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GEOECOLOGICAL ASSESSMENT AND OPTIMISATION DIRECTIONS OF LAND USE OF THE TERRITORIAL COMMUNITIES (ON THE EXAMPLE OF THE KREMENETS DISTRICT, TERNOPIL REGION)

The article analyses the structure of land use of territorial communities of the Kremenets district. The share of natural lands in the land structure of each community was determined. The level of ploughing and forest cover of the communities was determined. To ensure effective environmental management of land resources, a geoecological assessment of the land use structure of the territorial communities of the Kremenets district was carried out. The anthropogenic transformation coefficient of the territorial communities was calculated according to the relevant methods, which averages 5.5 for the Kremenets district, with the highest indicator in the Borsuky community (6.1) and the lowest in the Shumsk community (4.3). The ecological stability coefficient of the territory of the Kremenets district is 0.38. This indicator is the highest in the Shumsk territorial community (0.69). The anthropogenic load score of the Kremenets district area is 3.56, the anthropogenic load coefficient is 3.45. According to the assessment of the land use structure of the Kremenets district, it was found that the territory of Borsuky, Vyshnivets and Lanivtsi communities is ecologically unstable with an average anthropogenic load. Kremenets, Pochaiv and Lopushen territorial communities belong to the category of stable unsteady territories with transformed landscapes and anthropogenic loads above average. On the basis of certain indicators and parameters, an optimisation model of the land use structure of the territorial communities of the Kremenets district has been developed. The proposed model is based on the principles of sustainable development and takes into account global trends in the ratio of natural and household land. Implementation of this model assumes reduction of arable land in the Kremenets district by 12% and increase of forest cover by 7-8% at the expense of low-productive and eroded lands. Changing the target designation of land plots will make it possible to transfer them from the anthropogenic to natural category, which will contribute to increasing the share of natural lands in the Kremenets district from 38% to 50%. Thus, the optimisation structure of the land use in the Kremenets district will include: 45% - arable land, 24% - forests, 23% - hayfields, pastures and perennial plantations, 5% - built-up land and 3% - land under water and marshes.
Key words: *land use, decentralization, geoecological assessment, anthropogenic load, ecological stability.*

Statement of the scientific-practical problem. Because of the decentralization reform, 55 territorial communities were created in Ternopil region, consolidating 3 new administrative districts. Ternopil (central) district – consolidates 25 territorial communities, Kremenets (northern) district – 8 territorial communities and Chortkiv (southern) district – 22 territorial communities. The Ternopil district prevails in terms of population and area (tabl. 1).

Table 1

Parameters of administrative districts of Ternopil region [4]

Administrative district	**Area, km^2**	**Population, persons**	**Number of settlements**	**Number of the territorial communities**
Kremenets	2633,9	143 191	204	8
Ternopil	6161,6	565 037	492	25
Chortkiv	5027,5	328 362	362	22

Relevance and novelty of the research. Modern processes of reforming property relations are reflected in the nature of use of natural and socio-economic resources of the territory. The decentralization reform creates new financial and administrative opportunities for the use of local natural resources. In January 2018, the Cabinet of Ministers of Ukraine adopted the Order «On the transfer of agricultural land outside inhabited areas to the management of consolidated territorial communities» [15]. The transfer of land outside inhabited areas into the ownership of communities will improve the mechanism of management in the sphere of land resources, will allow for clear and transparent formation of the revenue part of local budgets in terms of land fees. In fact, land fees account for about 15% in the structure of revenues to the general fund of local budgets, and in the receipts of local taxes and fees – more than 50% [12]. Given that in the structure of the natural resource potential of Ternopil region the largest share is land resources, in the new territorial communities, the most valuable resource is land. Since land resources are the main means of filling local budgets, their research and analysis is always a relevant and important scientific and practical task. Therefore, the *object* of our study is the territorial communities of the Kremenets district of

Ternopil region, the *subject* is the structure of land use of the territorial communities under study.

Relation of the article topic to important scientific-practical tasks. Relation of the article topic to important scientific-practical tasks. The subject of the research corresponds to the theme of the research work of the Department of Geoecology and and Hydrology 2024-2028: «Optimisation of ecosystem services in natural-economic systems, including river-basin systems, on the basis of sustainable development as an important investment in maintaining natural processes in the environment, as well as in the well-being and living standards of the population». The results of the study are of great practical importance for the implementation of the Environmental Protection Programme in Ternopil Region for 2021-2027 and the Development Strategy of Ternopil Oblast for 2021-2027.

