Management of Land Resources with Consideration of Agricultural Land Zoning Indices

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Abstract: Land management as a state system of measures aimed at providing the population with food, providing other sectors of the national economy with raw materials at the optimal level of investment in resources and their maximum return in compliance with environmental goals, as well as programs to ensure standards and requirements for land use of agricultural enterprises aimed at acquiring ecologically clean crop and livestock products while preserving natural resources. The management of land resources of agricultural enterprises based on agricultural zoning indicators is proposed, which provides information on regionalized crops and crop rotation types that are most suitable for growing at a particular agricultural enterprise, implementation of technological measures for land use and protection, the level of impact on productivity, and use efficiency of land by an agricultural enterprise. Criteria features of land zoning types that shape agrarian zoning, identification of their impact on the development of agricultural enterprises in the land management system have been identified. The component structure of agrarian zoning as a branch zoning of lands in the agrarian sector of the economy has been singled out and disclosed to improve management actions to form a competitive agricultural producer. Given the classification features of the elements of ecological zoning, which are part of the agricultural zoning, there are restrictions on the cultivation of certain crops on the territory of the agricultural enterprise, taking into account its local characteristics. Economic indicators in performing the economy such as specialization, concentration, and skillful integration of production will help increase the efficiency of land use of agricultural producers. Social and economic classification features of agricultural zoning will determine the level of employment and integration of labor.

Keywords: Land resources management, land zoning, agricultural zones, agricultural enterprise, natural and agricultural zoning, natural and economic zoning, social and economic zoning, ecological zoning.

INTRODUCTION

Land management as a state system of interconnected legal, technical, economic, organizational, and technological measures of the state in market conditions aimed at regulating land relations, organizing a rational, efficient, and environmentally stable territorial unit at the appropriate levels based on sustainable development.

The science of management is based on the works of Taylor F. (1991), Gilbert F., Gilbert L., and Gantt G. The instability of the market capitalist economy and the need for government intervention in management was first proved by Keynes J. (2012).

Major credit for the development of scientific prospects and ideas of humanization of production management belongs to Owen R. (1950), who practiced the introduction of social and psychological methods of management, which were unknown at the time.

Ricardo D. paid considerable attention to the issues of management under industrialization – the distribution of the value of goods between different classes of society, coordination, and management of production control at the enterprise.

Smith A. (2007) analyzed the obligations of the state and the individual. He believed that the state should ensure the safety

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of human life and property, resolve disputes, ensure compliance with the rules, and perform other functions that the individual is unable to perform independently or does so inefficiently.

For the first time, management functions (planning, forecasting, and scientific prediction of national economic development) were formulated by Fayol A. (1991).

Significant attention to land management in Ukraine has been paid by modern domestic scientists. Researchers such as Verveiko A. P. (2001) and Horokhov G. I. (1984) studied the issue of organization of the territory and management of land resources of agricultural enterprises with the use of land management methods.

The classification of management methods (administrative, economic, and socio-psychological) based on the content and mechanism of the influence on land resources was proposed by Horlachuk V. V. (2002), Viun V. G. (2002), Peshchanska I. M. (2006), and Sokhnich A. Ya. (2002).

Characteristics of economic management methods, which are the ways to achieve economic goals based on the implementation of the requirements of economic laws were proposed by Tretyak A. M. (2008) and Dorosh O. S. (2011).

Martyn A. G. (2008) argued that economic methods of production management are more flexible and more responsive to changing social needs.

Dobryak D. S. (2004) drew attention to the environmentally sound use of agricultural land in the management of land resources.

Koshkalda I. V. et al. (2018) paid attention to the ecological and economic foundations of anti-erosion stability of agricultural landscapes in agricultural enterprises.

The issue of land zoning as an integral part of land management, allocation of units of natural and agricultural zoning, the establishment of their boundaries, classification features, and development of schemes of natural and agricultural zoning of Ukraine was studied by such scientists as Kanash O. P. (2007), Loik G. K. (2011), Nosko B. S. (1985), Osypchuk S. O. (2011), Chepkov B. M. (1985), and others.

