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ECOLOGICAL AND ECONOMIC ORGANIZATION OF CROWNING TERRITORY AND ARRANGEMENT OF EXISTING LAND IN THE RIGHT-BANK FOREST-AND-STEPPE OF UKRAINE

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Abstract. *The article analyzes the current land use of Dzendzelivske LLC of Mankivka village community of Uman district of Cherkasy region (former Dzendzelivska village council), which showed that the agro-ecological condition of agricultural lands before the project was in deteriorating condition and required sound land use solutions.*

The purpose of the work is to assess the ecological and economic justification of the organization of the territory of LLC "Dzendzelivske", ensuring the rational use and protection of land, creating a favorable ecological environment and improving agricultural landscapes.

The proposed project solutions are based on the provisions of the regulatory framework and take into account environmental and economic requirements for the rational use of agricultural land.

Based on the qualitative characteristics of agricultural groups of soils and their economic evaluation, the classes of suitability of arable lands for growing crops have been identified.

Within the limits of the allocated classes of arable lands on ecological and economic suitability of soils for cultivation of agricultural crops introduction of soil protective (grassland) crop rotation is provided.

During the implementation of ecological and economic land management of the territory, the natural resources of the allotted land plot should be mobilized, which will provide an opportunity to obtain quality plant products and at the same time preserve the natural environment and organize environmentally friendly production.

Key words: *ecological and economic substantiation, rational land use, technological groups of lands, organization of lands, crop rotations, transformation of lands, land management project, landscaping*.

Problem statement. The land management project regarding ecological and economic substantiation of crop rotation and arrangement of agreements is being developed in accordance with the current legislation of Ukraine.

However, the majority of landowners and land users still do not have appropriate land management projects with reasonable crop rotation for private farming. This means that in most cases natural and legal entities use Ukraine's land resources irrationally. That is why regulation of agreements of various forms of ownership on the territory of administrative units with ecological and economic justification of crop rotation is extremely relevant nowadays.

Analysis of recent research and publications. Land in agriculture is the main means of production, therefore its effective use significantly affects the state of economic activity as a whole [1, p. 5].

In the scientific resources, considerable attention is paid to the problem of ecological and economic substantiation of the territory of crop rotation and land management in general. Many works of such scientists as V. H. Andriychuk [2,

p. 15], D. S. Dobryak, Ye. V. Butenko [3, p. 9–17], T. O. Zinchuk [4, p. 84], O. Krasnolutskyi [5, p. 14–17], O. M. Tretyak, V. M. Druhak [6, p. 29–33], I. A. Yasinetska, T. M. Kushniruk, V. V. Dodurich [7, p. 207–212]. The works of H.I. Hreshchuk [8, p. 112–120], N.V. Komarova [9, p. 124–132], G. D. Hutsuliak [10, p. 92–99].

Investigating the ecological and economic efficiency of modern land use, it should be noted [10, p. 20–25], that it is characteristic for the majority of commodity producers predominance of extensive method in agricultural production, the growth of share of cultivated land, neglect of crop rotations, too limited use of organic fertilizers, an unformed system of application of mineral fertilizers, and insufficient attention to implementation of environmental protection measures.

As of today, the organization of previously formed crop rotations has been disorganized, the principles of differentiated use and protection of productive lands have been violated. The key measure that should ensure full, rational and effective land use in specific agribusiness enterprises is the organization of the territory, carried out on the basis of the project, which establishes the nature and order of land use according to the intended purpose. When drawing up the project, the necessary spatial and organizational foundations are formed for the growth of culture of agricultural activity, the most rational use of agricultural machinery, and the optimal organization of the production process.

The goal of the research is to evaluate the ecological and economic justification of the organization of the territory of “Dzendzelivske” LLC, to ensure rational use and protection of land, to create a favorable ecological environment and to improve agricultural landscapes.

Research methodology. When performing the work, such research methods were used as a comprehensive classification assessment of the existing situation, camera studies of cartographic materials, graphic, field studies, observation, analysis of topographic plans, real design, calculation and comparison.

The main results of the study. The territory of Dzendzelivka village is located 6 km from the administrative center - settlement Mankivka, 8 km from the

Potash railway station and 2 km from Kyiv-Odesa highway. The main land users are citizens, agricultural enterprises, transport and communication enterprises, and organizations.