Analysis of recent publications on the research topic. Among the latest publications that highlight issues of land use and management of land resources of territorial communities of Ukraine, it is worth noting the study by Tretiak A. & Tretiak V. [17], Dorosh O., Melnyk D., Sviridova L. [5], Novakovsky L. & Novakovska I. [12] ets. International experience in implementing land use planning policies was studied by Philip Booth [24], Alois Mandondo & Witness Kozanayi [28], John W. Bruce & Anna Knox [25], Samuel B. Biitir, Baslyd B. Nara, Stephen Ameyaw [29], Suhardiman D., Keovilignavong O., Kenney-Lazar M. [31]. Analysis of land use in the context of territorial communities was carried out by Putrenko V.V. & Hapon S.V. [14]. The issues of administrative and territorial reform and the formation of capable territorial communities were studied by Zastavetska L.B. [27], Oliynyk Ya.B. & Ostapenko P.O. [13], Lazarieva O. [9] ets. The role of the land use in organizing the balanced development of territorial communities, issues of the land management and optimization of the land relations in new administrative units was studied by Bubyr N. [23]. Geoinformation analysis of the land use of consolidated territorial communities was carried out by Evdokimov A., Dolia K., Rudomakha A., Palamar E. [26].

Geoecological issues of the land use of the Ternopil region territorial communities are reflected in the publication of Kuzyk I. [8]. The issue of accounting the amount of agricultural land of the Ternopil region territorial communities was studied by Zablotskyi B., Gavryshok B., Demyanchuk P. [6]. The comparative analysis of the structure of the land use of the territorial communities of different types was carried out by Chebolda I. & Kuzyk I. [21]. Approbation of the methodology of geoecological assessment of land use structure on the example of the Ternopil urban territorial community was carried out in the study of Tsaryk L. & Kuzyk I. [19].

Research methodology. In the course of the study, the methods of geoecological assessment and optimisation modelling of the land use structure in the territorial communities were used. The coefficient of anthropogenic transformation of landscapes is an integral indicator that can be used to assess the ecological state of natural and natural-anthropogenic systems of administrative or natural areas. According to the methodology by V.A. Anuchin, M.Ya. Lemeshev, K.G. Hoffman and P.G. Shyshchenko [22], the *anthropogenic transformation coefficient* (K_{at}) is calculated by the formula:

$$K_{at} = \sum (r_i \times q_i \times p) \times n / 1000 \quad (1)$$

where, K_{at} – the anthropogenic transformation coefficient; r_i – rank of the landscape's anthropogenic transformation by a certain type of natural resource use; q_i – the index of landscape transformation depth; p – rank area (%); n – the number of constituent parts within the landscape area contour [22].

Each type of natural resource use is assigned a rank of the anthropogenic transformation: 1 – natural protected areas; 2 – forests; 3 – marshes and wetlands; 4 – meadows; 5 – orchards and vineyards; 6 – arable land; 7 – rural building; 8 – urban building; 9 – reservoirs, canals; 10 – industrial land [22].

When calculating the index of landscape transformation depth (q_i) the «weight» of each type of the nature management is determined by experts. The index of landscape transformation depth for different types of the nature management, established by experts means, is as follows: 1.00 – natural protected areas; 1.05 – forests; 1.10 – marshes and wetlands; 1.15 – meadows; 1.20 – orchards and vineyards; 1.25 – arable land; 1.30 – rural building; 1.35 – urban building; 1.40 – reservoirs, canals; 1.50 – industrial land [22].

Given the significant range of fluctuations K_{at}, distinguish a five-stage scale of its interpretation: 2.00 – 3.80 – poorly converted landscapes; 3.81-5.30 – converted landscapes; 5.31-6.50 – medium converted landscapes; 6.51-7.40 – heavily converted landscapes; 7.41-8.00 – overly converted landscapes [22].

To determine the ecological stability coefficient of the territory and the anthropogenic load score, a system of indicators has been developed that characterises each type of the land by the impact that these lands have on the environment (table. 2). The ecological stability coefficient is calculated by the formula:

$$К_{es} = (\sum К_i \times P_i / \sum P_i) \times К_p \ (2)$$

where, $К_{es}$ – the ecological stability coefficient; $К_i$ – the ecological stability coefficient of the certain type lands (table. 3); P_i – area of the certain type lands (ha); $К_p$ – coefficient of the relief morphological sustainablility – 1.0 [1].

Table 2

***Indicators characterising the ecological impact of certain types of land** [1]*

Name of the land	**Ecological stability coefficient, $К_i$**	**Anthropogenic load score, $Б_i$**
Built-up area and roads	0.00	5
Arable land	0.14	4
Vineyards	0.29	4
Forest belts	0.38	4
Gardens, shrubs	0.43	3
Hayfields	0.62	3
Pastures	0.68	3
Land under water and marshes	0.79	2
Forests	1.00	2

The value of the ecological stability coefficient determines of the study area environmental sustainability. If:

$К_{es}$ < 0.34 – the territory is ecologically unstable and requires the identification of radical measures to remedy the situation and prevent the deterioration of the ecological state of the territory;

$К_{es}$ = 0.34-0.50 – the territory is unstable, measures must be taken to correct and improve the situation, bringing the territory to environmental stability;

$К_{es}$ = 0.51-0.66 – the territory is medium stable, recommend measures to improve and maintain the territory in a stable condition;

$К_{es}$ = 0.67 і > – the territory is ecological stable, identify the desired measures to maintain the territory in an ecologically stable state [1].