METHODOLOGY

The methodological basis of the study is the dialectical method of cognition and a systematic approach to the analysis of the issues of the formation of environmental and economic management of land resources of agricultural enterprises under the conditions of zoning. The theoretical basis of the study was the scientific works of domestic and foreign scientists on land management, formation, and development of agricultural enterprises under the conditions of zoning. The scientific and methodological bases of natural-agricultural zoning of the territory of Ukraine, the selection of taxonomic units of zoning and their main characteristics were used in the research.

The methods used in the research are as follows: historical and evolutionary (zoning theory in progress and as a separate scientific field), abstract and logical (theoretical generalizations and formulation of conclusions), computational and constructive (determining the optimal ratio of land for administrative areas), comparative and other generally accepted methods and modern economic and statistical methods.

The practical basis of the study was the basis of the introduction of agrarian land zoning in the management of land resources. The influence of agrarian zoning on increasing the efficiency of use of the land resource potential of agricultural enterprises has been established. Criterion features of types of land zoning that form agrarian zoning, identification of their impact on the development of agricultural enterprises in the land resources management system are determined. The component structure of agrarian zoning as a sectoral zoning of lands in the agrarian sector of the economy is singled out and disclosed in order to improve management actions for the formation of a competitive agricultural producer. In the territory of Sumy region and Kharkiv region, the boundaries of agricultural zones have been determined. The results of the research are applied in production, in scientific activity, in the economic sphere in order to increase the efficiency of the use of the land resource potential of agricultural enterprises.

RESULTS AND DISCUSSION

Land zoning is implemented in terms of land management of agricultural enterprises on the territory of an object, which shows a sign of zoning within an administrative-territorial unit, under the influence of land management in ensuring land use according to their intended purpose. Land zoning should establish the presence or absence of the level of restrictions on the use of a specific land plot, taking into account its location within a certain zone; restriction of the rights of landowners and land users. These restrictions should refer to spatial characteristics, the formation of agricultural enterprise type, tillage system, the zonation and cultivation of certain crops, types of crop rotations, and so on.

Land zoning is the determination, allocation, and consolidation of homogeneous territories and landmasses in compliance with certain properties, which are established according to the task, category of land, existing restrictions on land use, and the type of land use.

In the United States, Germany, and France, land zoning is being considered within the legal framework. Information on land zoning is open and the entrepreneur or investor can get all the information about the existing restrictions and risks in certain areas. The experience of the Russian Federation, which has already introduced certain types of land zoning, shows the viability and effectiveness of this measure. This direction is acceptable for Ukrainian conditions.

To improve land use planning, formation of land use regulations and an increase in the efficiency of land relations regulation following the draft Law of Ukraine “On Land Zoning” types of land use are distinguished, one of which is agricultural.

Accordingly, there is a need to allocate separate sectoral zoning for the agricultural type of land use – agricultural zoning, which is applied for agricultural enterprises.

Land zoning as one of the directions of the State Land Cadaster is fixed in the Law of Ukraine “On the State Land Cadaster” (Article 17). Attempts to apply land zoning were

made according to the Law of Ukraine "On the General Scheme of Territorial Planning of Ukraine" to create a full living environment and favorable conditions for the economic development, which determine the allocation of agricultural zones.

The boundaries of the zones are specified during territorial planning at the regional and local levels and are determined according to the procedure prescribed by law.

Land zoning is carried out on the territory of the council, where the interests of territorial communities and executive bodies are accommodated.

Natural and ecological conditions have a significant impact on the development of the economy in agriculture. There are six natural and economic zones on the territory of Ukraine: Polissya, Forest-Steppe, northern and central Steppe, southern Steppe, foothills and mountainous regions of Crimea, foothills and mountainous regions of the Carpathians. Each of them has its characteristics and differs in the sectoral structure of agriculture.

Natural and economic zoning of land affects the concentration of means of production, land, and labor resources aimed at increasing output in specialized enterprises and associations – the concentration of agricultural production.

