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Environmental activities of agricultural enterprises: accounting and analytical support

Abstract

The article outlines the causes of the ecological crisis in Ukraine and various factors affecting the natural environment, such as air pollution, depletion and degradation of land resources, exhaustion of forest and water resources, caused by agricultural production. Thus, in Ukraine, as of 1 January 2018, more than 1.1 million hectares of degraded, unproductive and technogenically contaminated lands counted to expand, and there were 315.6 thousand hectares of unproductive lands that needed improvement; 57% of the territory of the country was affected by wind and water erosion, about 12% were flooded lands and 20% more - polluted lands. The authors detail the consequences of the impact of agricultural activities on the environment.

It is necessary to reflect environmental activities in accounting, including environmental assets (natural resource potential, production waste, non-current assets of environmental protection purposes), liabilities (environmental liabilities) and results of activities (environmental incomes, environmental expenses, financial results from environmental activities). The components of natural resource potential, which are to be reflected in the accounting system, are determined.

The authors of the research provide an analytical estimation of the state, structure and changes of land resources in Ukraine and define the degree of compatibility between the modern system of agriculture and new environmental and technological requirements. The article discusses normative and legal provisions concerning land protection in Ukraine, as well as normative legal acts on ecologisation of agriculture. The tendency of the recent years shows that the mechanism of combining measures of financial incentives and legal responsibility in the field of land protection, as well as the establishment of legally determined environmental restrictions in land use by means of land management, remains insufficient in terms of optimising the use and protection of land in Ukraine.

The study covers the main problem aspects of the land use in Ukraine. Analytical data describing the anti-desertification measures planned until 2030, as well as measures for the restoration of degraded lands and soils, including lands affected by desertification, droughts and floods, are presented. The need to reflect the costs of implementing measures to protect and restore the natural resource potential (including land resources) is emphasised. The authors generalise the information on three groups of accounting objects in terms of the use of agricultural land: objects affecting the qualitative condition (natural fertility) of land, objects representing land capital with a certain level of natural fertility which are at the disposal of enterprises, and objects that depend on the type of agricultural lands and their natural fertility.

It is suggested to generalise the information on the objects of ecological accounting in the form of the Environmental Activity Report, which will increase the effectiveness of the managerial decisions on the environment at micro- and macro-levels.

Keywords: Environmental Activity; Agricultural Enterprises; Natural Environment; Natural Resource Potential; Environmental Accounting; Degraded Land; Desertification

JEL Classification: M21; M41; O13; Q10; Q24

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Екологічна діяльність сільськогосподарських підприємств: обліково-аналітичне забезпечення

Анотація. У статті окреслено причини кризового екологічного становища в Україні та фактори впливу сільськогосподарського виробництва на забруднення навколишнього природного середовища (забруднення повітря, виснаження та деградація земельних ресурсів, вичерпність лісових і водних ресурсів). Деталізовано наслідки впливу сільськогосподарської діяльності на довкілля. Доведено необхідність відображення в бухгалтерському обліку об'єктів екологічної діяльності, до яких варто відносити екологічні активи (природно-ресурсний потенціал, відходи виробництва, необоротні активи природоохоронного призначення), пасиви (екологічні зобов'язання) та результати діяльності (екологічні доходи, екологічні витрати, фінансові результати від екологічної діяльності). Визначено складові природно-ресурсного потенціалу, що підлягають відображенню в системі бухгалтерського обліку. Проведено аналітичну оцінку стану, структури та зміни земельних ресурсів як об'єкта екологічного обліку. Представлено аналітичні дані, що характеризують заплановані до 2030 року відповідні заходи щодо боротьби з опустелюванням, а також заходи щодо відновлення деградованих земель і ґрунтів, включаючи землі, уражені внаслідок опустелювання, посух і повеней. Наголошено на необхідності відображення в обліку витрат на здійснення заходів щодо охорони та відновлення природно-ресурсного потенціалу (у тому числі земельних ресурсів). Запропоновано узагальнювати інформацію щодо об'єктів екологічного обліку в формі Звіту про екологічну діяльність, що сприятиме підвищенню ефективності управлінських рішень щодо навколишнього природного середовища на мікро- та макрорівнях.

Ключові слова: екологічна діяльність; сільськогосподарські підприємства; природне середовище; природно-ресурсний потенціал; екологічний облік.