The anthropogenic load score is calculated by the formula:

$$Б_{an} = (\sum Б_i \times P_i / \sum P_i) \times К_p \ (3)$$

where, $Б_{an}$ – the anthropogenic load score; Бі – the anthropogenic load score of the certain type lands (table. 2); P_i – area of the certain type lands (ha); $К_p$ – coefficient of the relief morphological sustainablility (1,0). The anthropogenic load score in ranges from 2 to 5. The closer of the anthropogenic load score is to 5, the greater the anthropogenic pressure on the territory, and vice versa.

Separately, the coefficient anthropogenic load score of the territory is determined ($К_{an}$), which shows how much human activity affects the state of the natural environment. This indicator is calculated by the formula:

$$К_{an} = \sum(P_i \times Б_i) / \sum P_i \quad (4)$$

where, $К_{an}$ – the coefficient of anthropogenic load, P_i – area of the land with the appropriate level of anthropogenic load (ha), $Б_i$ – bal corresponding to an area with a certain level of anthropogenic pressure (is measured on a five-point scale, table. 3) [19].

Table 3

***Scale for assessing the impact of land use types** [19]*

Type of the land use	**Bal**	**Degree of the anthropogenic pressure**
Built-up land, industrial and transport land	5	High
Arable land and perennial plantations	4	Significant
Pastures and hayfields	3	Medium
Forests, shrubs, forest belts, marshes and land under water	2	Insignificant
Protected areas	1	Low

Optimisation modelling of the land use involves the implementation of a number of approaches based on the techniques by Grodzynskyi M.D. [3] and Tsaryk L.P. [20] and take into account of the territory zonal characteristics. In particular the optimisation performance of the zone of mixed, broadleaved forests and the forest-steppe zone of the temperate belt. The development of the territorial communities an optimisation model of land use structure is based on the optimisation indicators of the broadleaf forest zone 23-40% forest cover and the share of natural lands 50-60% [3]. After all, it is 60% of natural lands that the geosystem needs to maintain dynamic equilibrium and perform its main stabilisation and regenerative functions [20].

Presentation of the main material. The study of the land use structure of the territorial communities is carried out on the example of the Ternopil region Kremenets district. The Kremenets district is located in the northern part of the region and includes 8 territorial communities. The area of the district is 263,390 ha with a population of 143,191 [4].

The territory of the modern Kremenets district is a part of the Volyn-Podillia plateau and is the easternmost part of the Kremenets lowland region of Podillia. The geological structure of the area is composed of sedimentary rocks of marine origin of the Cretaceous period of the Mesozoic era. The lower part is composed of white hard chalk with inclusion of black silicon. Light grey and grey forest soils, as well as black podzolized soils have been formed on the territory of the study area, occupying the central part of the district [2].

The Kremenets district is located on the border of two climatic provinces – Western European with humid and moderately warm climate and Eastern Continental with continental climate. According to the meteorological station of Kremenets city, the annual precipitation in the district is 680.0 mm. The number of days with precipitation is 165 per year. The average air temperature of the coldest month (January) is -5.5 C°, the warmest month (July) is +18.5 C°. The maximum temperature in summer reaches +37.0 C°, the minimum temperature in winter is -33.0 C°. The average annual temperature is +7.5 C°. The duration of the frost-free season is 118 days. The soil freezes on average 73.0 cm (maximum 114.0 cm). The thickness of snow cover is 13-22 cm and the duration of stable snow cover is 125 days [2].

The Kremenets district is located in the hydrological zone of the Volyn-Podillia artesian basin with predominant aquifers in the Proterozoic and Mesozoic sediments of the Ukrainian crystalline shield. Hydrocarbonate-calcium waters with mineralisation less than 1 g/l prevail here. The groundwater level varies from 0.5 to 15.0 metres. The territory has a branched river network belonging to the Dnipro basin. The largest rivers of the district are the Horyn, Ikva and Viliia [2].

The land use structure of the Kremenets district is dominated by agricultural land – 76%, of which 57% is arable land. Built-up land in the district occupies about 5%, land under water and marshes – 3%, hayfields, pastures and perennial plantations – 18% (Fig. 1).

