

Електронний журнал «Ефективна економіка» включено до переліку наукових фахових видань України з питань економіки (Категорія «Б», Наказ Міністерства освіти і науки України № 975 від 11.07.2019). Спеціальності – 051, 071, 072, 073, 075, 076, 292.
Ефективна економіка. 2025. № 6.

DOI: <http://doi.org/10.32702/2307-2105.2025.6.16>

УДК 332.3:504

A. Sitkovska,
Doctor of Economic Sciences,
Dnipro State Agrarian and Economic University
ORCID ID: <https://orcid.org/0000-0003-1892-6314>
M. Polehenka,
PhD in Economics, Associate Professor,
Dnipro State Agrarian and Economic University
ORCID ID: <https://orcid.org/0000-0001-5866-668X>
V. Oleksiuk,
PhD in Economics, Associate Professor,
Dnipro State Agrarian and Economic University
ORCID ID: <https://orcid.org/0000-0003-4841-458X>

PROSPECTS FOR THE USE OF LAND POTENTIAL IN CONDITIONS OF SUSTAINABLE DEVELOPMENT

A. O. Сітковська,
д. е. н., професор кафедри економіки,
Дніпровський державний аграрно-економічний університет
М. А. Полегенька,
к. е. н., доцент кафедри економіки,
Дніпровський державний аграрно-економічний університет
В. О. Олексюк,
к. е. н., доцент кафедри економіки,
Дніпровський державний аграрно-економічний університет

ПЕРСПЕКТИВИ ВИКОРИСТАННЯ ЗЕМЕЛЬНОГО ПОТЕНЦІАЛУ АГРАРНОГО СЕКТОРУ В УМОВАХ СТАЛОГО РОЗВИТКУ

The article considers the prospects of using the land potential of the agricultural sector in conditions of sustainable development. The essence of the land potential, which is revealed by the characteristic of consumer properties and quality of land, and serves as the basis for assessing the effectiveness of its use on the basis of determining the level of realization of this potential, is investigated. Land potential, namely its qualitative and quantitative base, determines the success of agricultural production, given that achieving the maximum possible level of use of the potential of land resources is not always economically justified, or socially unjustified or first and second at once. The socio-economic, organizational, legal and environmental problems in the use of land resources in the agrarian sphere, which not only damage the land potential of the country, but also create a real threat to food security, have been allocated. This is especially true of the problem of returning to the economic circulation of damaged agricultural land as a result of hostilities. The perspective directions of the use of land potential are outlined with an effective mechanism of state regulation of land relations, a complex of land reclamation measures, ecologization and digitalization of the agricultural sector. Reproduction of land resources in agriculture through a system of "smart" land use should be aimed at finding proposals for its effectiveness, which is achieved by tracking and analyzing various parameters, processing large amounts of information, etc. The implementation of these processes is complex and lengthy, as it requires significant efforts and investments from agrarian enterprises and from the state. These changes should be based on a conceptual model of legal regulation of sustainable agriculture. The advantages of their use are associated with an increase in the profitability of agricultural production due to a verified and reasonable optimization of costs and a more rational distribution of funds, an increase in yield and an improvement in product quality, which can ensure an increase in its competitiveness in the international market.

У статті розглянуто перспективи використання земельного потенціалу аграрного сектору в умовах сталого розвитку. Досліджено сутність земельного потенціалу, який розкривається як характеристикою споживчих властивостей і якості землі, так і виступає базисом оцінки ефективності використання її на основі визначення рівня реалізації даного потенціалу. Земельний потенціал, а саме його якісна і кількісна база, визначає успіх ведення аграрного виробництва, враховуючи, що досягнення максимально можливого рівня використання потенціалу земельних ресурсів не завжди є економічно виправданим, або соціально невиправданим або першим і другим відразу. Виділено соціально-економічні, організаційно-правові та екологічні проблем при використанні земельних ресурсів в аграрній сфері, які не лише завдають збитку земельному потенціалу країни, але й створюють реальну загрозу продовольчій безпеці. Особливо це стосується проблеми повернення до господарського обігу пошкоджених земель сільськогосподарського призначення в результаті військових дій. Окреслені перспективні напрями використання земельного потенціалу пов'язані з дієвий механізмом державного регулювання земельних відносин, комплексу меліоративних заходів, екологізацією та цифровізацією аграрного сектору. Відтворення земельних ресурсів у сільському господарстві за допомогою системи «розумного» землекористування повинно бути спрямоване на пошук пропозицій щодо його ефективності, що досягається за рахунок відстежування та аналізу різних параметрів, обробки великих масивів інформації тощо. Впровадження цих процесів є складним і тривалим, оскільки потребує значних зусиль та інвестицій від аграрних підприємств і від держави. Зміни повинні здійснюватися на основі концептуальної моделі правового регулювання сталого сільського господарства. Переваги від їх застосування пов'язані зі зростанням прибутковості аграрного виробництва за рахунок вивіреної та обґрунтованої оптимізації витрат і більш раціонального розподілу коштів, зростанням врожайності та покращенням якості продукції, що можуть

забезпечити підвищення її конкурентоспроможність на міжнародному ринку.