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Экологическая деятельность сельскохозяйственных предприятий: учетно-аналитическое обеспечение

Аннотация. В статье обозначены причины кризисного экологического положения в Украине и факторы влияния сельскохозяйственного производства на загрязнение окружающей природной среды (загрязнение воздуха, истощение и деградацию земельных ресурсов, полноту лесных и водных ресурсов). Детализированы последствия воздействия сельскохозяйственной деятельности на окружающую среду. Доказана необходимость отражения в бухгалтерском учете объектов экологической деятельности, к которым следует относить экологические активы (природно-ресурсный потенциал, отходы производства, необоротные активы природоохранного назначения), пассивы (экологические обязательства) и результаты деятельности (экологические доходы, экологические расходы, финансовые результаты от экологической деятельности). Определены составляющие природно-ресурсного потенциала, подлежащие отражению в системе бухгалтерского учета. Дана аналитическая оценка состояния, структуры и изменения земельных ресурсов как объекта экологического учета. Предоставлены аналитические данные, характеризующие запланированные к 2030 году соответствующие меры по борьбе с опустыниванием, а также мероприятия по восстановлению деградированных земель и почв, включая земли, пораженные вследствие опустынивания, засух и наводнений. Отмечена необходимость отражения в учете расходов на осуществление мероприятий по охране и восстановлению природно-ресурсного потенциала (в том числе земельных ресурсов). Предложено обобщать информацию по объектам экологического учета в форме Отчета об экологической деятельности, что будет способствовать повышению эффективности управленческих решений, касающихся окружающей природной среды, на микро- и макроуровнях.

Ключевые слова: экологическая деятельность; сельскохозяйственные предприятия; природная среда; природно-ресурсный потенциал; экологический учет.

1. Introduction

Ukraine belongs to a group of countries with complex environmental problems. Such problems are typical of both developing countries with their unbalanced use of natural resources and industrially developed countries with environmental pollution resulting from industrial activity.

During the last century, the agricultural sector of the economy has been focused on the development of energy-intensive and resource-consuming technologies. The desire to take as much as possible from nature in the shortest possible time has led to great imbalances in the social-ecological system. The reasons for the ecological crisis in agriculture are primarily related to the intensive development of the agricultural production, the lack of normative and technical documentation concerning environmentally safe technologies for agricultural production, as well as the lack of an efficient environmental protection mechanism. The existing practice in land management causes the deterioration of land, while the exhausting use of land, forest and water resources leads to irreversible loss of ecosystems and biodiversity. At the micro and macro levels, there are no objective and reliable data on the impact of pollution resulting from agricultural activities on the environment, including atmospheric air, land, water and forest resources. Therefore, in order to evaluate the reasons for the ecological crisis with the highest degree of reliability both at the level of agricultural enterprises and the state level, as well as to make efficient managerial decisions in terms of the reduction of anthropogenic impact on

the natural environment, it is required to perform environmental accounting and prepare environmental reporting.

2. Brief Literature Review

A significant contribution to the development of accounting systems and analytical support for environmental activities has been made by leading domestic scientists such as S. Polkovnychenko [1], L. S. Soroka [2], V. M. Zhuk [3], G. Kaletnik [4], N. L. Pravdiuk [5], S. M. Ostapchuk [6], as well as by foreign specialists, among whom are Sian Sullivan and Mike Hannis (2017) [7], Yelena Ryumina (2016) [8], F. Moukoko-Ndoumbe (2001) [9], Sara Jo Breslow (2015) [10], Shona Russell (2017) [11], Markus J. Milne and Colin Dey (2017) [11], Clement Feger and Laurent Mermet (2017) [12], Constantin Mindricelu (2014) [13], Carlos Ferreira (2017) [14], Laura Onofria, Glenn Marie Lange, Rosimeiry Portela and Paulo A. L. D. Nunes (2017) [15], Matthew Dennis and Philip James (2016) [16], Bashir Ahmad, Munir Ahmad and Zulfiqar Ahmad Gill (1998) [17], Matthias Schroter (2015), Roy P. Remme, Elham Sumarga, David N. Barton and Lars Hein (2015) [18], Yannis Dafermos, Maria Nikolaidi and Giorgos Galanis (2017) [19].