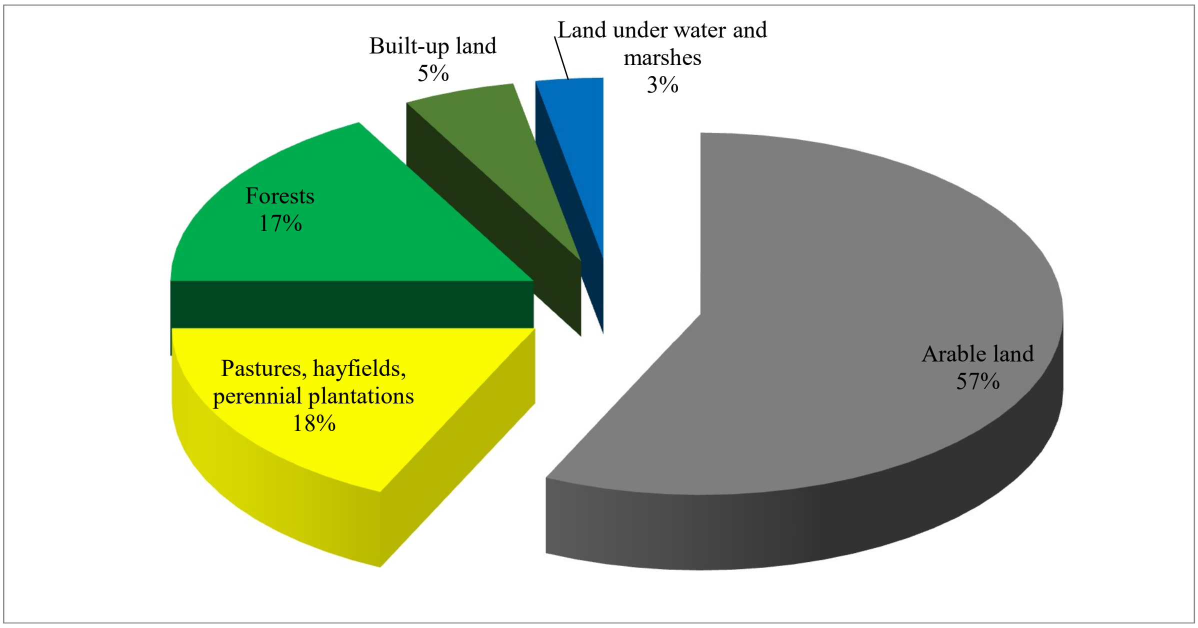

Fig. 1. Land use structure of the Kremenets district

The structure of the land use is different in the territorial communities of the Kremenets district (tabl. 4). The highest share (53%) of natural lands (forests, pastures, hayfields, perennial plantations, lands under water and marshes) is observed in Shumsk territorial community, the lowest share (23%) of natural lands – in Lanivtsi territorial community. The highest share (7%) of built-up land is in Kremenets municipal territorial community. The most lands under water and marshes are occupied in Borsuky territorial community, which is conditioned by a large number of ponds and reservoirs in the settlements of the community. A high share of pastures, hayfields and perennial plantations is observed in Velyki Dederkaly, Shumsk and Lopushen territorial communities.

Table 4

Land use structure of the Kremenets district territorial communities, %

Territorial community	Arable land	Built-up land	Land under water and marshes	Forests	Pastures, hayfields and perennial plantations	Share of natural lands
Borsuky	64.0	5.0	5.0	9.0	15.0	**29.0**
Velyki Dederkaly	65.5	5.0	2.0	5.0	20.5	**27.5**
Vyshnivets	64.0	5.0	2.0	10.0	17.0	**29.0**
Kremenets	52.5	7.0	2.0	21.5	15.0	**38.5**
Lanivtsi	72.0	4.0	2.0	5.0	16.0	**23.0**
Lopushen	61.0	3.0	2.0	14.0	18.0	**34.0**
Pochaiv	62.0	4.0	1.5	15.5	15.0	**32.0**
Shumsk	42.0	4.0	2.0	32.0	19.0	**53.0**

The formation of a high share of the natural lands and, consequently, a balanced structure of the land use of the territorial communities is influenced by the level of ploughing and forest cover. Lanivtsi territorial community is characterised by the highest level of ploughing (72%) in the Kremenets district (Fig. 2). Ploughing within the range of 61-65% is in Lopushen, Pochaiv, Borsuky, Velyki Dederkaly and Vyshnivets territorial communities. And the lowest ploughing is in Shumsk (42%) and Kremenets (52.5%) communities.

