of agricultural products, increase feed production to create a strong fodder base for livestock. Producers are faced with the task of increasing yields, increasing and ensuring the efficiency of production of major crops.

Over the last 30 years, the structure of agricultural production in Ukraine has changed, the percentage of industrial crops (beets, sunflowers, soybeans, rapeseed) has decreased, as evidenced by the dynamics of sown areas (Fig. 1).

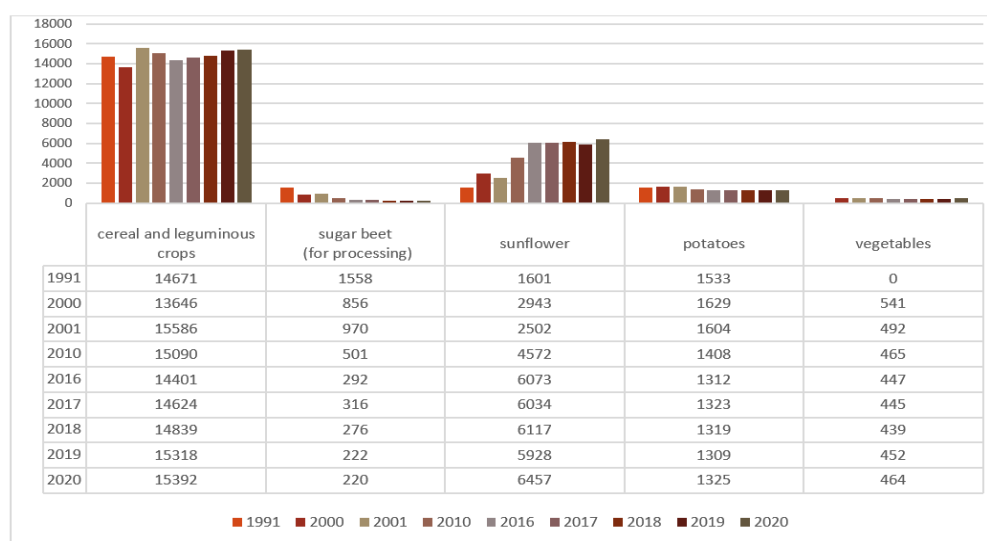


Figure 1. Dynamics of sown areas of agricultural crops, thousand hectares, Ukraine, 1991-2020 (State Statistics Service of Ukraine)

In 1990, Ukraine grew 47.1 million tons of industrial crops, and in 2020 - 27.6 million tons. In the period from 2010 to 2019, the sown area under wheat in Ukraine increased by 347.5 thousand hectares - up to 6 , 8 million hectares. At the same time, oilseeds are more profitable than cereals, which has led to a significant increase in their sown areas. The sown area of these crops is growing every year. Thus, in the 1990-1991 season, only 1.6 million hectares were allocated for sunflower in Ukraine, and in 2020-2021 - 7 million hectares of sown area.

The yields of some crops in Ukraine are shown in Figure 2.

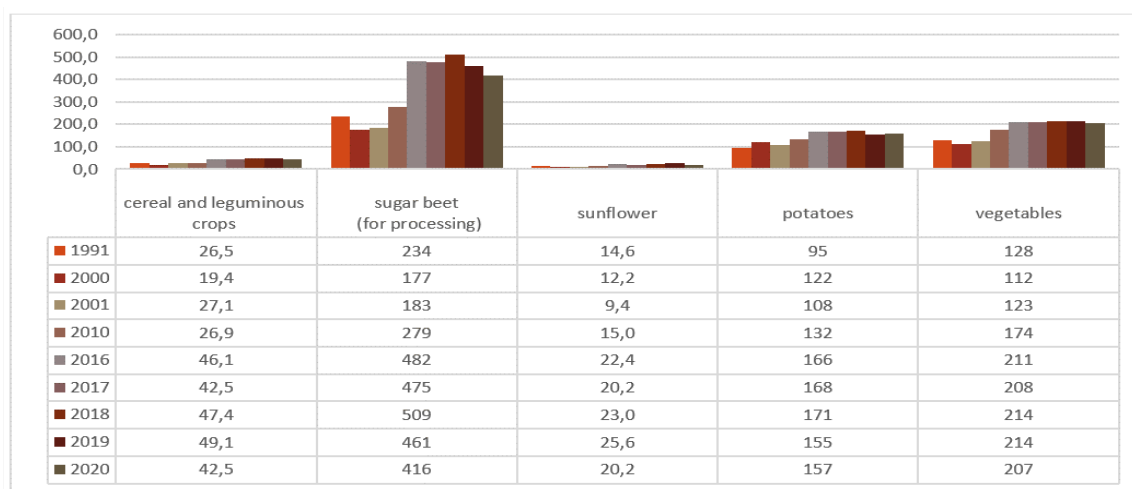


Figure 2. Dynamics of yield of some crops, c per 1 ha of harvested area, Ukraine, 1991-2020, (State Statistics Service of Ukraine)

According to the State Statistics Service of Ukraine, grain yields increased by 18% compared to last year. Production of crop products by Ukrainian enterprises, which account for 64.6% of the total, increased by 8.5% in January-July 2021 (against "minus" 15.7% in January-July 2020), households - by 4 , 4% (against "minus" 2.5%, respectively). During 2020 and 2021, a number of adverse economic events caused by the effects of the pandemic contributed to rising farm costs and had a significant impact on both the supply and cost of important agricultural resources.

Such factors have become (US Department of Agriculture, 2021):

- Increasing prices for goods, which is very important for producers of both crop (seeds, fertilizers) and livestock (feed, etc.).
- Widespread supply chain shortages: from shortages of agricultural equipment to shortages of fertilizers and pesticides, supply chain constraints increase the costs of agricultural producers.
- Restrictions on transportation. The various restrictions in the transportation pandemic, including a shortage of trucks and port closures, have led to increased transportation costs, leading to higher production costs.

- The labor shortages, which were also provoked by pandemic restrictions on the movement of people.

The data from the State Statistics Service of Ukraine indicate that production costs have been growing steadily for several years (Table 1).