Despite the high level of scientific achievements in the researched area, a number of topical theoretical and practical issues remain unresolved. The increasing ecological crisis, which is complicated by the lack of adequate measurement and information about it, and the neglect of the possibilities of the accounting system in terms of environmental activities of economic entities, requires the revision of accounting

principles relevant to the needs of those who apply them at micro and macro levels in order to preserve the biosphere and to achieve a sustainable economic development. The lack of an environmental activity accounting system prevents the evaluation of the impact of business entities on the environment, the improvement of accounting tools for environmental information supply and the preservation of natural resource potential. All this requires the pursuit of solutions with regard to the problematic aspects mentioned above.

Close reading and review of policy texts and associated calculations in the United Kingdom shows that natural capital accounts for «opening stock» inventories as well as in the experimental implementation of biodiversity offsetting (BDO) in land-use planning in England. Tracking the iterative calculations of biodiversity offset requirements is a specific planning case which needs further conceptual review, drawing on and contrasting different numbering practices being applied so as to generate numerical-economic values for natures-beyond-the-human [7].

The quality of the environment became an object of study by economists and sociologists relatively not so long ago, when it went beyond the equilibrium. For more than 50 years, the main chain of researched interrelations has looked as follows: «production as a source of pollution - deterioration of the environment - impact on public health» [8]. A major challenge that remains is to establish an appropriate environmental accounting framework allowing for the assessment of the impact on the natural productive capital of given farming systems, cropping rotations, projects, etc. [9].

3. The purpose of the article is to determine peculiarities of objects relevant to environmental activity accounting, to evaluate the state of land resources as an object of environmental accounting, to reveal problematic aspects of information support of agricultural enterprises' environmental activities and to develop suggestions on how to improve the contents of information relating to financial reporting in terms of environmental accounting.

4. Results

Prevailing models of the human-environment relationship in environmental science, policy, and management (ESPM), largely based on the Drivers-Pressures-State-Impact-Responses (DPSIR) framework, are restricted in their ability to incorporate insights from the environmental social sciences and humanities (ESSH). Focusing on social drivers offers a potential avenue for bridging ESPM and ESSH, and collaborating toward mutual goals of environmental sustainability and human wellbeing [10].

How to «ecologise» accounting and conceptualise human and non-human entities has received little attention in accounting research. Environmental accounting research overwhelmingly focuses on economic entities and their inputs and outputs. Conceptually, an «information throughput» model dominates. There is little or no environment in environmental accounting, and certainly no ecology [11].

The impact of agricultural activity on the environment should be divided into two groups: the impact of crop farming and the impact animal breeding [1, 81]. The impact of crop farming on the natural complex depends on the composition, location, rotation and method of cultivation of crops, overgrowing of arable land with perennial weeds and shrubs, ploughing the territory above the permissible limits, burning of cultivating residues, the amount and type of the applied fertilizers, application of pesticides and insecticides, improper storage and transportation of mineral fertilizers and poisonous chemicals and lack of water-protective plantations. The factors of influence of animal breeding include: production of waste that can enter the soil, reservoirs and atmosphere; unregulated grazing of animals, which causes the degradation of pasture lands, deterioration of soil-protective properties and the development of erosion processes; corpses of animals near the farms [1, 81].

Clement Feger and Laurent Mermet assume that the use of new information systems centred on organised collective action for biodiversity conservation should be regarded as a new type of accounting for the management of ecosystems, complementary to organisation-centred biodiversity accounting and to ecosystem accounting at the national scale [12].

The implementation of agricultural works (plowing, sowing, cultivating, harvesting and processing of agricultural products, feeding of animals) has a negative impact on the environment (Table 1).

The environmental activity of enterprises is one of the directions of their operational activity, which is realised through the development of natural resources, their use, reproduction and protection. As a result of its functioning, the maximum environmental protection should be maintained.

Environmental activities are those activities the primary purpose of which is to prevent, reduce and eliminate pollution and other forms of environmental degradation. Delimitation of environmental activities is based on the elements of the environment, nature or consequences of pollution they generate and techniques used [13].