The land plot with an area of 4.8340 ha of “Dzendzelivske” LLC, according to the agro-soil zoning scheme of Ukraine, belongs to the Forest-Steppe Right Bank province of the Forest-Steppe Zone.

The territory of "Dzendzelivske" LLC of Mankivka settlement community of Uman district of Cherkasy region (former Dzendzelivka village council) belongs to the second agro-climatic district with a moderate-continental climate.

According to Uman weather station, 633 mm of precipitation falls per year, including 379 mm during the vegetation period (April-September). The annual average annual temperature is 7.4°C, the temperature of the coldest month (January) is (–)7.8°C, and the hottest month (July) is 19.5°C. The sum of active temperatures during the vegetation period is 2810°C. The vegetation period lasts 205 days, and the period of active vegetation lasts 160-165 days.

The topography of the studied area is a wide undulating plain with gentle slopes up to 7°. It should be noted that the territory is generally favorable for the use of agricultural machinery, since the predominant area of erosion-resistant slopes is almost 60%. On slopes with a steepness of more than 5°, when using agricultural machinery, anti-erosion measures should be followed or agrotechnical requirements should be met.

The characteristics of the relief of the territory of Dzendzelivske LLC are given in the table 1.

Table 1

Distribution of arable lands by the steepness of slopes on the territory of “Dzendzelivske” LLC

Lands	Square, ha	Steepness of slopes			
		0-1°	2-3°	3-5°	5-7°
Arable lands	4,8340	0,6909	2,2031	0,5280	1,4120