Table 1. Total index of expenditures for production of agricultural products¹ in 2021, Ukraine (State Statistics Service of Ukraine, 2021)

	Total index of expenditures for production of agricultural products	Including		Indices of prices on material and technical resources of industrial origin consumed by agricultural sector
		crop production	animal production	
% to the previous month				
January	103.3	103.3	103.3	102.4
February	106.6	107.7	103.6	109.5
April	102.5	102.9	101.5	102.0
May	99.4	99.4	99.4	99.9
July	102.7	103.5	100.5	104.7
August	101.9	102.4	100.2	104.3
September	101.8	102.4	100.3	102.9
November	108.3	109.8	103.4	110.2
% to corresponding period of previous year				
January	122.5	115.4	137.8	113.2
January-February	126.4	120.4	140.1	119.7
January-March	130.4	125.1	142.5	125.4
January-April	132.2	127.8	142.3	129.9
January-May	133.6	129.7	142.4	132.4
January-June	134.0	130.4	141.5	133.8
January-July	134.7	131.5	141.3	135.8
January-August	135.6	132.8	141.1	137.8
January-September	136.0	133.7	140.1	139.4
January-October	137.2	135.6	139.1	142.1
January-November	138.8	138.8	137.8	145.5

¹ Data exclude the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and a part of temporarily occupied territories in the Donetsk and Luhansk regions.

According to the forecast US Department of Agriculture (2021), total farmers' production costs have expected to grow by 7.3% or \$ 26.1 billion, reaching \$ 383.5 billion in 2021. This is the highest level of spending since 2016. As a result of rising input costs, farmers have needed to spend more of their working capital on production costs. If a significant part of working capital is spent on production costs, less can be used to expand and invest in the growth and development of their activities.

In such a commodity industry as crop production, the cost control system becomes especially important for the manufacturer, which is a determining factor in business development in the long run. Determining the cost per unit of output and detailing these costs by major categories is one way to find out what costs to focus on and try to reduce.

In the context of the development of accounting, gradual alignment with International Standards, the practice of accounting in agriculture in a separate accounting category allocated plants and animals as objects of agricultural activity (Singgih Setya Zenandaa & Mohamad Suyunusb, 2020).

The peculiarity of accounting in agricultural enterprises is that most transactions have related to the reflection of the movement of biological assets. A biological asset is an animal or plant that in the process of biological transformation is able to provide agricultural products and/or additional biological assets, as well as otherwise bring economic benefits. The technological process of crop production is quite long and seasonal. Therefore, it is possible to determine the actual cost of crop production only at the end of the year. The issue of reorganization of the system of cost control of current biological assets of crop production became acute (Rafael Todescato Cavalheiro et al., 2018; Shmatko et al., 2020). Determining the fair value of current biological assets is a challenge. Therefore, the problem of developing a control mechanism at each stage of the formation of the cost of current biological assets of crop production is relevant.

The purpose of the study is to develop scientifically sound proposals and recommendations for controlling the cost of current biological assets of crop production, identifying priority cost items at each stage of cost formation.

Of course, farmers cannot control prices. Therefore, the system of internal control of production costs becomes especially important. Such a system will help reduce costs and preserve working capital of the enterprise. In conditions of increased instability, taking into account the increase in production costs will be crucial in making management decisions on producer activities and implementing effective strategies to reduce the total cost of agricultural production.

Literature Review

The term "biological assets" has defined in International Accounting Standard (IAS) 41 "Agriculture" and National Provision (Standard) of the Financial Accounting (NP(S)FA) 30 "Biological assets". According to the international standard, a biological asset is a living animal or plant (IASB, 2000). Many researchers believe that to define the term "biological assets" should use clearly defined features of the asset as an economic category, ie the asset: (1) must be owned by the enterprise (controlled by the enterprise), (2) must have a certain value in monetary terms, 3) should bring future economic profits (Bielova et al., 2017; Popov et al., 2021; 2022; Zavorodnii et al., 2021).

IAS 41 "Agriculture" and NP (S) FA 30 "Biological assets":

- reflect the methodological principles of formation in accounting information about biological assets and about additional biological assets and agricultural products obtained in the process of their biological transformations;

- determine the general principles of valuation of biological assets, generation of income and expenses and determination of financial results based on them;
- regulate the disclosure of information about biological assets in the financial statements.

IAS 41 Agriculture sets standards for the accounting and financial reporting of agricultural activities. IAS 41 deals with items related to agricultural activities:

1. Biological assets.
2. Agricultural products at the place of harvesting.
3. State subsidies related to agricultural activities.

According to research (Rubén Dario Marrufo Garcia & Abel Maria Cano Morales, 2021), the main provisions of IAS 41 apply only until the time of harvest. All subsequent operations and production processes that use agricultural products as raw materials will be governed by the provisions of IAS 2 Inventories. At present, there are some misunderstandings regarding the inclusion of certain agricultural products, there are not very clear boundaries of the application of IAS 41 or IAS 2.

The national standard of Ukraine proposes the following definition: "Biological asset - an animal or plant that in the process of biological transformation is able to provide agricultural products and /or additional biological assets, as well as otherwise bring economic benefits" (NP(S)FA, 2005).

By type of economic activity, the biological assets have divided into agricultural and other biological assets not related to agricultural activities.

Agricultural includes biological assets that are capable of producing agricultural products and/or additional biological assets that have intended for sale or use in agricultural activities.

Other biological assets not related to agricultural activities have recognized:

- stocks, if they are not used in agricultural activities and have held for sale or the direction of their use is uncertain;
- fixed assets, if they have used in activities other than agricultural, and the expected period of their use is more than one year (or operating cycle, if longer than one year).

Other non-agricultural biological assets include perennials and animals that have bred and kept for purposes other than agricultural production, including forest strips, ornamental plants, circus and zoo animals, and so on.

Depending on the industry, agricultural biological assets have divided into:

- biological assets of crop production;
- biological assets of livestock.

According to item 4 NP(S)FA 30, current biological assets are biological assets capable of producing agricultural products and/or additional biological assets, otherwise bringing economic benefits for a period not exceeding 12 months. Current biological assets differ in duration and life cycle, their dependence on natural and climatic conditions (Aboody et al., 2002; Yang Ou et al., 2021).