An analysis of the processes involved in the creation and eventual demise of the market for biodiversity offsets suggests

Tab. 1: Consequences of the impact of agricultural activity on the environment

Components of production cycle in agriculture	Consequences of the impact on the environment
Use of mobile energy resources	Chemical, mechanical and acoustic pollution of the atmosphere, pollution of the environment; soil compaction (pressure, dynamic effect and vibration)
Tillage of soil	Increase in the concentration of heavy metals in the supply chain
Soil cultivation	Development of water, wind and technical erosion; the formation of a tillage pan; increase of traction effort as a result of soil compaction
Application of fertilizers, meliorants and plant protection products	Climate change, formation of acid rain, increase in the concentration of nitrates (nitrites) in food chains, corrosion intensification. Pollution of water and soil by chemical substances and pathogens; accumulation of pesticides in the organism by food chains
Cultivation and harvesting of root and tuberous plants	Development of erosion, consolidation of the fertile soil layer, removal of soil from the field with products; damage to tubers and the related loss of agricultural products during storage
Harvesting of cereals and forage crops	Improvement of nourishing conditions for pests in connection with the loss of part of products; crushing and traumatising of grain, destruction of animals under cars
Drying, cleaning, sorting and storing grain and seeds	Pollution of the environment by toxic gases in the process of drying, getting insufficiently clean sowing material and polluting crops; grain damage and product loss during storage
Agricultural equipment and tractor park exploitation	Pollution of the environment by metal products, oil products, mechanical damage to soils
Melioration	Destruction of the fertile layer of soils, erosion, excessive moisture and drainage
Animal breeding	Pollution and contamination of the environment with manure, pollution of the air basin with gases formed during the life of animals and decomposition of manure; contamination of natural waters by sinks of livestock farms
Grazing animals	Depletion of pastures, pollution of the territory (forests, reservoirs, ravines, pastures) with manure
Cleaning of premises and their disinfection; water drainage of manure	Environmental pollution (discharge of sewage into water basins and soil)
Preparation of fodder, washing the equipment	

Source: [1, 81]

that parts of a failed market assemblage have the capacity to continue to influence economic processes [14].

Each type and subtype of branches of the economy have their own specific directions of formation of environmental activities and factors of environmental impact, which must be taken into consideration while forming a strategy for the development of a particular enterprise or a group of enterprises of the same type.

There are the following objects of accounting of environmental activity: environmental costs, environmental means (assets), environmental liabilities, environmental effect, environmental business operations; natural resources and the rights for their use.

L. S. Soroka [2] suggested including natural resource potential to the objects of environmental accounting, in particular environmental assets. Components of natural resource potential, as well as economic transactions which may be executed with their application, are presented in Figure 1.

The three main objects of environmental activity accounting, which should be allocated, are assets, liabilities and results of enterprise activity. The group of objects that are economic means (assets) includes natural resource potential, waste production and non-current assets of nature conservation purposes. Environmental liabilities are included in the sources of the creation of economic assets (liabilities). Activity results are defined as environmental incomes, environmental expenses and financial results of business entity environmental activities. Objects of environmental activity accounting should be combined into three groups, with the aim of their reflecting in the accounting (Figure 2).

Results of separate researches on the estimation of natural resources (including water resources) corroborate the understanding that the value of water in its alternative uses is a key to fostering informed debate on water management and allocation [15].

According to V. M. Zhuk, «the focus of accounting on getting the information in value terms has led to the comprehensive nature of the evaluation processes and significantly increased their role in the accounting system, where land plots appear to be the most complex for evaluation, which is due to the specifics of the given object, the insufficient development of the legal and regulatory framework and the underdevelopment of the land market in Ukraine» [3, 21].

We agree with H. M. Kaletnik who states that the country's food security largely depends on how efficiently our main wealth, i.e. land, is used [4, 6].

According to N. L. Pravdiuk, Ukraine currently has a powerful potential of land resources, creating objective prerequisites for providing our state with economic, food and energy security [5, 22].

Land is not a product of the labour process, and, consequently, has no value. Therefore, its assessment and reflection in accounting is one of the most important unsolved issues.

A subsequent projection of the value of stakeholder-led land management was calculated and compared to an existing reference for the value of urban green space from the Economics of Ecosystems and Biodiversity database [16].

In Ukraine, different categories of land are distinguished, with agricultural land having the largest specific weight, which, as of 1 January 2018, amounted to 42.2 million hectares (71%) [20].

It should be mentioned that, in the structure of Ukrainian lands, as of 01.01.2018, about 71% of the total area is agricultural land; forests and other forest areas account for 16% (instead of 18% in 2010), built-up lands make up 4%, surface waters comprise 4% (compared with 6% in 2010), while open earths without plant cover or with insignificant vegetation (stony places, sands, ravines) and dry open lands with a special vegetation cover are 2.0% (Figure 3).