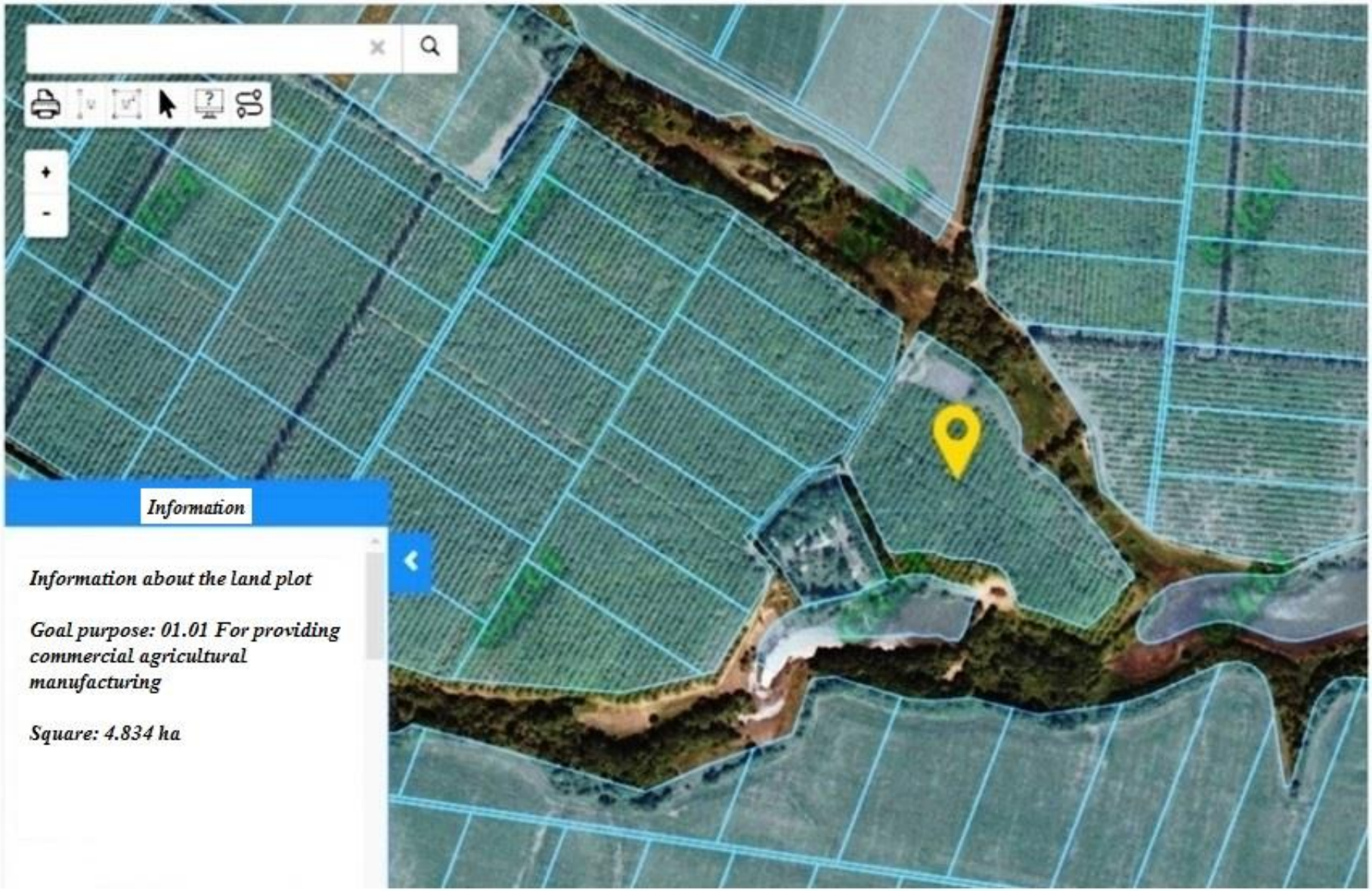

Fig. 1. Information about investigated plot of land taked from the Public cadaster map

The soil cover of the land plot of "Dzendzelivske" LLC was determined on the basis of archival data provided by the Department of the Main Department of the State Geocadastre in Cherkasy region in the former Mankivka district. The nomenclature of agricultural production groups of land use soils of "Dzendzelivske" LLC is given in the table 2.

Table 2

The nomenclature of agricultural production groups of land use soils of "Dzendzelivske" LLC

Code of agri-cultural produ-ction group	Name of agricultural production group	Square, ha
40d	Dark gray podzoled and seek regraded soils	0,6909
49d	Dark gray podzoled and seek regraded soils and podzoled and regraded few washed chornozems	4,1431
Total		**4,8340**

The assessment of the natural resource potential of the territory of "Dzendzelivske" LLC is carried out according to the classes of suitability for growing agricultural crops.

The classification of arable land according to its suitability for growing agricultural crops is given in the table 3.

Table 3

The classification of arable land according to its suitability for growing agricultural crops

Code of agricultural production group	Winter grain crops (wheat)		Many-year grasses (alfalfa)	
	Mark of bonitet	Class of suitability	Mark of bonitet	Class of suitability
40д	40	II	40	I
49д	46	II	46	I

Land use in “Dzendzelivske” LLC depends on the type of land. The main features characterizing different lands are their purpose and natural and acquired properties.

Classification of lands is carried out taking into account their purpose and systematic use. It is generally accepted to call areas of land that are systematically and systematically used for certain production and other purposes, which have characteristic natural or artificially determined properties.

A state-owned plot of land with an area of 4.8340 hectares, located within the administrative boundaries of the territory of Mankivka settlement community of Uman district of Cherkasy region (former Dzendzelivka village council), is leased by "Dzendzelivske" LLC.

Access will be via the existing field road, so there is no need to build new access roads. No construction, product processing, or animal husbandry is carried out on the plot of land.

According to the state statistical reporting (form 6 - land), 4.8340 hectares are accounted for by "Dzendzelivske" LLC, of which: agricultural land - pastures with an area of 0.6485 hectares and perennial plantings (orchards) with an area of 4.1855 hectares.

The main part of the land plot is practically flat, from the northwest to the southeast, the steepness of the slopes gradually increases from up to 7°.

During the inspection of the land plot of "Dzendzelivske" LLC it was established that perennial plantations (apple trees) are absent on most of the land plot (4.1855 ha) and were uprooted because they lost their economic value and economic value.

The transition from the modern composition of land to the planned one is carried out by means of land transformation - the transfer of land from one type to another in accordance with the principle of the optimal ratio of stabilizing and destabilizing types of land. Transformation is not a one-time act, but a whole process; in economic, organizational, technical and legal terms, this is one of the most important tasks of land management.