Researchers pay special attention to the assessment of the fair value of biological assets (Ratté-Fortin, C. et al., 2019; Argilés, JM et al., 2011; Filho, ACCS et al., 2013; Bondarenko et al., 2021).

Current biological assets of crop production are: cereals, vegetables, technical, fodder crops and nurseries, etc. (NP (S) FA, 30). Additional biological assets of crop production after their initial recognition and separation from the biological asset and/or soil, they are recognized as a stock and accounted for as part of agricultural production. In their theoretical research, the authors reflect the features of accounting in agriculture in different countries (Lampe & Sharp, 2017; Bohušová et al., 2012; Maruli & Farahmita, 2011; Danylyshyn et al., 2019).

Vanová et al., (2017), Shmatko et al., (2020) investigated the importance of financial reporting for agricultural companies. The authors proved the existence of specific factors that determine the production process in primary agricultural production.

In the given works it is given to problems of an estimation of biological assets. Research suggests that satisfactory accounting models for estimating the fair value of biological assets of agricultural enterprises are virtually non-existent. The research Li Yu (Colly) et al., (2018) proved that the fair value of biological assets does not provide an opportunity to predict future operating cash flows, whether or not market prices have used or estimated by management. This approach has applied to the period in which it becomes possible to determine the fair value of current biological assets.

Researchers (Rubén Dario Marrufo Garcia & Abel Maria Cano Morales, 2021; Babenko et al., 2019) claim that it is impossible to reliably determine this indicator at the balance sheet date. Biological assets are recognized and recognized at cost, except for current biological assets of crop production, which have recognized as work in progress.

Ismayilov (2020) proves that the issue of fair value of assets is a popular area of research, because, as the results of the study show, that the most violations of the fair value of assets and corporate governance. In addition, violations have identified due to uncertainties regarding cost accounting, accounting methods, asset value, valuation, cost-benefit analysis, and so on. The author argues that the triangles "accounting / financial management - book value / IFRS - cost accounting / asset management - valuation of equity / financial statement" are key areas for improving the organization of accounting and auditing the book value of assets.

The defining features of current biological assets are:

the period during which biological assets are able to bring economic benefits in any form (for current - this is a period not exceeding 12 months);

the initial recognition of agricultural products has reflected in the reporting period in which it is separated from the biological asset;

the initial cost of additional biological assets that have not used in agricultural activities are their fair value less costs to sell, determined at initial recognition, or the cost at which they have recognized at the date of recognition of their inventories;

costs associated with the biological transformation of biological assets have recognized as operating expenses (paragraph 17 NP(S)FA 30).

A study of literature sources showed that in practice there are a number of problems to control production costs and cost of crop production:

there is a large number of objects that relate to biological assets and are different in nature, so it is necessary to ensure clarity on the main categories of accounting for biological assets of agricultural enterprises;

identification of groups of biological assets (their classification according to certain characteristics) is important for accounting purposes, which is the basis of methodological principles for determining the objects of accounting and calculation, evaluation of biological assets, as well as determining performance;

for the correct organization of accounting, first of all, it is important to clearly identify the objects of accounting, as inaccurate choice of the object of cost accounting can lead to errors in determining the actual cost of finished products;

needs to improve the process of accounting and control of the availability and movement of biological assets, which is quite complex due to the fact that they are constantly changing, are exceptional, acquire age maturity, etc.;

agricultural enterprises need to form an appropriate system of information and accounting support in order to increase the efficiency of biological assets, increase competitiveness;

the organization of accounting and control must provide conditions for reliable and real accounting of biological assets, their analysis and proper management control.

Therefore, the issues of accounting and valuation of biological assets are very important for improving the efficiency of agricultural enterprises. Khushvakhtzoda (Barfiev) & Nazarov, D. (2021), Kuznetsov et al. (2019; 2021) in their research they conclude about the need to create a digital platform for the collection and processing of data related to the accounting of biological assets, which will allow the introduction of digital valuation methodology.

According to a recent report McKinsey & Company (2020), agriculture is currently the least digitized industry in the world. Technologies implemented in agricultural production are

mainly aimed at creating powerful and efficient mechanisms, as well as more productive seeds and fertilizers (Hetman et al., 2019; Marhasova et al., 2020). Therefore, agricultural production needs effective digital tools to improve the management system, optimize business processes, create an effective system of control over production costs. Artificial intelligence, analytics, controls and other new technologies would help to further increase yields, efficiency in the use of soil, seeds, water and other resources, as well as ensure sustainability in crop and livestock production (McKinsey & Company, 2020; Bondarenko et al., 2019).

Methodology

The methodological basis of the study is the dialectical method of cognition of phenomena and processes. The analytical, systematic and comparative methods have become the basis for identifying the essence of current biological assets of crop production, highlighting their main characteristics that are crucial for accounting and selection of analytical factors and indicators. The deductive, inductive and comparative methods were used to form the conceptual apparatus, to establish the advantages and disadvantages of the current practice of valuation of biological assets, to justify the cost of their formation. Methods formal logic and generalization became the basis for improving the organization and methods of accounting for the formation of biological assets, substantiation of the concept of cost control system and cost of production of current biological assets of crop production.

To account for crop production the concept of "technological operation" was introduced. All documents on the registration of the fact of work performed accumulate data in terms of typical technological operations. The structure of crops has entered into the program, graphic representation of the scheme of fields is possible. Costs of preparation for production activities have accumulated in terms of fields, crops and cost items. The mechanism of cost distribution in proportion to the area of fields, cost analysis, calculation of actual cost has implemented. The generalization has applied for the purpose of development of structural schemes of the account and control of prime cost of current biological assets of plant growing, stages of their realization, substantiation of interrelations between constituent elements of these systems.

Information base scientific research is the scientific work of domestic and foreign scientists on the problems of accounting and cost control and the formation cost of current biological assets of crop production agricultural enterprises; development of research institutions; normative and legal documents of Ukraine; international and national accounting and control standards; instructional materials; official statistics and factual information of agricultural enterprises.