In Ukraine, agricultural land, with its large share in the country's total area, is the most valuable land. Ukraine has one of the highest indicators in the world on the provision by agricultural and arable lands per capita. Thus, arable land has the largest specific weight in 2017, occupying 78%, whereas wastelands account for 1%, perennial plantings - 2%, hayfields - 6% and pastures - 6% [20] (Figure 4). Such a distribution of lands is characterised by high cultivation and agricultural development of the territory of Ukraine, which has a negative impact, since the increase in the area of arable lands is due to the decrease in the area of forests, pastures and hayfields.

The intensification of farming, increasing technogenic pressure on land resources, the uncontrolled use of chemicals in conditions of low technological culture and other negative trends have led to the deterioration of soil quality and decreased their fertility.

The use of floodplains under arable land, which are subject to intense flooding and become a source of pollution of surface and underground waters, is environmentally dangerous. Also, the agricultural use of slopes under arable land is extremely dangerous for the environment and humans. In conditions of agricultural use, slopes stop performing the function of protecting water basins.

In Ukraine, as of 1 January 2018, more than 1.1 million hectares of degraded, unproductive and technogenically contaminated lands counted to expand, and there were 315.6 thousand hectares of unproductive lands that needed improvement [22].

Ukraine has rich soil resources presented by fertile black soils. However, the land cover suffers from pollution and erosion.

As of 1 January 2018, it was established that 57% of the territory of the country is affected by wind and water erosion, about 12% was flooded lands and 20% more was polluted

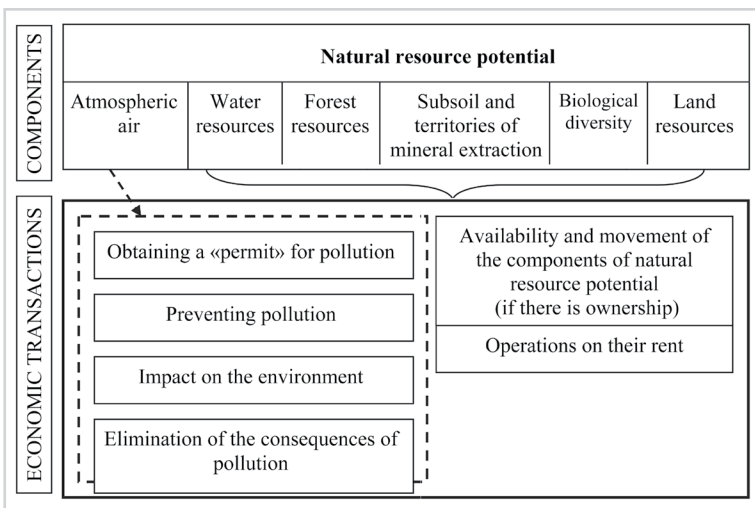


Fig. 1: Components of natural resource potential which are to be reflected in the accounting system
Source: [2, 292]

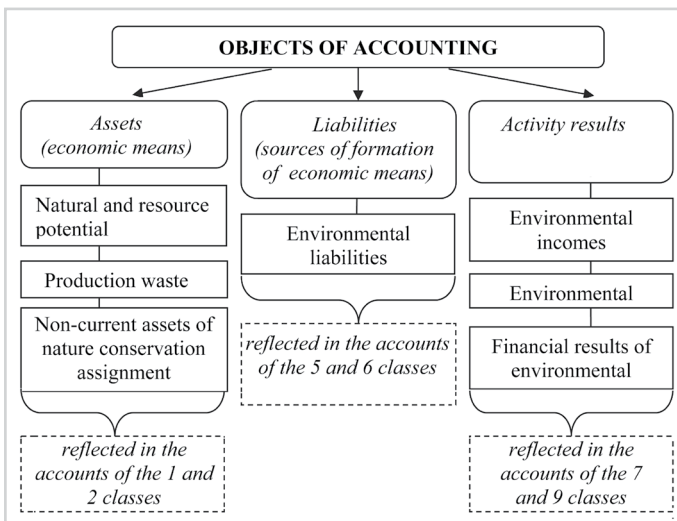


Fig. 2: Objects of accounting of environmental activity
Source: Compiled by the authors