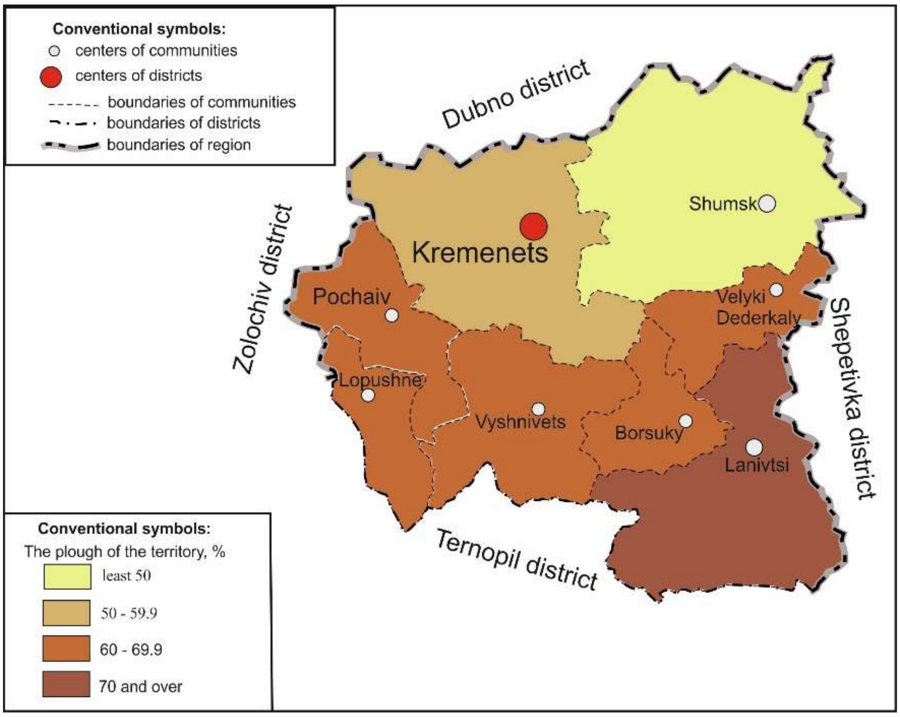

Fig. 2. Arable land of the Kremenets district territorial communities

According to the indicators of forest cover, the best positions are occupied by Shumsk and Kremenets territorial communities, with the share of forest land of 32% and 21.5%, respectively (Fig. 3). Borsuky, Velyki Dederkaly and Lanivtsi territorial communities are characterised by the lowest forest cover (5%).

Having analysed the current state and structure of the land use of the Kremenets district territorial communities, it is necessary to carry out a geoecological assessment of the land structure of these administrative territories. After all, the geoecological assessment of the land use structure plays an important role in landscape and territorial planning of the community. Since the methodology of the such planning is based on the consideration of the ability of the natural potential of the territory to fulfil certain socioeconomic functions without deterioration of the ecological state and the emergence of destructive processes and phenomena [10]. On the basis of the analysis of the land use of the territorial communities, based on the areas occupied by certain categories of land, the coefficients of anthropogenic load, anthropogenic transformation and environmental sustainablility, bal of anthropogenic load of the studied territories were calculated. The specific indicators obtained through the relevant calculations will allow to develop and justify the directions of the land use optimisation of the Kremenets district territorial communities in the most efficient way.

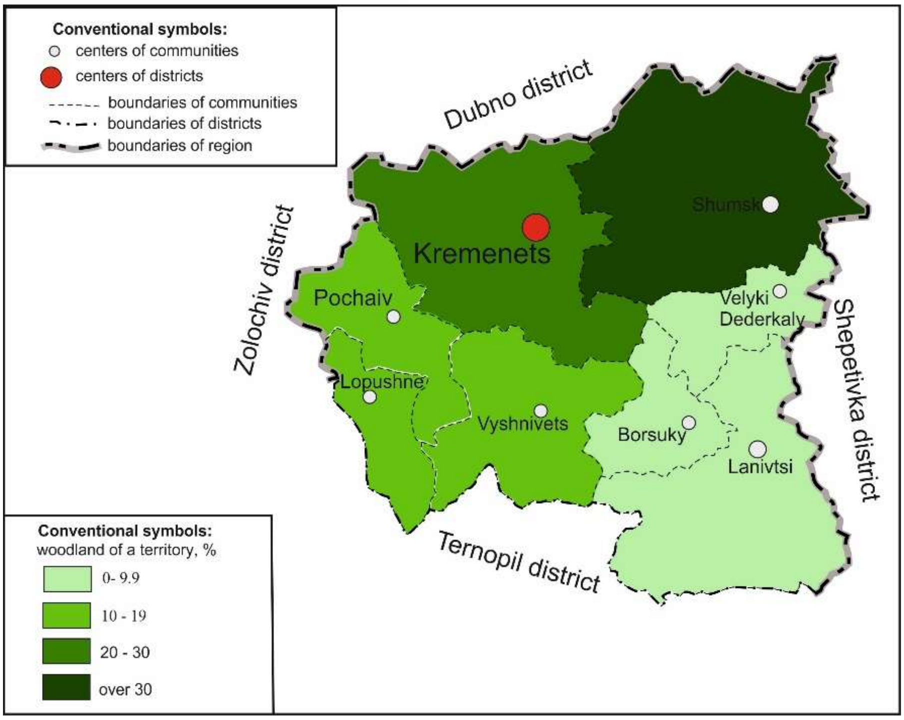

Fig. 3. Woodedness of the Kremenets district territorial communities

One of the important tasks of this study is to assess the degree of transformation of natural complexes by calculating the coefficient of their anthropogenic transformation. It is based on taking into account the impact of different types of the natural resource use on the properties of the natural components, the course of the landscape creation processes within communities. According to the calculations, the highest anthropogenic transformation coefficient is in Borsuky and Lanivtsi territorial communities. According to the scientifically grounded gradation, landscapes of all studied communities, except for Shumsk and Velyki Dederkaly, are moderately transformed.