Results

Accounting for current biological assets of crop production: the experience of Ukraine

With the adoption of January 1, 2003 IAS 41 “Agriculture” On November 18, 2005, the Ministry of Finance of Ukraine approved NP(S)FA 30 “Biological Assets”. Also, Methodical recommendations on accounting of biological assets, approved by the Order of the Ministry of Finance of Ukraine dated 29.12.2006 № 1315, were developed to clarify the procedure for applying the provisions of the standard (Methodological recommendations № 1315).

The object of accounting in crop production can be both individual types of such bioactive assets and their individual groups (Methodological recommendations № 1315). In crop production it is:

- certain crops (winter wheat, barley, millet, etc.);
- plant species (cereals, fodder, industrial crops, vegetables, etc.);
- homogeneous groups of bioactive assets, which consist of subspecies of agricultural crops (winter and spring cereals) or individual crops (barley, corn, etc.).

The examples of current biological assets in crop production are shown in table 2.

Table 2. The example of current biological assets of crop production and agricultural products

Current biological assets of crop production	Agricultural products	Additional biological assets	Processed products
Cereals	Grain, grain waste, straw		Flour, cereals, feed
Vegetable crops	vegetables		Canned vegetables, pickles
Technical cultures	Tobacco leaves, sunflower seeds, sugar beets		Tobacco, butter, sugar
Forage crops	Green mass, roots		Silage, haylage
Nurseries		seedlings	

Highlighting the characteristics of classification groups helps to form a holistic system of analytical accounting of biological assets.

On the basis of maturity, there are mature and immature biological assets.

Mature biological assets are current biological assets that have reached a certain condition. Immature biological assets include perennial plantations (orchards, vineyards, berries) that have not reached the time of fruiting.

Depending on the possibility of multiple production of agricultural products and additional biological assets, there are consumer biological assets and biological carrier assets. The consumer biological assets - biological assets that are able to give one-time agricultural products, after which they end their existence: there are crops of annual crops (wheat, corn, sunflower, barley, etc.); trees grown for timber, etc. The biological assets-carriers - biological

assets that are able to repeatedly provide agricultural products or additional biological assets: vineyards - for grapes; gardens - for fruit collection; forest trees, from which wood is obtained without felling the trees themselves, etc.

According to the term of use, the biological assets are divided into:

- Current biological assets;
- Long-term biological assets;
- Immature long-term biological assets.

The current biological assets - biological assets capable of producing agricultural products and/or additional biological assets, otherwise bringing economic benefits for a period not exceeding 12 months. The current biological assets include plants that are less than 12 months old or less economically viable than one year, including winter and spring cereals, annual grasses, and so on.

Long-term biological assets include perennials, including orchards, vineyards, hop and berry plantations, perennial grasses, and so on.

Immature long-term biological assets include biological assets with an operating cycle of more than 12 months, which in the reporting period are not yet able to provide agricultural products and/or additional biological assets of a certain quality, in particular perennials (orchards, vineyards, berries, etc.) have not reached the time of fruiting.

An important classification feature is the method of valuation of biological assets. The basic approach to the measurement of biological assets is the application of fair value, at which all biological assets and agricultural products at initial recognition and at the balance sheet date have measured at fair value less costs to sell.

However, the rules NP(S)FA 30 on the valuation of biological assets and agricultural products are not unalterable. Thus, long-term biological assets whose fair value cannot be measured reliably at the balance sheet date have recognized and carried at cost, taking into account the amount of depreciation and impairment losses, in accordance with NP(S)FA 7 "Fixed assets".

Similarly, current biological assets whose fair value cannot be measured reliably at the balance sheet date have recognized and carried at cost in accordance with NP(S)FA 9 "Inventories".

The fair value of a biological asset has based on active market prices. However, in the absence of an active market, the fair value of biological assets and agricultural products has determined at market price. In addition, in the absence of information on market prices for biological assets, fair value has determined at the present value of future net cash flows.

The separation of the cost approach into a separate classification feature is primarily due to the disclosure requirements for biological assets, as the Notes to the Financial Statements

should separately state biological assets that are not measured at fair value. Therefore, to ensure the formation of information about biological assets in order to properly disclose them in the financial statements, they have divided into:

- biological assets measured at fair value;
- biological assets measured at cost.

Depending on the right of ownership, long-term biological assets have divided into own and leased.

Current biological assets of crop production that have not reached maturity and the technological process of which has not completed, are recognized as an asset (ie reflected in sub-account 211 "Current biological assets of crop production measured at fair value »), if their fair value can be reliably determined.

Otherwise, they continue to be reflected in the work in progress (account 23 "Production") and have valued at production cost in accordance with NP(S)FA 16 "Costs" (Methodological recommendations № 1315).

In a general sense, biological assets at the balance sheet date have measured at fair value less estimated point-of-sale costs (NP(S)FA, 2005). Exceptions to this rule are current biological assets of crop production, which have accounted for and valued at the balance sheet date as work in progress. Analytical accounting has conducted by types (crops) of current biological assets of crop production (crops of cereals, technical, vegetable, etc.).

Some evaluation rules have provided for:

- substandard agricultural products and additional biological assets (in the absence of an active market in them). They can be assessed on the basis of market prices for such conditional agricultural products and additional bioactive assets, adjusted for quality and suitability for use;
- by-products of agricultural products in the absence of an active market. It can be estimated by the regulatory costs of collection, transportation, movement, removal and other costs associated with the procurement of these products.

Defective agricultural products and wastes that cannot be used in the production process or sold have not recognized as assets. Therefore, their disposal costs have included in other operating expenses. Additional bioactive assets and agricultural products arise as a result of biological transformation of bioactive assets. To obtain such assets, the company incurs certain costs (planting material, fertilizers for crops, plant protection products, wages, depreciation of agricultural equipment, etc.). In this case, the costs of accounting have recognized as the costs of operating activities and reflected in the rules provided NP(S)FA 16"Costs".

In the case when agricultural products and additional bioactive assets have recognized at fair value, there is a difference between the cost at which such objects have recorded on account 23 "Production" and the value at which they have posted to account 21 "Current biological assets" or 27 «Agricultural products ».