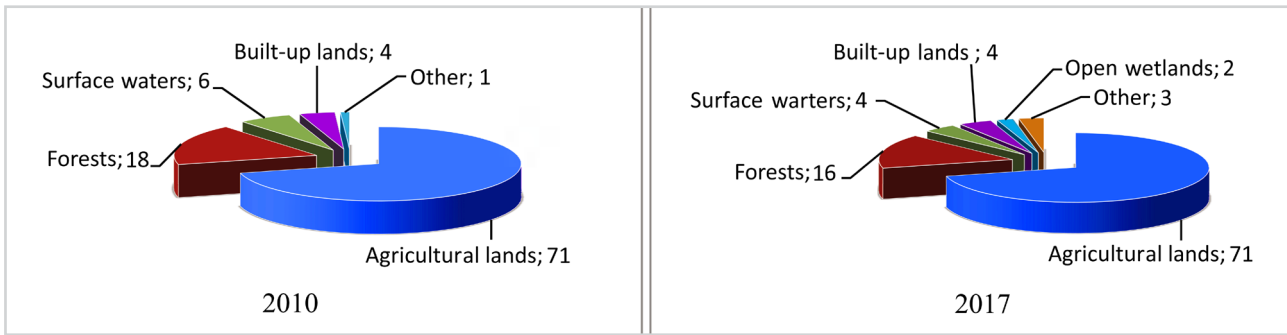


Fig. 3: Structure of lands in Ukraine in 2010 and 2017, %
Source: [20-21]

lands [20]. Each year, almost 23 thousand cases of landslides are registered; more than 150 thousand hectares of land are disturbed as a result of mining and other activities; up to 60 percent of the Azov and Black Seas and 41 percent of the coastline of the Dnieper reservoirs are destroyed [20].

Depending on the degree of manifestation of degradation processes, losses only due to the deficiency of agricultural products estimated by scientists exceed UAH 20 billion annually. Current practice of land management causes about 25% of greenhouse gas emissions [20].

The modern agricultural system does not fully meet the new environmental and technological requirements, as it:

- does not meet the needs of plants in the ratio of nutrient elements of mineral fertilizers, since mostly nitrogen fertilizers are introduced;
- after reforming the agricultural sector, the number of small land plots has increased, and, as a result, there has been a violation of crop rotation; the technologies of growing crops and feeding forage lands are not observed;
- provides for the transformation of landscapes on the basis of drainage and irrigation, which, under certain conditions, leads to significant negative ecological consequences;
- is focused on the maximum attraction of lands to agricultural turnover, which leads to their deterioration;
- uses environmentally dangerous territories such as floodplains and inclined areas suffering significant degradation;
- indicates the excessive application of mineral fertilizers and pesticides;
- promotes the use of intensive technologies for growing crops, which worsens the situation with land degradation.

Such impacts obligate the state to take measures on the restoration of soil fertility. Since the processes of land degradation arise and develop in different places, the restoration of land is aimed at maintaining the neutral condition of land as a whole and preventing its further deterioration. Achieving a neutral level of land degradation becomes the basis of the land policy in Ukraine.

The normative legal framework for the protection of lands in Ukraine is determined by the provisions of the Constitution of Ukraine, the Land Code of Ukraine [23], the Laws of Ukraine «On Environmental Protection» [24], «On Land Protection» [25], «On State Control of the Use and Protection of Lands» [26] and other normative legal acts that are adopted in accordance with them.

According to Article 164 of the Land Code of Ukraine [23], land protection includes:

- 1) justification and ensuring the achievement of rational land use;
- 2) protection of agricultural lands, forest lands and shrubs from unjustified withdrawal for other needs;
- 3) protection of lands from erosion, landslides, flooding, waterlogging, secondary salinisation, overdrainage, compaction, pollution resulting from production waste, chemical and radioactive substances, as well as pollution resulting from other unfavourable natural and man-made processes;
- 4) conservation of natural wetlands;
- 5) prevention of deterioration of the aesthetic state and the ecological role of anthropogenic landscapes;
- 6) conservation of degraded and unproductive agricultural lands.