Significant diversity of the geoecological parameters of the landscape complexes occurring within the territorial community leads to difficulties in the implementation of an appropriate integral assessment. For the integrated geoecological assessment of the land use structure of the territorial communities, we determine the ecological stability coefficient of the territory, which most fully represents the function of the geosystem from the position of maintaining dynamic equilibrium and balanced development. The calculations carried out according to formula 2 and the data of table 2 showed that the highest ecological stability coefficient is inherent to Shumsk territorial community. The territory of this community is characterised as ecologically stable. At the same time, the territories of Borsuky, Velyki Dederkaly, Vyshnivets and Lanivtsi territorial communities with the coefficient of environmental sustainablility less than 0.34 are categorised as ecologically unstable and require the introduction of the radical measures to improve the situation and prevent deterioration of the ecological state of the territory.

The anthropogenic load score of the territories of the communities, calculated according to formula 3 and the data of table 2, is higher than average and ranges between 3.2-3.8. Therefore, it can be stated that the studied communities experience a rather high anthropogenic load. This is also confirmed by the earlier determination of the coefficient of anthropogenic transformation and ecological stability of the territory.

Separately, according to formula 4 and the data of table 3, we determine the coefficient of anthropogenic load of the territorial communities of the Kremenets district. According to the results of the calculations, it was found that the highest anthropogenic load coefficient is inherent in the territories of Borsuky, Vyshnivets and Velyky Dederkaly territorial communities. The territory of Kremenets community has the average anthropogenic load and Shumsk community has the below average one. Thus, the degree of anthropogenic load of the studied territories is not significant, but above average. In this regard, it is necessary to take measures to improve and maintain the territories of the territorial communities in a stable condition.

Thus, summarising (tabl. 5) the results of the geoecological assessment of the land use structure of the territorial communities of the Kremenets district, we can conclude that all the calculated indicators are almost the same. Among other communities, Shumsk territorial community is characterised by the best parameters. The structure of the land use is the most unbalanced in Borsuky and Lanivtsi communities, which is due to the high ploughing of their territories and, consequently, the low share of natural lands. It is necessary to develop and introduce measures to optimise the land use for the communities under study. Priority directions of such optimisation should take into account landscape-ecological features of the territory, be implemented over a certain period of time by changing the target designation of individual land plots.

Table 5

Results of the assessment of the land use structure of the Kremenets district territorial communities

Territorial community	Anthropogenic transformation coefficient	Ecological sustainability coefficient	Anthropogenic load score	Coefficient of anthropogenic load
Borsuky	6.1	0.30	3.7	3.7
Velyki Dederkaly	5.2	0.30	3.5	3.7
Vyshnivets	5.7	0.33	3.8	3.7
Kremenets	5.5	0.37	3.4	3.1
Lanivtsi	5.9	0.27	3.8	3.6
Lopushen	5.4	0.35	3.6	3.5
Pochaiv	5.8	0.36	3.5	3.5
Shumsk	4.3	0.69	3.2	2.8

Based on the calculations of the anthropogenic transformation coefficient, ecological stability coefficient and anthropogenic load score of the Kremenets district territorial communities, it is possible to assert the need to optimise the land use structure of the studied territories. Optimal landscape-ecological organisation of the territory implies justification of such a territorial differentiation of functions (in practice – patterns of lands), in which the natural potentials of geosystems are maximally realised and conflict situations between its functional use are excluded [3]. An optimally organised territory should be highly productive, conflict-free and attractive. Considering the scientifically justified ratio between natural and household lands, 60% of natural lands are necessary for a geosystem to maintain dynamic equilibrium, to fulfil its basic stabilising, regenerative functions to ensure proper natural conditions for the population [20].

The analysis of the territorial differences in the ratio of natural and anthropogenic land in the territorial communities of the Kremenets district (tabl. 4) has shown significant differentiation and distinction from scientifically substantiated norms. Taking into account the basic principles of the concept of sustainable development, we have developed an optimization model of land use for each territorial community (Table 6), which is located in the zone of broadleaf forests with a standard forest cover of 23-40%. The proposed model considers the global trends in the ratio of the land areas under natural vegetation and anthropogenic land plots (60:40 %) [20].