This difference, depending on its outcome, has recognized as income or expense from the initial recognition of agricultural products and additional bioactive assets received during the reporting (calendar) year (NP(S)FA, 2005; Methodological recommendations № 1315).

Income (expenses) from the initial recognition of agricultural products and additional bioactive assets are included in other operating income (expenses).

They have displayed, respectively, on:

- sub-account 710 "Income from initial recognition and changes in the value of assets carried at fair value";
- sub-account 940 "Expenses on initial recognition and changes in the value of assets carried at fair value".

In this case, the excess of the fair value of agricultural products and additional bioactive assets over the amount of costs incurred in connection with their receipt, reflect the correspondence:

Dt 23 - Kt 710.

In the opposite situation - written off as part of costs:

Dt 940 - Kt 23.

Revenues (expenses) from the initial recognition of additional biological assets and agricultural products have calculated for each object of accounting for biological assets. Do this:

- once a year - at the end of the reporting (calendar) year;
- at each balance sheet date, adjusted for the actual amount of income (expenses) from the initial recognition of additional bioactive assets and agricultural products, determined at the end of the reporting (calendar) year.

Example.

The agricultural enterprise carried out preparatory work for sowing fodder crops (including pre-sowing soil preparation, fertilization, sowing, watering, fertilizing, herbicide treatment, etc.).

Expenses for labor, services of contractors and other expenses (overhead) amounted to UAH 200,000.00.

Expenses for care of crops and harvesting of fodder crops (wages and other related expenses related to general production) - UAH 70,000.00.

At the balance sheet date, forage crops were estimated at UAH 330,000.00.

At the time of harvest of fodder crops, their estimate was 550000.00 UAH.

Display of operations will be shown in two versions:

- 1) at cost;
- 2) at fair value less costs to sell.

The display of operations is shown in table 3.

Table 3. Reflection in accounting of the valuation of current biological assets

№	Content of business transactions	Correspondence of sub-accounts		Amount, UAH
		Debit	Credit	
Cost estimation				
1	Sowing costs before the balance sheet date are shown	23	208, 631, 65, 66, 91	200000.00
2	Expenses are displayed after the next balance sheet date	23	208, 65, 66, 91	70000.00
3	The harvest is posted	27	23	270000.00
Measurement at fair value				
1	Sowing costs before the balance sheet date are shown	23	208, 631, 65, 66, 91	200000.00
2	The harvest is posted	211	23	330000.00
3	Revenue from initial recognition is recognized (330000.00 - 200000.00)	23	710	130000.00
4	Expenses are displayed after the next balance sheet date	23	208, 65, 66, 91	70000.00
5	The cost of crops is written off on the date of harvest	23	211	330000.00
6	The harvest is posted fodder crops	27	23	550000.00
7	Revenue from initial recognition is recognized (550000.00 - 330000.00 - 70000.00)	23	710	150000.00

If shortages, damage, loss of current biological assets or agricultural products have detected, they must also be written off from the balance sheet. In this case, as in the case of ordinary stocks, use sub-account 947 "Shortages and losses from damage to property".

The amount of damage and shortages in excess of the rate of natural loss at the same time as write-off has reflected on the debit of off-balance sheet sub-account 072 "Uncompensated shortages and losses from damage to property".

Here, such amounts appear until the issue of the perpetrator of the damage (shortage) has resolved. After establishing the culprit, the amount of losses has debited to the credit of sub-account 072 "Uncompensated shortages and losses from damage to property".

At the same time recognize the debt of the guilty person to compensate the company for losses and income (Dt 375 "Calculations for damages" - Kt 716 «Reimbursement of previously written off assets").

If the culprit has not identified, the amount of losses should be listed on sub-account 072 "Uncompensated shortages and losses from damage to property " not less than the statute of limitations from the moment of establishing the fact of damage (shortage).

Cost accounting and costing of current biological assets of crop production

According to the Methodological recommendations (№ 1315), the actual cost of products (works and services) on agricultural enterprises has calculated as a whole for the year. The exception is the determination of the cost of products (works, services) of ancillary production, which has determined monthly. Services provided by one ancillary production to another are valued at the planned cost and have not adjusted.

It will not be possible to determine the actual cost of agricultural products by places, as the process of production of crop products is more than a month and is seasonal. Currently in Ukraine there is no legal act that would give the right to reduce the time of determining the actual cost of agricultural products.

The sequence of appropriate actions is important to determine the financial result. The procedure for closing the accounts of various types of agricultural production is prescribed in item 6.2 of the Recommendations № 132. Schematically, this sequence is shown in Figure 3.

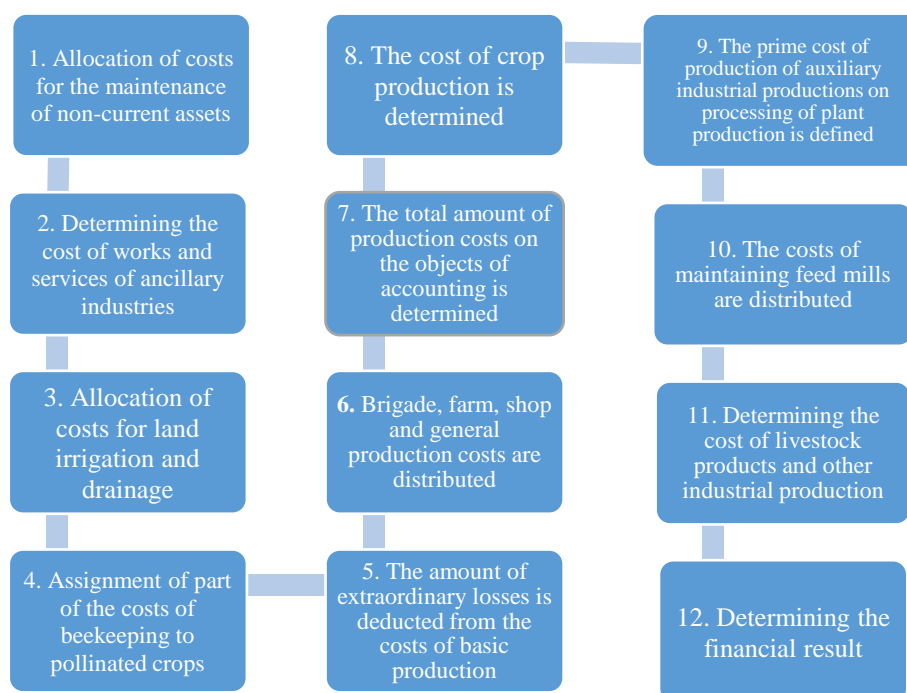


Figure 3. The sequence of closing accounts in determining the financial result of production in agricultural production

To close the accounts of production set a specific sequence:

1. The costs of maintaining non-current assets have distributed among the individual objects of planning and accounting.
2. The cost of works and services of auxiliary productions has determined.