To provide more accurate recommendations to agricultural producers, it is necessary to take into account the indicators of ecological zoning – the division of the territory by the intensity of use into three ecological and technological groups (ETG). This division helps to differentiate the use of agricultural land, allows moving from rectangular to contour organization, provides information on the optimal ratio of crop rotations and continuous sowing depending on the potential risk of erosion processes, as well as intensive and organic farming.

The basis of zoning of agricultural lands is natural and agricultural zoning – the division of the territory of Ukraine and individual regions, taking into account natural conditions and agro-biological requirements of crops.

As a result of research work done in several stages on the territory of Ukraine, 5 natural and agricultural zones and 2 mountain regions, 19 natural and agricultural provinces, 33 natural and agricultural districts, including 1 sub-district, and 222 natural and agricultural districts have been identified.

Each natural and agricultural taxon has developed ecological and economic characteristics according to the indicators presented in Table **1**.

Table 1. Indicators of Ecological and Economic Characteristics of Natural and Agricultural Taxa of Ukraine *

№	Indicator	The main elements characterizing the indicator
1	2	3
1	Climate (multi-year averages)	a) the distribution of precipitation by month per year; b) minimum and maximum amounts of annual precipitation; c) average annual air temperature; d) total of active temperatures (over + 10 degree C); e) hydrothermal index by Selyaninov (HTI); f) the duration of the growing season; g) reserves of productive moisture in the soil at the beginning of the growing season; h) the number of days with dry winds.
2	Geomorphology, surface, and hydrology	a) attribution of the territory to certain geomorphological regions and their characteristic features; b) the main types of surface, their ratio, roughness, and drainage of the surface; c) surface waters (river network); d) groundwater (depth of relief elements and mineralization).
3	Ground cover	a) area and share of agricultural groups of soils; b) basic properties and indicators of soils (humus – content, depth of profile; content of physical clay and silt; acidity – pH, etc.); c) area and share of degraded and marginal lands within arable areas; d) area and share of especially valuable lands.
4	Qualitative characteristics of agricultural lands	a) mechanical composition; b) salinity; c) saline complexes;

Continuation of table **1**

		d) acidity; e) waterlogging; f) bogginess; g) rockiness (gritty consistency); h) deflation; i) erosivity.
5	Suitability of soils for growing major crops	a) points of separate grading of arable lands for zonation of crops; b) economic assessment of the efficiency of growing major crops.
6	The ratio of lands	a) the total area of lands; b) the total area of agricultural lands; c) forest cover (area, share); d) optimization of the land structure.

* Source: tabular data generated by the authors.

Natural and Agricultural Zoning	
Classification Signs	**Management of the Development of Agricultural Enterprises**
• Soil and climatic conditions • Roughness and drainage of the surface • Level of erosivity (deflation) • Agroclimatic conditions • Zone types of agricultural production, systems of agro-technical and reclamation measures	• Impact on productivity, land use, and efficiency of agricultural production • Differentiation of technological measures for land use and protection • A set of cultivated crops

Fig. (1). The component structure of natural and agricultural zoning as a part of agrarian zoning of lands and its influence on the management of agricultural enterprises' development*.
* Source: developed by the authors.

Following the detailed analysis of the land zoning types and taking into account the priority of agricultural land use and agricultural development of Ukraine, it is advisable to form such a type of zoning as agricultural.

In our opinion, agrarian zoning is sectoral zoning of land in the agricultural sector of the economy, based on climatic, economic, and environmental indicators, includes homogeneous land with appropriate production potential, level of ecological and anthropogenic load, characterized by a certain ratio of land, type of agricultural production, and zone specialization, the level of employment. It allows the public authorities to determine the potential of production activities of agricultural enterprises.

Agrarian zoning combines natural and agricultural, natural and economic, ecological and socio-economic elements that affect the activities of agricultural enterprises, provides the development of management areas, as well as the allocation of administrative areas of agricultural zones.

The boundaries of agricultural zones are formed considering the natural and agricultural zoning (Fig. **1**).

According to the attribution of land use to the agricultural zone, the agricultural enterprise is provided with information on zone crops and types of crop rotations that are most suitable for growing on its territory, implementation of technological measures for land use and protection, the level of impact on productivity and efficiency of land use.