Table 6

An optimisation model of the structure of the land use of the Kremenets district territorial communities, %

Administrative unit	Arable land *existing* / ***optimal***	Built-up land	Land under water and marshes	Forests *existing* / ***optimal***	Pastures, hayfields and perennial plantations *existing* / ***optimal***	Share of natural lands *existing* / ***optimal***
Borsuky	64.0 / **43.0**	5.0	5.0	9.0 / **23.0**	15.0 / **22.0**	29.0 / **50.0**
Velyki Dederkaly	65.5 / **43.0**	5.0	2.0	5.0 / **24.0**	20.5 / **24.0**	27.5 / **50.0**
Vyshnivets	64.0 / **43.0**	5.0	2.0	10.0 / **23.0**	17.0 / **25.0**	29.0 / **50.0**
Kremenets	52.5 / **40.0**	7.0	2.0	21.5 / **24.0**	15.0 / **25.0**	38.5 / **51.0**
Lanivtsi	72.0 / **45.0**	4.0	2.0	5.0 / **24.0**	16.0 / **24.0**	23.0 / **50.0**

Lopushen	61.0 / **44.0**	3.0	2.0	14.0 / **24.0**	18.0 / **25.0**	34.0 / **51.0**
Pochaiv	62.0 / **44.0**	4.0	1.5	15.5 / **24.5**	15.0 / **24.0**	32.0 / **50.0**
Shumsk	42.0 / **40.0**	4.0	2.0	32.0 / **32.0**	19.0 / **21.0**	53.0 / **55.0**
Kremenets district	57.0 / **45.0**	5.0	3.0	17.0 / **24.0**	18.0 / **23.0**	38.0 / **50.0**

Given the high plowing rate in Kremenets district (57%), it should be reduced by an average of 12%. Taking into account the peculiarities of the landscapes of the territorial communities, we propose to reduce arable land at the expense of low-productive, weakly and moderately eroded lands and ploughed lands within water protection zones. Part of this type of land with a slope steepness of more than 7° is recommended for afforestation, which will contribute to the growth of forest cover of community territories by 7-8%. The other part of the withdrawn arable lands with slope steepness less than 7° is to be planted, which will bring the share of pastures, hayfields and perennial plantations in the territorial communities up to 23%. Implementation of such optimization measures will help increase the share of land under natural areas in the Kremenets district from 38% to 50%.

Thus, the optimisation structure of land plots in the Kremenets district (Fig. 4), will include: 45% – arable land, 24% – forests, 23% – hayfields, pastures and perennial plantations, 5% – built-up land and 3% – land under water and marshes. Implementation of the optimisation model assumes reduction of arable land in the Kremenets district by 32 thousand ha and increase of forested land by 18 282 ha.

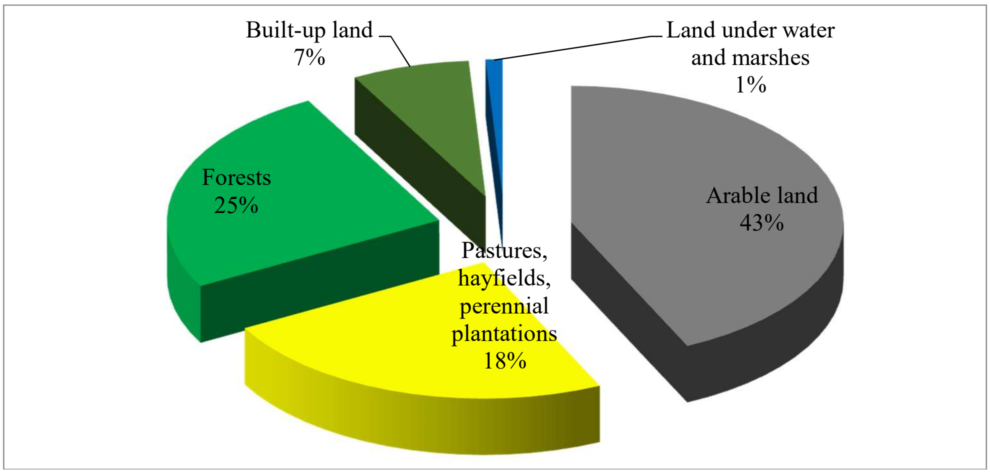

Fig. 4. The optimal for land use structure of the Kremenets district

The proposed model is based on the principle of balance and parity of economic development. This means that the use of the land and other natural resources of the study areas will not worsen the quality of the environment and the state of natural geosystems. This approach should be implemented over a certain period of time by changing the purpose of land and organising its landscape-adapted use.

Conclusions. The analysis of the land use structure of the territorial communities of the Kremenets district showed a significant imbalance and difference from scientifically justified norms. In general, the share of natural lands in the land use structure of the district is 38%, with the highest in Shumsk community (53%), the lowest in Lanivtsi community (23%). The forest cover of the territorial communities of the Kremenets district varies from 5% (Lanivtsi and Velyki Dederkaly communities) to 32% (Shumsk community). Ploughing is the highest in Lanivtsi community (72%), the lowest – in Shumsk community (42%).