3. General costs have allocated: for irrigation and drainage of lands, including costs for maintenance of reclamation facilities, liming and plastering of soils and maintenance of protective strips.
4. Part of the costs of beekeeping for pollinated crops is written off.
5. The amount of extraordinary losses has deducted from the costs of basic production.
6. Brigade, farm, shop and general production costs have distributed.
7. The total amount of production costs for the objects of accounting has determined.
8. The cost of crop production has determined.
9. The prime cost of production of auxiliary industrial productions on processing of plant production has defined.
10. The costs of maintaining feed mills have distributed (according to the decision of the owner, which must be approved by the order of the accounting policy of the enterprise, the distribution of costs can be performed monthly).
11. The cost of livestock and other industrial products has determined.
12. The financial result of production of marketable products of crop production, animal husbandry and auxiliary industrial productions is determined.

The cost of certain types of agricultural products has determined based on the costs attributed to the crop.

The production cost of plants includes:

- direct material costs;
- direct labor costs;
- other direct costs;
- variable overhead and fixed allocated overhead costs (item 11 NP (S) FA 16).

Overhead costs can not be attributed only to the production of one specific type of product, they always relate to several types. Overhead costs in agricultural enterprises have not divided into fixed and variable. Overheads include (Methodological recommendations № 1315):

- production management costs. These include wages, social security contributions, health insurance, pay for business trips of management staff and specialists, and so on;
- depreciation of non-current assets of general production purpose;
- costs of maintenance, operation and repair, insurance, operating lease of fixed assets, other non-current assets of general production purpose;
- costs of improving technology and organization of production, such as wages of workers engaged in improving product quality; payment for the services of third-party organizations and so on;

- costs of heating, lighting, water supply, drainage and other maintenance of common production facilities;
- costs of maintenance of the production process (wages and other costs of technological control over production processes and quality of products, works, services, etc.);
- costs of labor protection, safety and environmental protection;
- other costs (losses from marriage, payment of downtime, etc.);
- rent for land and industrial property;
- the amount of accrued (paid) fixed agricultural tax. At the end of the reporting year, this amount has distributed among the objects of accounting for production costs in proportion.

Overhead costs have recorded in separate sub-accounts opened to account 91 "Total expenditures». During the year, the debit of these accounts collects overhead costs, which should then be distributed among the types of agricultural products, the production of which is associated with these costs.

Thus, the corresponding sub-account has debited from the loan to account 91 "Total expenditures» debit costs of the relevant sub-account of production, opened to account 23 "Production".

As a general production costs in agricultural enterprises have not divided into fixed and variable, such costs should be included in the production cost in full.

General production costs for growing crop products have distributed among the objects of accounting for production costs in proportion to the area of land occupied by certain crops.

In the case of overhead costs affecting all industries, the distribution is between the main industries and the objects of costs in proportion to the total amount of direct costs less:

- in crop production - the cost of seeds;
- in animal husbandry - fodder;
- in industrial units - raw materials and semi-finished products.

This distribution requires a self-developed calculation of overhead costs, which indicate:

- objects of accounting and the amount of overhead costs allocated;
- distribution base;
- calculated cost allocation factor.

On the basis of such calculation, the accounting department forms an accounting certificate and carries out the final distribution of costs.

The costs of ancillary production should be collected on sub-account 234 "Ancillary production" with separate analytical accounts to account for costs and output of products or services provided for certain types of production.

Expenses for the period have distributed among the objects of accounting on a monthly basis on the basis of the physical volume of services provided.

Calculations of the cost of services of auxiliary productions are made out in any form. On the basis of such calculations, the accountant draws up an accounting certificate, which will form postings to close the accounts of ancillary production and the distribution of accrued costs to the objects of accounting for other industries.

At the time of posting, the quantity and cost of harvested agricultural products are determined. That is, the costs incurred so far have included in the cost, and incurred after - are included in the costs of the current period, such as marketing costs and so on. At the same time, after closing the accounts, the analytical section of the received cost has preserved, which allows to analyze the structure of the actual cost by type of costs (seeds, fuels and lubricants, fertilizers, wages, budget contributions, etc.).

Controlcost of current biological assets of crop production

In the crop production, cost reduction is the key to long-term success.

Therefore, the cost control is absolutely necessary. Determining the cost per unit of output and detailing these costs by major categories is one way to find out what costs to focus on and try to reduce. To do this, it has recommended to follow the main strategic directions (Fig. 4) (Agamerica Lending, 2021).