Given the classification features of the elements of ecological zoning, which are part of agrarian zoning, there are restrictions on the cultivation of certain crops on the territory of the agricultural enterprise, taking into account its local characteristics and the optimal ratio of crops in crop rotations (Fig. **2**).

Ecological zoning	
Classification Signs	**Management of the Development of Agricultural Enterprises**
• The degree of anthropogenic impact • Intensity of erosion processes • Contamination of soils with pesticides, heavy metals, radionuclides, etc. • Providing soils with nutrients, microelements • Ratio of lands	The optimal ratio of crops in crop rotations, taking into account local characteristics

Fig. (2). The component structure of ecological zoning as a part of agrarian zoning of lands and its influence on the management of agricultural enterprises' development*.
* Source: developed by the authors.

Such economic indicators as specialization, concentration, and skillful integration of production will help increase the efficiency of land use of agricultural producers (Fig. **3**).

Natural and Economic Zoning	
Classification Signs	**Management of the Development of Agricultural Enterprises**
• Zone, economic, industrial specialization • Combination of manufacturing industries • Concentration and integration of production	• Ensuring integrated development of the region's economy • Agribusiness integration • Improving the efficiency of land use

Fig. (3). The component structure of natural and economic zoning as a part of agrarian zoning of lands and its influence on the management of agricultural enterprises' development*.
* Source: developed by the authors.

Social and economic classification features of agrarian zoning will determine the level of employment and integration of labor through raising the qualification level of the population sending them to study at the expense of enterprises due to the need of providing qualified personnel (Fig. **4**).

Social and Economic Zoning	
Classification Signs	**Management of the Development of Agricultural Enterprises**
• Trends in raising the qualification level of staff and providing agricultural and processing enterprises with qualified personnel • Level of labor efficiency (production time for the received products)	Integration of labor of producers and processors of agricultural products

Fig. (4). The component structure of social and economic zoning as a part of agrarian zoning of lands and its influence on the management of agricultural enterprises' development*.

* Source: developed by the authors.

Agrarian zoning should be defined as a mechanism of ecological and economic management of land resources. In the course of its implementation within the administrative areas, there are zones characterized by such classification features as the ratio of land, erosion risk, soil erosion, areas contaminated with industrial waste, the relative homogeneity of soil, and climatic conditions of the territory, which have an impact on the efficiency of the use of available land resources and the development of zone types of agricultural production, taking into account the specialization of agricultural enterprises.

The Kharkiv region was chosen to study the provisions of agrarian land zoning on a specific case.

The border of forest-steppe and steppe zones divides the territory of the Kharkiv region almost in half (Fig. **5**). The steppe zone includes Zachepylivka-Blyznyuky (04), Balakliya (05), and Kupyansk (06) natural and agricultural districts.

In addition to natural and agricultural zoning, ecological zoning has been studied in the Kharkiv region in two direc-