In order to ensure effective environmental management of land resources, we carried out a geoecological assessment of the land use structure of the territorial communities of the Kremenets district. According to the results of the assessment, it was established that the territory of Borsuky, Vyshnivets and Lanivtsi communities is ecologically unstable, medium transformed with medium anthropogenic load. Kremenets, Pochaiv and Lopushen territorial communities belong to the category of stable unsteady territories with medium transformed landscapes and anthropogenic load above average. The land use structure of Shumsk and Velyki Dederkaly territorial communities is the most optimal. The territories of these communities are ecologically stable with transformed landscapes and average anthropogenic load.

Based on certain indicators and parameters, an optimisation model of the natural land structure of the territorial communities of the Kremenets district has been developed. The proposed model is based on the principles of sustainable development and takes into account global trends in the ratio of natural and agricultural land. The implementation of this model assumes the reduction of arable land in the Kremenets district by 12% and the increase of forest cover by 7-8% at the expense of low-productive and highly eroded lands. Changing the target designation of certain land plots will make it possible to transfer them from the anthropogenic to natural category, which will contribute to increasing the share of natural lands in the Kremenets district from 38% to 50%. Thus, the structure of the land use of the studied communities will be more balanced and will correspond to the category of ecologically stable lands with little transformed landscapes and little anthropogenic pressure.

Література:

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Анотація:

Ігор ЧЕБОЛДА, Ігор КУЗИК, Богдан ГАВРИШОК. ГЕОЕКОЛОГІЧНА ОЦІНКА ТА НАПРЯМКИ ОПТИМІЗАЦІЇ ЗЕМЛЕКОРИСТУВАННЯ ТЕРИТОРІАЛЬНИХ ГРОМАД (НА ПРИКЛАДІ КРЕМЕНЕЦЬКОГО РАЙОНУ ТЕРНОПІЛЬСЬКОЇ ОБЛАСТІ)

Метою роботи є оцінка структури землекористування територіальних громад Кременецького району та обґрунтування напрямків її оптимізації. Під час дослідження було використано загальнонаукові методи: узагальнення та систематизація, описовий, статистичний, оцінювання; спеціальні методи: конструктивно-розрахунковий, картографічний, оптимізаційного моделювання, а також окремі методики для визначення антропогенного навантаження, коефіцієнтів екологічної стабільності та антропогенної трансформації території територіальних громад Кременецького району.

У статті проаналізовано структуру землекористування територіальних громад Кременецького району. Встановлено частку природних угідь у структурі земельних угідь кожної громади. Визначено рівень розораності та лісистості громад. Для забезпечення ефективного екологічного менеджменту земельних ресурсів проведено геоекологічну оцінку структури землекористування територіальних громад Кременецького району. За відповідними методиками розраховано коефіцієнт антропогенної трансформації територіальних громад, який в середньому для Кременецького району становить 5.5, найвищим цей показник є у Борсуківській громаді (6.1), найнижчим – у Шумській (4,3). Коефіцієнт екологічної стабільності території Кременецького району становить 0.38¸ найвищим цей показник є у Шумській територіальній громаді (0.69). Бал антропогенного навантаження території Кременецького району становить 3.56, коефіцієнт антропогенного навантаження 3.45. Відповідно до проведеної оцінки структури землекористування Кременецького району, встановлено, що територія Борсуківської, Вишнівецької та Лановецької громад є екологічно нестабільна із середнім антропогенним навантаженням. Кременецька, Почаївська і Лопушенська територіальні громади відносяться до категорії стабільно нестійких територій із трансформованими ландшафтами та антропогенним навантаженням вище середнього.

На основі визначених показників та параметрів розроблено оптимізаційну модель структури землекористування територіальних громад Кременецького району. Запропонована модель ґрунтується на засадах сталого розвитку та враховує світові тенденції щодо співвідношення природних і господарських земель. Реалізація цієї моделі, передбачає скорочення орних земель у Кременецькому районі на 12% та збільшення лісистості на 7-8%, за рахунок малопродуктивних та еродованих земель. Зміна цільового призначення земельних угідь дозволить перевести їх з категорії антропогенні у природні, що сприятиме збільшенню частки природних угідь у Кременецькому районі з 38% до 50%. Таким чином, оптимізаційна структура землекористування Кременецького району, включатиме: 45% – орних земель, 24% – лісів, 23% – сіножатей, пасовищ і багаторічних насаджень, 5% – забудованих земель та 3% – земель під водою і болотами.

Ключові слова: землекористування, децентралізація, геоекологічна оцінка, антропогенне навантаження, екологічна стабільність.

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