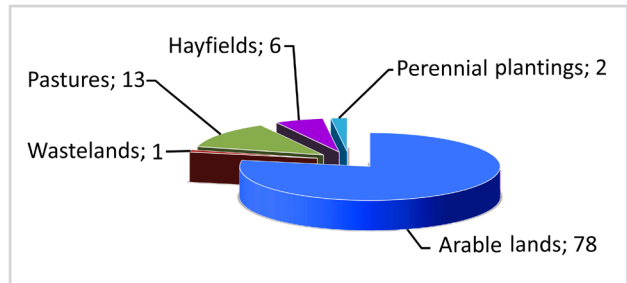


Fig. 4: Structure of agricultural lands in Ukraine in 2017, %
Source: [20]

Soil compaction is caused by the concentration of salts, ploughing at higher moisture levels, frequent use of tractors and implements, increased use of irrigation water and less use of animal and crop wastes. The loss of micro and macro pore spaces, as a result of compaction, reduces the infiltration capacity, restricts gaseous exchange in soils and hinders most important biological activities that are essential for plants [17].

In order to prevent soil degradation and economic losses, as well as to improve the protection of environment as a whole, certain normative legal acts were adopted on the ecologisation of agriculture during the 2014-2017 period. They include the Concept for the Fight against Land Degradation and Desertification from 2014 [27], the National Plan of Action for Fighting Land degradation and Desertification from 2016 [28], the Coordinating Council on the issues of fighting land degradation and desertification from 2017 [29].

Also, in 2017, the Ministry of Economic Development and Trade of Ukraine approved the Draft State Environmental Policy Strategy for the period up to 2030 [30], according to which the primary tasks for the protection of lands are:

- ensuring the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems;
- promoting sustainable forest management;
- the restoration of degraded lands and soils with the application of innovative technologies;
- ensuring the conservation of mountain ecosystems [30].

By 2030 the appropriate measures on fighting the desertification, as well as the measures on restoration of the degraded lands and soils, including lands affected by desertification, droughts and floods, are planned.

In order to achieve the forest cover of the territory of Ukraine, it is necessary to increase the area of forests by over 965 thousand hectares, to the level defined in the Draft Strategy of the State Environmental Policy for the period until 2030, at its current level of 15.9% to 17.0% in 2020 (Figure 5) [20].

The figures in the Figure 5 indicate that for the years 2015-2030, an increase in the share of the areas of agricultural lands of extensive use (grassland, pastures) from 13.0% in 2015 to 15.8% in 2030 is planned. The plan on the reduction of the area of arable lands (tillage) from 53.9% in 2015 to 47.0% in 2030 is a positive one.

As the tendency of recent years shows, the mechanism of combining measures of financial incentives and legal responsibility in the field of land protection, as well as the

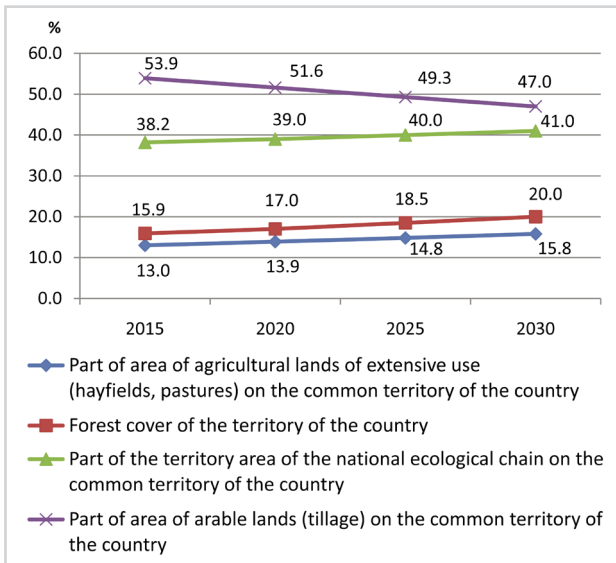


Fig. 5: Planned figures on the share of areas to the total territory of Ukraine during 2015-2030
Source: [30, 109]

establishment of legally determined environmental restrictions in land use by means of land management, remains insufficient in terms of optimising the use and protection of land.

Unfortunately, Ukraine does not have a national program for land use and protection, which would determine the composition and amounts of priority and perspective measures for land protection, as well as the amount and sources of financial support for their implementation. Consequently, such a program could provide for financing of the planned measures or repayment of expenses incurred by agricultural enterprises for the protection of land resources and the natural environment as a whole (Figure 6).

However, the absence of an information system, which would be relevant to environmental accounting and financial reporting, is an obstacle to making efficient decisions on the selection of financing objects in the field of environmental activities. For this reason, the primary task is formation of reliable and timely information in the accounting relating to environmental activities of agricultural enterprises aiming at the possibility to reflect either positive changes or negative consequences in terms of the concept of sustainable development of the country's economy.