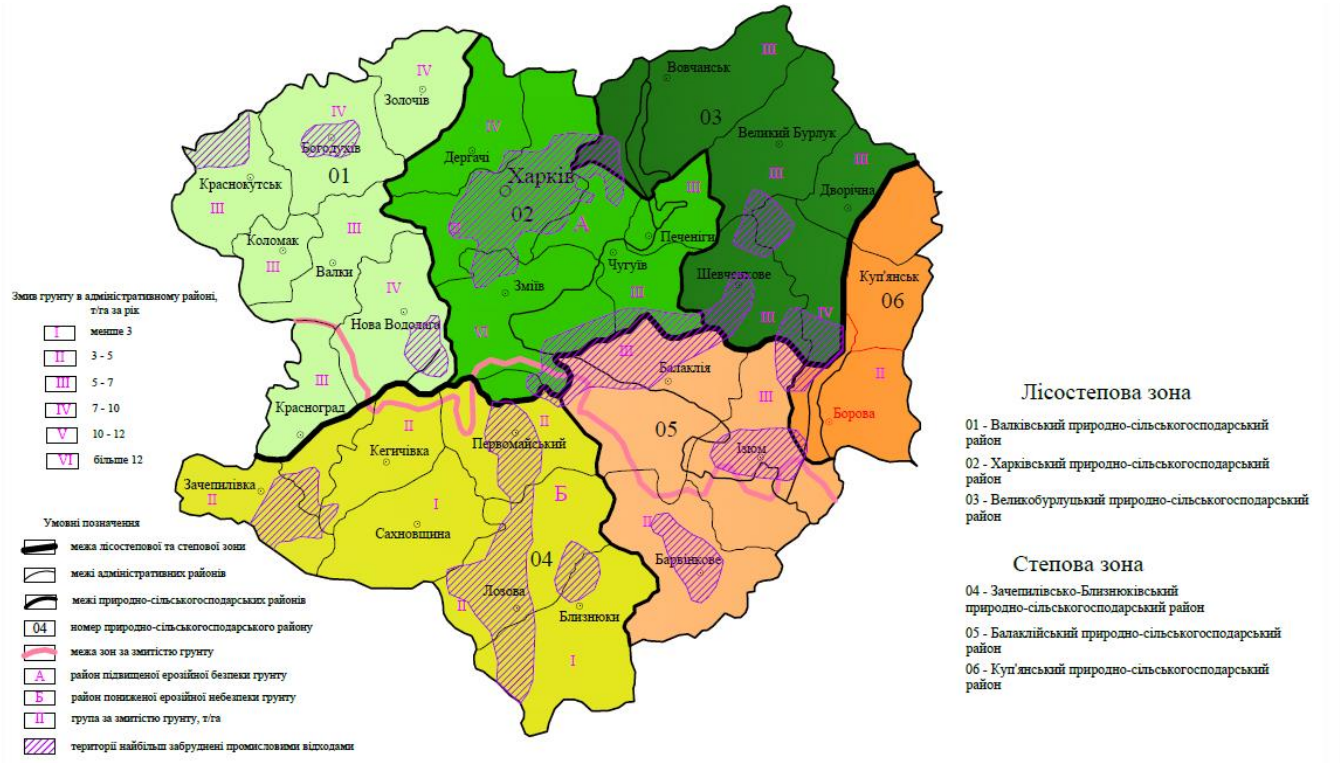

Fig. (5). Scheme of agrarian zoning of lands and ecological zoning of the Kharkiv region*.
* Source: developed by the authors.

tions: soil washing in the regions in terms of administrative districts, t/ha per year, industrial waste pollution of the territory.

As a result of the study, the following areas were identified: areas of increased soil erosion hazard (A), which included Krasnokutsk, Kolomatsk, Valkivsk, Novovodolazsk, Zolochiv, Derhachiv, Zmiyv, Chuhuyv, Pecheneh, Balaklia, Izyum, Vovchansk, Velykoburlutsk, Dvorichansk, Kupyansk, Shevchenkivsk, and Borivsk districts of the Kharkiv region; and areas of reduced soil erosion hazard (B).

The Kharkiv region belongs to the moderately polluted region. In the Kharkiv region, the contaminated areas are located around the cities of Kharkiv, Bohodukhiv, Izyum, Barvinkove, Lozova, Pervomaisky. Besides, there are polluted lands in the north-western part of Krasnokutsk district, in the south-eastern part of Novovodolazhsk district, north-west of Balaklia, south and north of Shevchenkove village, in the western and eastern parts of Kupyansk district, north of Blyznyuky village, and east of the village of Zachepylivka. Pollutions are local and related to the activities of industrial enterprises, hydroelectric stations, gas production.

When managing the land resources of an agricultural enterprise, it is obligatory to consider the impact of pollution with technical elements. On the lands contaminated with industrial waste, we introduce oats and peas into crop rotation (clean the lands and determine the ecological balance).

There are 57.1 thousand hectares of degraded, marginal, and polluted lands in the Kharkiv region, and 2339.2 thousand hectares in Ukraine.

According to the State Agency of Forest Resources of Ukraine for the Kharkiv region, the optimal forest cover of the territory is 15.00%, in Ukraine – 20.00%.