Thus, in organizational and economic terms, land transformation is an ambiguous process that is often carried out on the basis of compromise and is associated not only with positive, but also with negative consequences.

It is no less complex in terms of engineering and technology, as it is carried out on the basis of a complex of reclamation, technical culture, organizational and economic, agroforestry, hydrotechnical and other measures.

Since "Dzendzelivske" LLC is engaged in the cultivation of agricultural products, and the soil cover of the plot of land allows the cultivation of agricultural crops, it is advisable to transfer the land on the plot of land from pastures and perennial plantations to arable land with the planning of crop rotation, implementation of measures to increase soil fertility and ensure ecologically safe agricultural production.

Based on the physical-geographical and social and manufacturing conditions of the characterized territory, which is not occupied by buildings and is represented by arable land, the land management project envisages the introduction of soil-protective (grassy) crop rotation. Soil protection (grass seeding) crop rotation is organized on dark gray podzolized soils of medium loamy mechanical composition and includes one field with an area of 4.8340 ha. Crop rotation in a soil-protective (grass field) crop rotation: 1) perennial herbs - 3 years; 2) winter wheat with perennial grasses.

The structure of sown areas, according to the land management project, is given in the table 4.

Table 4

Structure of sown areas, according to the land management project

Grain cultures and legumes	Square, ha	%
	4,8340	100
2022		
Many-year grasses (alfalfa)	4,8340	100
2023		
Many-year grasses (alfalfa)	4,8340	100
2024		
Many-year grasses (alfalfa)	4,8340	100
2025		
Winter wheat with sowing many-year grasses	4,8340	100

Sown areas, forecasted yield and gross harvest of agricultural crops are given in the table 5.

Table 5

Sown areas, forecasted yield and gross harvest of agricultural crops

Cultures	Sown areas, ha	Forecasted yield, c/ha	Gross harvest, t
2022			
Many-year grasses (alfalfa)	4,8340	49,2	23,78
2023			
Many-year grasses (alfalfa)	4,8340	49,2	23,78
2024			
Many-year grasses (alfalfa)	4,8340	49,2	23,78
2025			
Winter wheat with sowing many-year grasses	4,8340	53,4	25,81

Since the plot of land is used as pastures and perennial plantations, and there are no real estate objects on it, after plowing, proper tillage and application of mineral fertilizers, implementation of the planned crop rotation is possible immediately from 2022.

One crop rotation field with an area of 4.8340 hectares is planned on the land plot with an area of 4.8340 hectares. The boundaries of the crop rotation field are fixed with signs of the established standard pattern. If there are pronounced (solid) contours on the boundary of the plot, the boundary marks are set as temporary.

According to the principles of the market, the main factor of production is profit, expressed by the difference between the cost of sales of products and production costs. In order to ensure the ecological efficiency of the farm, the costs should include those related to the restoration of the main property of the soil - fertility.

The calculation of the humus balance was carried out in accordance with the indicators of the planned yield, that is, we implemented the principle of obtaining the desired humus balance.

In 2022, after sowing perennial grasses, we will have a positive balance of humus. Since the nutrient regime of the soil improves significantly due to the mineralization of the organic matter of the roots and stubble of plants, the amount of humus in the field with perennial grasses will increase every year, so there is no need to apply organic fertilizers to the soil. In 2025, after sowing winter wheat with subsowing perennial grasses, we will also have a positive balance of humus.

In the table 6, the calculation of the economic efficiency of the land management project was performed. We can see that the total cost of cultivation of crops provided for by the land management project is 128.94 thousand UAH, the net income from the sale of products is 227.04 thousand UAH.

