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Territorial features of agro-resource potential of Volyn Region

Potapowa A., Pogriebskij T., Golub G., Głuszko S. **Cechy terytorialne potencjału zasobów rolnych obwodu wołyńskiego**. Artykuł dotyczy oceny funkcjonalnej struktury składników naturalnego potencjału zasobów rolnych i cech jego terytorialnego zróżnicowania. Określono wpływ wielkości i struktury danego potencjału na efektywność i wydajność produkcji rolniczej obwodu wołyńskiego. Dokonano regionalizacji naturalnych zasobów rolnych i określono poziom wydajności naturalnego potencjału zasobów rolnych.

Потапова А., Погребский Т., Голуб Г., Глушко С. **Территориальные особенности агроресурсного потенциала Волынской области**. Статья посвящена оценке компонентной, функциональной структуры природного агроресурсного потенциала и особенностям его территориальной дифференциации. Определено влияние величины и структуры данного потенциала на эффективность и производительность сельскохозяйственного производства Волынской области. Проведено природно-агроресурсное районирование и определен уровень производительности природного агроресурсного потенциала.

Потапова А., Погребський Т., Голуб Г., Глушко С. **Територіальні особливости агроресурсного потенціалу Волінскої області**. Стаття присвячена оцінці компонентної, функціональної структури природного агроресурсного потенціалу та особливостям його територіальної диференціації. Визначено вплив величини та структури даного потенціалу на ефективність і продуктивність сільськогосподарського виробництва Волинської області. Проведено природно-агроресурсне районування та визначено рівень продуктивності природного агроресурсного потенціалу.

Key words: natural agro-resource potential, natural agro-resource district, land-resource potential, agricultural nature use, social security of the region
Słowa kluczowe: naturalny potencjał zasobów rolnych, naturalny region zasobów rolnych, potencjał zasobów gruntów, rolnicze wykorzystanie warunków naturalnych
Ключевые слова: природный агроресурсный потенциал, природно-агроресурсный район, земельно-ресурсный потенциал, сельскохозяйственное природопользование, социальная безопасность региона
Ключові слова: природний агроресурсний потенціал, природно-агроресурсний район, земельно-ресурсний потенціал, сільськогосподарське природокористування, соціальна безпека регіону

Abstract

The article is devoted to the assessment of the component, functional structure of the natural agro-resource potential and the peculiarities of its territorial differentiation. The influence of the size and structure of this potential on the efficiency and productivity of agricultural production of Volyn region is determined. Natural agro-resource zoning was carried out and the level of productivity of natural agro-resource potential was determined.

Formulation of the problem

The introduction of commodity-market relations between the owners of natural resources and nature management leads to new approaches to solving practical problems of nature management. In modern conditions, the issues of researching the natural potential, namely, its components that determine the integrated development of the region's economy, remain relevant. Natural agro-resource potential is the basis for the development of agriculture – an industry that has undergone significant restructuring in all regions of Ukraine. This is especially true for agro-industrial regions, where natural agricultural potential is the basis of economic development, a resource that meets the needs of the population and the economy in raw materials and consumer goods, as well as reduce the region's dependence on food imports.

Analysis of scientific research on this problem

Issues of structure and territorial features of agro-resource potential were considered in scientific works of Ukrainian and foreign scientists. We should mention the scientific works of V. Medvedev, M. Grodzinsky, P. Shishchenko, M. Pytulyak and others. But these issues are still underdeveloped. There is also no analysis of changes in the use of this potential, not fully justified ways of using natural agricultural resources, which led to the choice of the problem.

Y. Dmitrevsky, A. Yuzefovich, A. Isachenko and others were directly involved in the study of the natural agricultural potential of the territory. According to them, the whole natural complex of the territory forms its natural agricultural potential, and its most important constituent elements are soil, climatic, water and plant resources. In their works the peculiarities of the structure and territorial features of agro-resource potential, ecological assessment, the main characteristics of lands were determined.

Constructive-geographical research of the natural agro-resource potential of Volyn region was conducted by Y. Molchak, M. Shevchuk, A. Potapova, M. Melniychuk.

The purpose of writing this paper is to determine the structure and territorial features of agro-resource potential of the territory for agricultural nature.

Research methodology – methodical bases of estimation of natural agro-resource potential are based on general scientific, system, landscape, statistical-mathematical, comparative-geographical, cartographic methods.