Important measures to optimize the structure of lands in the studied areas and Ukraine as a whole should be the removal of eroded and contaminated lands, their siltation, afforestation, or transformation into other lands (Table **2**). This will allow reducing the level of plowing of the territory to the environmentally optimal, establishing the optimal ratio of land and the recommended forest cover of the territory, and increasing land fertility.

Table 2. Areas of Arable Land Conversion into Natural Forage Lands and Forests, Liming and Plastering of Soils on the Territory of Agricultural Zones of the Sumy and Kharkiv Regions, Thousand Hectares*.

Agrarian zones	Siltation	Afforestation	Liming	Gypsuming
The Kharkiv region				
I	1,4	22,5	18,2	-
II	0,1	1,4	51,4	-
III	1,2	21,1	12,4	-

* Source: calculated by the authors.

The actual and optimal ratio of lands within the agrarian zones of the Kharkiv region has been calculated (Table **3**).

Table 3. The Actual and Optimal Ratio of Lands within the Agrarian Zones of the Kharkiv Region*.

Agrarian Zones	The Ratio of Lands (Arable Land: Natural Forage Lands: Forests and other Wooded Areas)	
	Actual	Optimal
The Kharkiv region		
I	1 : 0,21 : 0,18	1 : 0,22 : 0,21
II	1 : 0,27 : 0,29	1 : 0,28 : 0,30
III	1 : 0,19 : 0,04	1 : 0,20 : 0,08

* Source: calculated by the authors based on data from the Main Department of the State Geocadaster in the Kharkiv region.

It has been proposed to implement measures for land management on the territory of agricultural enterprises within the agricultural zones: cultivation of agricultural products, which according to international and state quality standards are competitive in foreign and domestic markets; preferential taxation of producers of environmentally friendly products; economic stimulation of rational use of land resources.

Economic stimulation of rational use of land resources is to provide tax and credit benefits in case of measures complying with regional programs of land use and protection, allocation of funds from state and local budgets to legal entities and individuals to restore the previous state of lands violated through no fault, exemption from fees for land plots under development and restoration of their fertility following national and regional land use and protection programs, compensation to legal entities and individuals for land plots subject to conservation or attribution to the national state reserve fund. Economic incentives provide savings to agricultural enterprises as a result of reducing the cost of environmental measures by withdrawing from the intensive use of eroded areas of land that are part of the agricultural enterprise, in exchange for non-eroded.

Soil washout in agricultural areas and the cost of 1 ton of humus are presented in Table **4**.

Table 4. Soil Washout at the Rate of t/ha per Year and the Cost of a ton of hummus, US Dollar, within the Agrarian Zones of the Kharkiv Region*.

Agrarian Zones	Soil Washout, t/ha per Year	The cost of a Ton of Hummus, US Dollar
The Kharkiv region		
I	5 – 10	200
II	3 – 7	200
III	до 5	200

* Source: formed by the authors based on data from the State Enterprise "Kharkiv Research and Design Institute of Land Management".

The purchase of land for the transformation into other lands should be carried out by local state administrations by order of the departments of state control over the use and protection of land that have discovered eroded land.

CONCLUSION

The scientific novelty of the obtained results concerns the improvement of land resources management of agricultural enterprises in terms of zoning, taking into account the potential of agricultural areas.

In our opinion, the management of land resources of agricultural enterprises under current conditions should be considered as an activity in agricultural production aimed at providing the population with food, as well as providing other sectors of the economy with optimal levels of investment in resources and their maximum return in compliance with environmental goals and programs on the norms and requirements for the rational use of agricultural lands to obtain environmentally friendly crop and livestock products while preserving natural resources.