Table 6

Economical effectivity of the management project

Cultures	Gross harvest, t	Cost of production, 01.01.2021		Costing of growing, 01.01.2021		Conditional net income, thousands of UAH	Rentability, %
		1 t / UAH	Total, thousands of UAH	1 t / UAH	Total, thousands of UAH		
2022							
Many-year grasses (alfalfa)	23,78	3000,00	71,34	981,56	23,34	48,00	67
2023							
Many-year grasses (alfalfa)	23,78	3000,00	71,34	981,56	23,34	48,00	67
2024							
Many-year grasses (alfalfa)	23,78	3000,00	71,34	981,56	23,34	48,00	67
2025							
Winter wheat with sowing many-year grasses	25,81	5500,00	141,96	2282,77	58,92	83,04	58
Total	**97,15**	**3664,23**	**355,98**	**1327,23**	**128,94**	**227,04**	63

Due to the fact that only one crop will be planted each year, the payback of the capital investments of the planned project activities will take place 4 years after the introduction of crop rotation.

Table 6 also calculates the profitability of the crop industry when all the proposed measures are implemented using the formula: divide the conditional net income by the cost of production and multiply by 100%. We see that the level of profitability of perennial grasses is 67%, winter wheat is 58%.

The land management project plans to increase the production of gross products in the field of agribusiness thanks to the improvement of the culture of agricultural activity. Effective use of transformed lands will enable the economy to increase the production of gross products and use this land plot in an economically beneficial and ecologically appropriate way.

Conclusions. The analysis of the modern land use of “Dzendzelivske” LLC of Mankivka settlement community of Uman district in Cherkasy region (former Dzendzelivka village council) confirmed that the agricultural and ecological condition of the agricultural lands before the project was in a deteriorated state and required well-founded project decisions in order to optimize land use.

Taking into account the qualitative characteristics of agricultural manufacturing groups of soils and their economic evaluation, with the aim of organizing more efficient cultivation of agricultural crops within the arable land, the classes of suitability of soils were selected.

Within each of the selected classes of arable land, according to the ecological and economic suitability of the soil for the cultivation of agricultural crops, the introduction of a soil-protecting (grass-seeded) crop rotation is foreseen, which also guarantees resistance to erosion processes.

The total cost of cultivation of crops provided for by the land management project is 128.94 thousand UAH, the net income from the sale of products is 227.04 thousand UAH. Due to the fact that only one crop will be planted each year, the payback of the capital investments of the planned project activities will take place 4 years after the introduction of crop rotation.

The motivational economic mechanism should stimulate the owner to improve both the ecological condition of the lands and their economic evaluation, which will contribute to the growth of production profits and preservation of soil fertility.

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ЕКОЛОГО-ЕКОНОМІЧНА ОРГАНІЗАЦІЯ ТЕРИТОРІЇ СІВОЗМІНИ ТА ВПОРЯДКУВАННЯ ІСНУЮЧИХ УГІДЬ В УМОВАХ ПРАВОБЕРЕЖНОГО ЛІСОСТЕПУ УКРАЇНИ

Анотація. *У статті проведено аналіз сучасного використання земель ТОВ «Дзендзелівське» Маньківської селищної громади Уманського району Черкаської області (колишньої Дзендзелівської сільської ради), який засвідчив, що агроекологічний стан сільськогосподарських угідь до проєкту перебував у погіршеному стані й потребував обґрунтованих проєктних рішень із метою оптимізації землекористування.*

Мета роботи – оцінка еколого-економічного обґрунтування організації території ТОВ «Дзендзелівське», забезпечення раціонального використання й охорони земель, створення сприятливого екологічного середовища та поліпшення агроландшафтів.

Запропоновані проєктні рішення базуються на положеннях нормативно-

правової бази та враховують еколого-економічні вимоги щодо раціонального використання земель сільськогосподарського призначення.

На основі якісної характеристики агровиробничих груп ґрунтів і їх економічної оцінки виділені класи придатності ґрунтів орних земель для вирощування сільськогосподарських культур.

В межах виділених класів орних земель з еколого-економічної придатності ґрунтів для вирощування сільськогосподарських культур передбачається запровадження ґрунтозахисної (травопільної) сівозміни.

При впровадженні еколого-економічного землевпорядкування даної території мають мобілізуватися природні ресурси відведеної земельної ділянки, що надасть можливість отримання якісної рослинницької продукції і при цьому буде збережено природне середовище та організовано екологічно безпечне виробництво.

Ключові слова: *еколого-економічне обґрунтування, раціональне землекористування, технологічні групи земель, організація угідь, сівозміни, трансформація угідь, проєкт землеустрою, упорядкування території.*