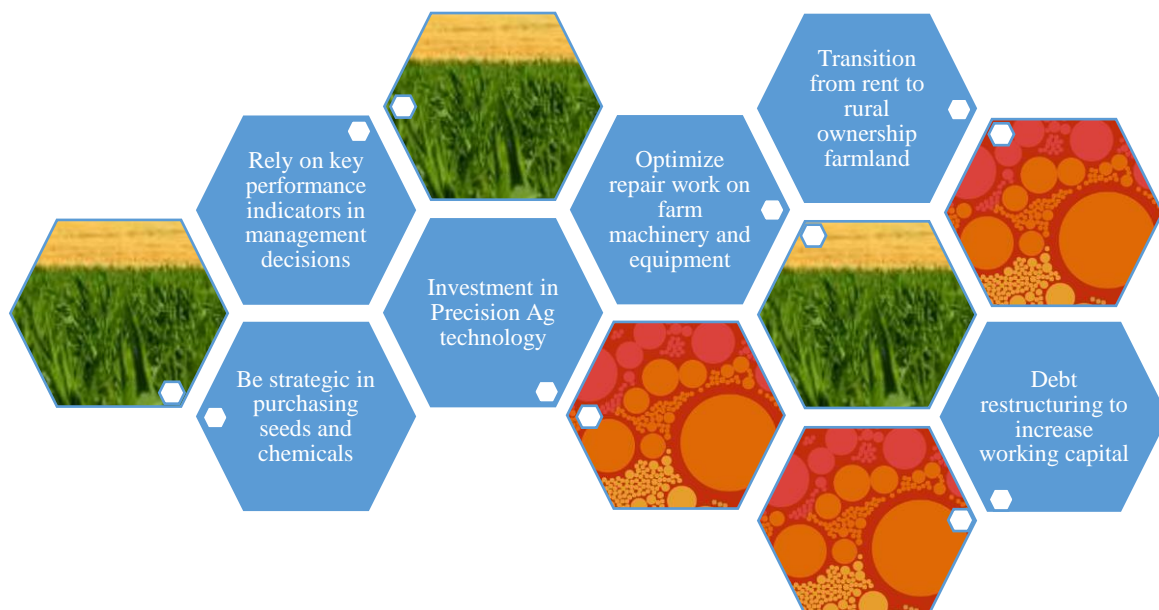


Figure 4. Strategic directions of crop agribusiness to reduce production costs

Such strategic directions are:

1. In making managerial decisions rely on key performance indicators. KPIs have used to measure the success of an operation. However, it is important to recognize that they differ depending on the specific operation. Paying attention to quantitative measurements of the financial condition of the activity, it is important to understand when and where to reduce production costs, at what process, stage of production, culture. That is, the introduction of continuous monitoring of these indicators helps to increase yields and reduce overall costs.
2. Be strategic in purchasing seeds and chemicals. Before buying seeds, pesticides, herbicides and fertilizers, conduct research and compare cost and quality between suppliers. To do this, use online reviews or contact the community of agricultural companies to make sure that the quality of the product meets the goals and needs of the enterprise. It is appropriate to place orders in advance, to organize preliminary negotiations with suppliers on prices, which is especially important in conditions of market instability. The introduction of modern technologies, comprehensive methods of pest control is a good way to limit the cost of fertilizers.
3. Invest in Precision Ag technology, which is essentially a method that can help increase production at a lower cost. Such technologies are: GPS, variable rate technology, drip irrigation systems, smart cloud databases, AI technology and more. By helping to optimize raw material purchases, accurate growing technology helps reduce costs. For example, farmers using precision cultivation technology have increased corn yields by 11 percent while reducing operating costs by nine percent (Precision Ag, 2021).
4. Optimize repair work on farm machinery and equipment. In the current period, new agricultural equipment may be unprofitable for the agricultural firm. Existing supply chain problems have made it even more difficult to provide new agricultural equipment. Various factors need to be considered that indicate whether the purchase of new equipment is cost-effective or not. Therefore, it is more appropriate now to repair existing equipment in anticipation of lower prices in the future.
5. Transition from lease to ownership of agricultural land, as land lease entails additional costs that increase the total cost of production. Acquisition of agricultural land is an alternative to rent, which not only eliminates the cost of rent, but also provides the farmer with stable investments that will become more expensive over time. In addition, property rights give you more autonomy in how you decide to use your land.
6. Debt restructuring to increase working capital. By combining existing debt into a new loan with lower payments, a farmer can increase his working capital to invest in operational upgrades and improvements.

An important direction in the formation of a system of control over the cost of current biological assets of crop production in agricultural enterprises is to strengthen internal control (Fig. 5).

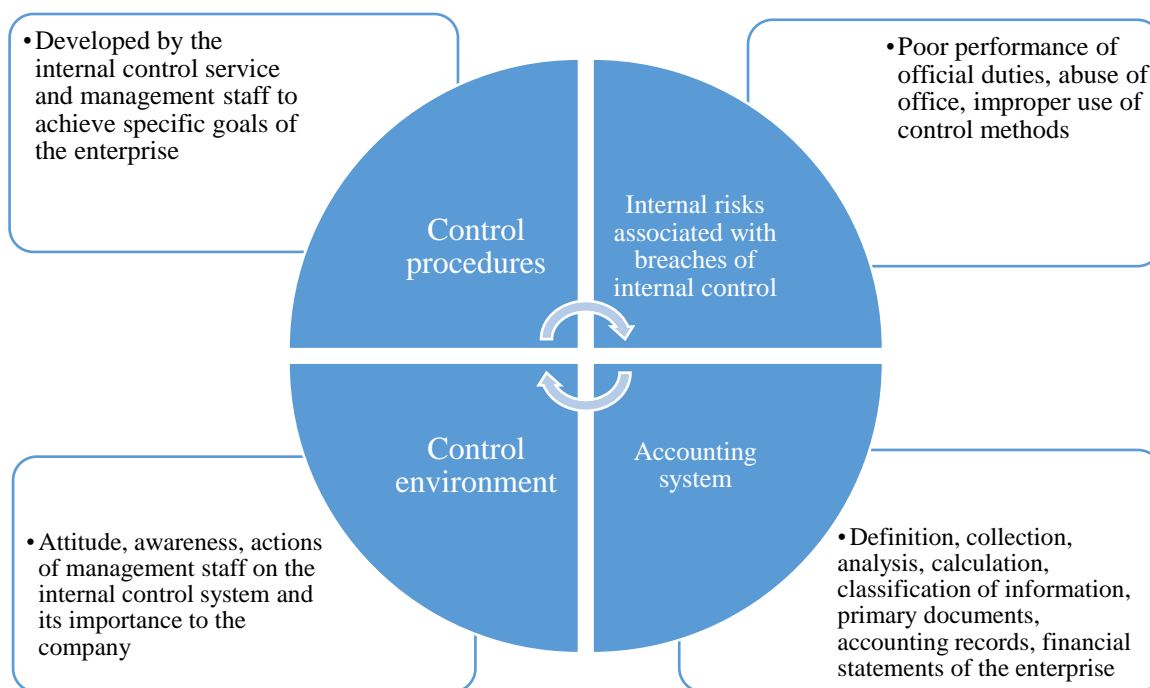


Figure 5. Elements of the internal control system

Control of costs that form the cost of crop production should be carried out both at the planning stage and during the implementation of works and at the stage of their completion (Table 4).