The system of accounting which exists in Ukraine at present reflects the following objects of land relations:

- land plots;
- right to use land plots;
- capital expenses for land improvement.

S. M. Ostapchuk [6] distinguishes three groups of accounting objects for the use of agricultural land:

- 1) objects that affect the quality (natural fertility) of the land plot (capital and current expenses for improvement of lands, costs for land protection, production costs);
- 2) objects representing land capital with a certain level of natural fertility that is at the disposal of the enterprise (land plots, right to use land plots);
- 3) objects that depend on the type of agricultural lands and its natural fertility (rent, land tax) [6; 26].

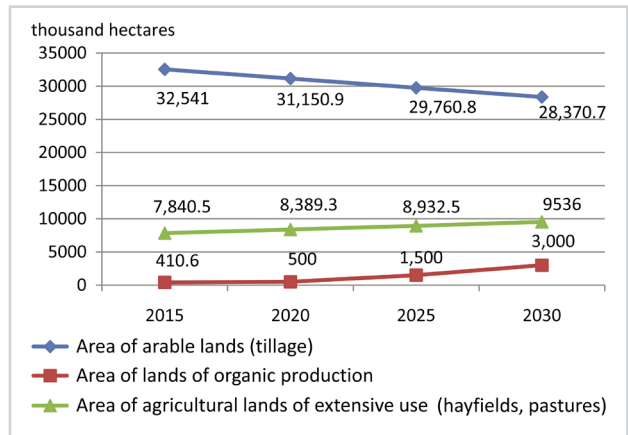


Fig. 6: The planned indicators on the protection and restoration of Ukraine's land resources during 2015-2030
Source: [30, 109]

To reflect the specific objects of environmental activities in the context of all types of natural resources in accounting, it is necessary to develop an appropriate methodology that will require improvements in the financial statements of the business entity.

Some foreign scientists suggest that an approach that provides sufficient accuracy at acceptable costs given heterogeneity of the respective service should be adopted in ecosystem accounting [18].

In our opinion, it is most advisable is to reveal information on environmental activities of enterprises as a separate form of financial reporting, e.g. «Report on Environmental activities», which would provide detailed information on environmental activities of enterprises (Table 2).

Tab. 2: Suggested Report form on environmental activities of agricultural enterprises, UAH thousand

Nº	Objects of accounting of ecological activity	For the reported period	For the previous period
1	2	3	4
<i>ENVIRONMENTAL ASSETS</i>			
1	Natural resource potential, total including:		
1.1	Land resources, including:		
	- recultivated lands		
	- construction of anti-erosion hydrotechnical structures		
	- prairie restoration of arable lands highly degraded and contaminated with harmful substances		
	- organic production		
1.2	Water resources		
1.3	Forest resources		
1.4	Subsoil and territory of mineral extraction		
2	Production waste		
	- costs of utilized plant waste		
	- costs of utilized animal waste		
3	Non-current assets of environmental purpose		
<i>ENVIRONMENTAL LIABILITIES</i>			
1	Owners' equity (reserve capital)		
2	Ecological liabilities and supply		
<i>ENVIRONMENTAL INCOMES, EXPENSES AND FINANCIAL RESULTS</i>			
1	Environmental incomes		
2	Environmental expenses:		
2.1	Land resources, including:		
	- recultivated lands		
	- construction of anti-erosion hydrotechnical structures		
	- prairie restoration of arable lands highly degraded and contaminated with harmful substances		
	- costs for the implementation of organic production		
2.2	Water resources:		
	- costs for cleaning of reservoirs, ponds		
2.3	Forest resources		
	- costs related to the increase of forest area (plantation of forest protection strips)		
2.4	Production waste		
	- utilized plant waste		
	- utilized animal waste		
3	Financial results of ecological activity		

Source: Compiled by the authors

It is suggested that the mentioned report should be included into the annual financial reporting of enterprises and be made the basis for decision-making in the system of environmental management at micro and macro levels of the economy.

Output is demand-determined but supply constraints might arise either due to environmental damages or due to the exhaustion of natural resources. Finances affect macroeconomic activity and the realisation of investment plans which determine environmental performance [19].

The reflection of transactions related to the entity's environmental activities in accounting will allow providing the information about the environmental management of the enterprise and make it public with the aim of informing the public about the results of such activities, which is one of the factors creating a business image helping to promote and strengthening economic security at the local and global levels.

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