Agrarian zoning as a branch in the agricultural sector of the economy has been distinguished, its component structure has been revealed. It has been proved that agrarian zoning is sectoral zoning of land in the agricultural sector of the economy, which is carried out on such classification criteria as the ratio of land, erosion risk, soil erosion, the presence of contaminated areas, relative homogeneity of soil and climatic conditions use of available land resources, zonal types of agricultural production, and specialization of agricultural enterprises. The agrarian zone includes homogeneous landmasses with the corresponding production potential and level of ecological and anthropogenic loading and allows public administration bodies to be defined with potential possibilities of production activity of agrarian enterprises. In the Kharkiv region, three agricultural zones have been identified. Depending on the attribution of land use to the agrarian zone, the agricultural enterprise receives information on zoning crops most suitable for cultivation on its territory, types of crop rotations, technological measures for land use and protection, as well as restrictions on growing certain crops. Economic indicators of enterprise development, such as specialization, concentration, and skillful integration of production will help increase the efficiency of land use. Social and economic classification features of agricultural zoning will determine the level of employment and integration of labor.

To economically justify the coefficients of the optimal ratio of lands using a zoning approach and to take into account the area of eroded, marginal, and contaminated land located in the administrative-territorial units, the optimal ratio of lands has been determined (arable land: natural forage lands: forests and other forest areas); in the Kharkiv region – 1.00: 0.23: 0.25. The optimal recommended plowing of the territory has been determined for the Kharkiv region at the level of 59.6. The economic expediency of the transformation of eroded lands, which economic use for its intended purpose is economically inefficient, has been substantiated. This should help reduce the volume of agricultural enterprises' investment in production, increase the volume of environmentally friendly products per unit area and increase its competitiveness.

When introducing research into production, we take into account that ecological zoning restricts the cultivation of certain crops, taking into account local characteristics. It is proposed to introduce oats and peas in crop rotation on contaminated lands, which ensure ecological balance and help clean the land from hazardous elements.

REFERENCES

Dobryak D.S., Kanash O.P., Osypchuk S.O. (2004) Metodychni rekomendatsii shchodo zdiisnennia pryrodno-silskohospordarskoho raionuvannia (zonuvannia) zemel Ukrainy [Methodical recommendations for the implementation of natural-agricultural zoning (zoning) of lands of Ukraine] *Messenger of Land Organization*, vol. 4, pp. 46 – 56.

Dobryak D.S., Kanash O.P., Rozumnyi I.A. (2001) Klasyfikatsiia ta ekolohobezpechne vykorystannia silskohospodarskykh zemel [Classification and environmentally friendly use of agricultural land]. Kyiv.

Dorosh O.S., Isachenko N.V., Martyn A.H., Osypchuk S.O., Loik H.K. (2011) Teoretychni zasady zonuvannia zemel v Ukraini: monohrafiia [Theoretical principles of land zoning in Ukraine: monograph]. Kyiv: MVTs «Medinform».

Fayol A. (1991) Obshchee y promushlennoe upravlenye [General and industrial management]. Moscow.

Horlachuk V.V., Viun V.H., Peschanska I.M., Sokhnych A.Ya. (2006) Upravlinnia zemelnymy resursamy [Land resources management]. Lviv: «Mahnoliia plius».

Horlachuk V.V., Viun V.H., Sokhnych A.Ya. (2002) Upravlinnia zemelnymy resursamy [Land resources management]. Mykolaiv: Vyd-vo MF NaUKMA.

Horokhov H.Y. (1984) Osobennosty sovremennoho zemleustroistva y eho znachenye dlia osushchestvlenyia Prodovolstvennoi prohrammy y razvytyia selskoho khoziaistva [Features of modern land management and its importance for the implementation of the Food Program and agricultural development]. Kharkiv.

Hudz V.P., Prymak I.D., Budonnyi Yu.V., Tanchyk S.P. (2010) Zemlerobstvo [Agriculture] Kyiv: Tsentr uchb. l-ry.

Kanash O. (2007) Skhema-karta pryrodno-silskohospodarskoho raionuvannia terytorii Ukrainy – prezentovana! Detalizuiut yii zemlevporiadnyky nyzovykh struktur [The scheme-map of natural-agricultural zoning of the territory of Ukraine is presented! It is detailed by land managers of grassroots structures]. *Messenger of Land Organization*, vol. 1, pp. 30-31.

Keynes Dzh. (2012) Obshchaia teoryia zaniatosty, protsenta y deneh [General theory of employment, interest and money]. Moscow: Helyos ARV.