Table 4. Components of internal control of the cost of current biological assets of crop production

Preliminary control	Current (operational) control	Final control
<i>The period of control procedures</i>		
Bringing goals, objectives to the performers, checking the availability and ability to attract the necessary resources. Competent employees of the internal control service must develop and implement effective measures to preserve the property of the enterprise, including current biological assets of crop production, from destruction, theft, etc.	The control of current economic activity should be carried out comprehensively, so this should be done by specialists who know the economics and technology of production in crop production.	After completion of work in the structural units of the economy
<i>The process of ensuring internal control</i>		
Ensuring sufficient confidence of the management staff in achieving the appropriate level of conservation and efficiency of all types of resources of the enterprise, including current biological assets of crop production, confirmation of the correctness of their accounting in accordance with applicable law and accounting policies	Measurement of the obtained results and comparison of operational reports with the internal cost standard, detection of losses during the execution of the work	Preparation of reports on the implementation of plans with a certain frequency, as well as in the form of inspections. Provides information for planning similar work, helps motivate staff
<i>Objects of internal control</i>		
groups of current biological assets, organization and reliability of accounting for biological assets, documentation of operations with current biological assets, the reality of their fair value in the financial statements, economic indicators of current biological assets of crop production, agricultural enterprise management system		

The internal control of production costs has carried out in the process of economic activity (at the time of implementation and registration of business transactions) and allows you to identify shortcomings, study the causes of their occurrence and take measures to eliminate them.

Tasks and basic control procedures have presented in table 5.

Table 5. Methods and basic procedures for the organization of internal control of the cost of current biological assets of crop production

The task of organizing the control of current biological assets of crop production	Methods and sequence of procedures for control of current biological assets of crop production
<ul style="list-style-type: none"> - constant provision of managers and specialists with up-to-date information on the availability and condition of sown areas, compliance with production standards, the effectiveness of agro-technological measures; - checking the timeliness and accuracy of paperwork for operations and providing complete data on biological transformations of plants; - control over the preservation of current biological assets, the state of sown areas, obtained as a result of growing plants with agricultural products in storage and at all stages of movement; - verification of the actual existence of groups of biological assets; - correct calculation of the initial value of current biological assets of crop production at the time of their receipt; - determining the fair value of current biological assets at the balance sheet date and disposal date; - analysis of the efficiency of the use of current biological assets 	<ul style="list-style-type: none"> - checking the availability of current biological assets of crop production; - checking records and documents and comparing them with existing assets of the enterprise; <ul style="list-style-type: none"> - comparison of internal data with external sources of information; - verification of calculations in documents by arithmetic; - maintenance and verification of control accounts and trial balances; - monitoring the inventory process and displaying information on the movement of biological assets, comparing the results of the inventory with the accounts; <ul style="list-style-type: none"> - independent execution of inventory and other control procedures; - survey of employees of the enterprise and third parties on the issues of reflection in the accounting of current biological assets of crop production; - analysis of storage and use of data objects of accounting; - control over application programs and the environment of computer information systems; - comparison and analysis of actual financial results with certain forecasts; - correct distribution of crop-specific costs (for irrigation and drainage of lands, maintenance of reclamation facilities, maintenance of protective forest disturbances, etc.), which relate to several crops or works and are reflected in separate analytical accounts during the year.

The control of the cost of current biological assets of crop production includes the following stages:

Stage 1. The preliminary control (examinations, formal control, financial monitoring, certification, accreditation, licensing, standardization): carried out in the process of their planning (coordination of planned material costs, payroll, overhead costs and calculation of their distribution coefficients, calculation of norms and cost standards); an inventory of the preservation and use of property (comparison and verification of accounting data and the actual availability of objects of accounting);

Stage 2. The current (operational) control of costs for crop production (thematic inspection, in-house inspection, investigation, counting of reports, economic dispute, survey,

audit inventory, controlling): it is advisable to carry out daily and simultaneously with the control of technology (comparison of actual volumes) works and costs for their implementation with the planned standards of technological maps); continuously monitor the movement of tangible assets, work in progress and products (accumulation and grouping of costs by objects of accounting for further comparison of budget and actual indicators in order to identify deviations);

Stage 3. The final control (audit, tax audits, financial audit, forensic accounting examination): the legitimacy of the costs has determined on the basis of certain documents, the persons responsible for the costs have determined, the facts and causes of overspending have identified, cost-effectiveness measures, including incentives employees for saving and punishing violators.

Therefore, the system of control over the cost of current biological assets of crop production at the enterprise should be built so as to timely inform the heads of the enterprise about the need for corrective and preventive measures based on effective management decisions.

Conclusion

This study examines the main aspects of cost control of current biological assets of crop production, with the allocation of priority cost items at each stage of cost formation. The main standards for accounting for current biological assets of crop production in Ukraine are IAS 41 "Agriculture" and NP (S) FA 30 "Biological assets". **The actual cost of crop production can be determined only at the end of the year, since** the technological process of crop production is quite long and seasonal. In Ukraine, there is no legal act that would give the right to reduce the time to determine the actual cost of agricultural products. To determine the financial result, there is a method of sequential closing of accounts of different types of agricultural production.

Determining the unit cost of current biological assets of crop production and detailing these costs by major categories is one way to find out what costs to focus on and try to reduce. In order to improve the system of control over the cost of current biological assets of crop production in agricultural enterprises, it has proposed to strengthen internal control.

The control of costs that form the cost of crop production should be carried out both at the planning stage and during the work and at the stage of their completion: (1) preliminary control (examination, formal control, financial monitoring, certification, accreditation, licensing, standardization)); (2) the current (operational) control of costs for the production of crop products (thematic inspection, in-house inspection, investigation, counting checks of reporting, business dispute, survey, audit, inventory, controlling); (3) the final control (audit, tax audits, financial audit, forensic accounting examination).

Conflict of interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

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