The methodological basis of the research is the provisions of constructive geography, the concept of sustainable development of the region, the doctrine of natural resource potential, as well as laws and regulations of Ukraine on land use and agricultural development during the formation of the economy.

Presentation of the main material and justification of the obtained research results

Based on the cost assessment of each type of land resources and their qualitative characteristics, as well as assessment of other components of natural agro-resource potential, natural agro-resource areas are identified: Polissya (North Polissya and South Polissya) and Forest-Steppe.

The largest by area (715.6 thousand hectares) is Polissya natural agro-resource area, which has a significant land resource potential – 4 742.3 million UAH (table 1), in which the plowed lands are 55.8%, which is facilitated by the flat, poorly articulated relief, large wetlands, as well as historical features of development and settlement of the territory. The majority of 57.5% of agricultural land is owned by citizens who have been granted ownership and use of agricultural land.

Table 1. Land resource potential in natural agro-resource areas (million UAH.), 2022*
Tabela 1. Potencjał zasobów ziemi w naturalnych regionach zasobów rolnych (mln UAH), 2022 r.*
Таблица 1. Земельно-ресурсный потенциал в природно-агроресурсных районах (млн. грн.), 2022 г.*

Natural agro-resource area	Types of agricultural land					
	Arable	Perennial plantings	Hayfields	Pastures	Total land resource potential	Potential density (thousand UAH/ha)
Polissya	3055,0	52,1	1182,3	1273,0	5562,4	7,8
Forest-Steppe	3980,1	102,9	204,0	185,6	4472,6	13,0

* Compiled and calculated by the authors

In the Forest-Steppe natural agro-resource area, the potential of arable lands in the component structure of land resource potential is 89.0%. In this natural agro-resource area is much higher potential of arable land – 81.8% and perennial plantations – 1.5%. Forest-steppe natural agro-resource area is characterized by the presence of large areas of agricultural land (335.03 thousand hectares), as well as favorable soil and climatic conditions that ensure the intensive development of agriculture, especially vegetables. This is evidenced by the structure of agricultural land, in which 81.8% is arable land and, accordingly, the plowed area is 61.1%.

The calculation of the functional structure of land resource potential is calculated in terms of its components in administrative districts and natural agro-resource areas according to the method of M. Ignatenko and V. Rudenko with changes and additions (Рудєнко, 2010). Its essence is the quantitative division of the same phenomenon by value and can be represented by resources interstate, intra-regional, district and local (Питуляк, 2002, 2003). The definition of the functional structure is based on the cost assessment of the land resource potential of the Volyn region.

The functional structure of the land resource potential in Volyn region is dominated by resources that have interregional and intraregional significance. Hayfields (88.5%), pastures (84.3%), arable land (81.8%) and perennial plantations (74.7%) have a fairly high functional value (interregional and intraregional rank). More than 47% of the region's land resources have the highest level of efficiency and potential complexing ability and the ability to participate in the territorial division of labor. According to the analysis of the functional structure of natural agro-resource areas, the highest rate of arable land (100%) and perennial plantations (80.5%) of interregional importance in the Forest-Steppe natural agro-resource area, and the highest rate of hayfields (82.4%) and pastures (78.8%) – in Polissya natural agro-resource area.

According to the density of land resources in the region, the following groups of districts can be distinguished: with high (more than 9 thousand UAH/ha), medium (7–9 thousand UAH/ha), low (up to 7 thousand UAH/ha) levels. The maximum indicators of potential density are typical for perennial plantations (13.0–23.7 thousand UAH/ha) and arable lands (12.1–14.5 thousand UAH/ha) of the region. The po-

tential density of forage lands in the region is much lower and averages 6.7–8.8 thousand UAH/ha. The average density of land resources – 9.7 thousand UAH/ha, and the highest – in the Forest-Steppe natural agro-resource area (table 1, 2).

Table 2. Territorial differentiation of land resource potential in natural agro-resource areas (UAH/ha) *
Tabela 2. Przestrzenne zróżnicowanie potencjału zasobów ziemi w naturalnych regionach zasobów rolnych (mln UAH)*
Таблица 2. Территориальная дифференциация земельно-ресурсного потенциала в природно-агро-ресурсных районах (грн/га) *

Natural agro-resource area	Arable	Perennial plantings	Hayfields	Pastures
Polissya	7196,35	11671,40	8958,46	7106,31
Forest-Steppe	14294,62	20552,98	8478,51	5971,71

* Compiled and calculated by the authors

In each of the allocated natural agro-resource areas, the productivity was determined, first of all, land resources. The following indicators were used for this purpose: the value of gross output of agriculture and crop production per unit area of agricultural land and one person, the yield of individual crops and natural forage land, production of basic agricultural products per person (POTAPOVA et al., 2022).