Koshkalda I. Ecological and economic basis of anti-erosion stability of forest-agrarian landscapes / I. Koshkalda, V. Tyshkovets, A. Suska // *Journal of Geology, Geography and Geoecology*. – 2018. - № 27(3). – S. 444-452 https://geology-dnu.dp.ua/index.php/GG/article/view/539

Larsson G. (2000). Land Development by Participation. Stockholm: KTH.

Martyn A. (2008) Upravlinnia zemelnymy resursamy: priorytetni zavdannia na suchasnomu etapi reform [Land management: priority tasks at the current stage of reforms]. *Messenger of Land Organization*, vol. 9, pp. 30-36.

Nosko B.S., Derevianko R.H., Chepkov B.M. (1985) Nauchno-metodycheskye osnovы pryrodno-selskokhoziaistvennoho raionyrovanyia Ukraynskoi SSSR [Scientific and methodological bases of natural-agricultural zoning of the Ukrainian USSR]. *Agrochemistry and soil science*, vol. 48, pp. 3 – 8.

Osypchuk S. (2009). Zonuvannja zemelj: teoretyko-metodologhichni pidkhody z oghljadu jevropejsjkoji ta vitchyznjanoji praktyky [Zoning of Land: Theoretical and Methodological Approaches in View of European and Local Practices]. Messenger of Land Organization, vol 11, pp. 18-25.

Owen R. (1950) Selected works [General theory of employment, interest and money]. Moscow: Yzd-vo AN SSSR.

Ricardo D. (1971). On the Principles of Political Economy and Taxation. 1-st edition, 1817. Harmondsworth: Penguin reprint [R. M. Hartwell, editor].

Ryborski I., Hoike E. (1988) Vplyv skladu uhid na ekolohichnu stabilnist terytorii [The impact of land composition on the ecological stability of the territory]. Tatranska Lomnitsa.

Smith A. (2007) Yssledovanye o pryrode y prychynakh bohatstva narodov [A study of the nature and causes of the wealth of peoples]. Moscow: Eksmo.

Taylor F. (1991) Pryntsypy nauchnoho menedzhmenta: monohrafyia [Principles of scientific management]. Moscow: Kontrollynh.

Tretyak A.M., Dorosh O.S. (2008) Upravlinnia zemelnymy resursamy [Land resources management]. Kyiv: TOV «Avhust Treid».

Verkhovna Rada Ukrajiny (2011). Pro Derzhavnyi zemelnyi kadastr [About the State Land Cadastre]. Retrieved from: https://zakon.rada.gov.ua/laws/show/3613-17.

Verkhovna Rada Ukrajiny (2002). Pro heneralnu skhemu planuvannia terytorii Ukrainy [About the general scheme of planning of the territory of Ukraine]. Retrieved from: https://zakon.rada.gov.ua/laws/show/3059-3.

Verkhovna Rada Ukrajiny (2021). Pro zonuvannia zemel [About land zoning]. Retrieved from: https://zakon.rada.gov.ua.

Verveiko A.P. (2001) Problemy formuvannia zemlekorystuvan pry riznykh formakh vlasnosti na zemliu [Problems of land use formation with different forms of land ownership]. Problemy efektyvnoho funktsionuvannia APK v umovakh novykh form vlasnosti ta hospodariuvannia: monohrafiia [Problems of effective functioning of agro-industrial complex in the conditions of new forms of ownership and management: monograph]. Kyiv, pp. 119 – 122.

Zahalna kharakterystyka lisiv Ukrainy [General characteristics of forests of Ukraine]. Retrieved from: https://forest.gov.ua/napryamki-diyalnosti/lisi-ukrayini/zagalna-harakteristika-lisiv-ukrayini

Zbarskiy V.K., Macybora V.I., Chaliy A.A. (2009) Ekonomika siljsjkogho ghospodarstva [Agricultural economics]. Kyiv: Karavela. (in Ukrainian)

Zdorovtsov O.I., Kasianov L.I., Matsybora V.I., Shyian V.Y. (1993) Ekonomika silskoho hospodarstva [Agricultural economics] Kyiv: Vyd-vo USHA.

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