It is established that the highest productivity of lands in the Forest-Steppe natural agro-resource area. In general, the productivity of the region's lands has decreased in recent years, as evidenced by the decline in production of almost all crops.

The discrepancy between the magnitude of natural land potential and the level of its use is due to ecological inconsistency of agricultural production structure with soil and climatic conditions, inconsistency of soil conditions with biological requirements of crops, high agricultural development and plowing of agricultural landscapes, soil degradation.

The main direction of increasing land productivity is to bring the specialization of agriculture in line with the volume and structure of natural agro-resource areas. In particular, in all natural agro-resource areas it is expedient to increase the share of vegetable crops and fodder crops, including perennial grasses. In the Forest-Steppe natural agro-resource area it is expedient to expand the area under gardens, and in Polissya natural agro-resource area – to develop berry growing. In all areas it is necessary to address the issue of optimal ecologically acceptable limits of concentration of certain crops in crop production, ensuring the reproduction of soil fertility, the most rational use of water and agro-climatic resources, as well as increasing productivity, reducing production costs.

It is important to clarify the size of sown areas of these crops in accordance with the norms of the maximum possible load on the environment.

To protect soils from erosion, to restore their fertility, it is necessary to introduce soil-protective tillage technologies and scientifically sound crop rotations. In increasing the productivity of crop production, it is important to improve seed production, sowing in regional varieties.

Research of the state of land resources, which is an indicator of the total environmental assessment, made it possible to identify territorial differences (ГРОДЗИНСЬКИЙ, ШИЩЕНКО, 1993; ГРОДЗИНСЬКИЙ, 1995). There are three groups of areas with different states of agro-ecological situation: pre-crisis, satisfactory and favorable. The first group includes Lutsk and Volodymyr-Volynskyi administrative districts, the second – Kovel administrative district. Favorable agro-ecological condition of land resources in Kamin-Kashirskyi administrative district of the region.

Estimation of anthropogenic transformation of the territory of the region by different types of nature management was carried out according to the method of K. Hoffman and P. Sushchenko. Determination and analysis of the indicator of anthropogenic change gives grounds to say that the region has a high level of anthropogenic transformation – 5.0 points. The highest level of anthropogenic transformation is characteristic of the southern part of the region (Forest-Steppe natural agro-resource area) – 5.3–6.3 points. The indicators of anthropogenic transformation obtained by this method are divided into four categories: weakly transformed (3.0–4.0), moderately transformed (4.1–5.0), transformed (5.1–6.0) and strongly transformed (6.1–7.0). The agrarian load determined by the same method averages 5.0 points for the territory of the region (Мольчак, Потапова, 2010).

In order to create environmentally sustainable agricultural systems in Volyn region it is necessary to: increase the area occupied by natural plant communities (meadows, forests) and perennial forage grasses by reducing the area of crops, especially row crops; ensure the loss of humus in the soil through the application of organic fertilizers and cultivation of green manures (lupine, burkun), differentiated application of mineral fertilizers, etc., remove degraded soils from the field of active agricultural development and create conditions for their conservation and gradual regeneration in biological conditions; carry out the ecological organization of agro-landscapes due to the inclusion of the system of natural territories.

The formation and ecological organization of agricultural landscapes will help to establish balance in nature, will neutralize the negative effects of agricultural nature management in the long-developed region.

Conclusions

The analysis of the component structure of natural agro-resource areas of Volyn region shows the leading role of land resources in it, which are characterized by a high level of development, significant soil degradation, low productivity. Land resources are both a major component of natural agro-resource potential and an integrated resource that provides the ability to produce agricultural products, taking into account the impact of other natural factors. The current state of development of natural agricultural resources of Volyn region gives grounds to define it as one that has the opportunity to further increase the efficiency of natural agricultural resources, provided it is rationally used.

In the perspective of further research is the restoration of agricultural land and the formation of optimal relationships between the elements of agricultural landscapes; conducting ecological production in the agro-industrial complex.

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