Keywords: *land potential, sustainable development, greening, digitalization, state regulation.*

Ключові слова: *земельний потенціал, сталий розвиток, екологізація, цифровізація, державне регулювання.*

INTRODUCTION

In modern socio-economic conditions, the most important task is to ensure sustainable development, which contributes to increasing the competitiveness of domestic agriculture and, on the basis of this, ensuring the country's food security. Transformations in the agricultural sector are decisive, they determine the formation of the basic principles of functioning of agricultural enterprises for the long term. Attention to various aspects of sustainable development stems from the problem of limited land and water resources, as well as environmental pollution problems caused by the activities of economic entities. In this regard, the study of the prospects for the use of land resources in conditions of sustainable development is relevant and practically significant, since it involves taking into account the interests of present and future generations in the conditions of balanced development of economic, social and environmental factors of production.

Studies of the peculiarities of the development of land relations, the reproduction and use of land potential are devoted to the works of Bespalko R., Vinichenko I., Veklich A., Melnik L., Mesel-Veselyak V., Mishchenko V., Sabluk P., Yurchishin V. and others. Achieving the strategic objectives of sustainable development of land use implies the need to modernize the agricultural management system based on the management of agroecological, technogenic, economic, social risks. Therefore, an innovative way to develop the use of agricultural land and the transition to a model of environmentally oriented sustainable agriculture is needed.

RESULTS OF THE STUDY

Land is the main resource, material basis, means of agricultural production, the efficiency of the use of which directly depends on the volume of production and the final financial results of the enterprises of the industry [1]. The natural features of this resource are inextricably linked with climatic conditions. At the same time, the earth as the main means of production not only does not wear out, but, on the contrary, improves if it is used correctly.

Like any other resource, land has a certain potential, which, on the one hand, characterizes its consumer properties and quality, and on the other, is the basis for assessing the effectiveness of its use based on determining the level of realization of this potential. Land potential is defined as the potential of land, integral to the sustainable generation of ecosystem services, that is, benefits for people obtained as a result of mutual influence and products of their activities [9, 11]. It includes the following elements: basicity, the possibility of land degradation and the ability to recover from the degradation of land potential. Land potential is the estimated maximum possible productivity of the main means of production in agriculture on the basis of a proven set of scientific and technological achievements in the natural and climatic conditions of the region, zone, and enterprises that are actually developing [10].

Land potential, namely its qualitative and quantitative base, determines the success of agriculture. Success in this context is correlated with the size and quality of the agricultural products obtained [1]. It should be noted that achieving the maximum possible level of use of the potential of land resources is not always economically justified. Whereas, in accordance with the economic law on the downward return of resources, additional investments in the realization of potential when critical values are reached may lead to a drop in the effectiveness of these investments, which requires solving the complex problem of optimal distribution and outgrowth of resource boundaries in determining the amount of financing of reproductive processes at the level of economic entities. Maximizing the use of land potential can be either economically unjustified or socially unjustified or first

and second at once.. It should be noted that it is possible to ensure the effective use of land potential in the long term by maintaining its base - the ecological balance. Therefore, when managing land potential, compliance with the conditions of sustainable development should provide for the future a balanced solution to the problems of socio-economic development and the preservation of a favorable environment and natural resource potential, meeting the needs of present and future generations [4]. Management of land potential should include both the reproduction of land resources, that is, the return of land to consumer properties that allow it to participate in the next cycle of production, and the widespread rationalization of their use [2].

Sustainable development is a balanced development in which the process of change in the exploitation of natural resources, the direction of investment, the orientation of scientific and technological development, personal development and institutional change are aligned with each other and strengthen the present and future potential to meet human needs [3]. That is why in the triad of factors that determine the paradigm of sustainable development in the first place, it turns out to regulate the influence of the economy and society on the state and success of preserving the natural environment [12].

Today, the use of land resources in the agrarian sphere is characterized by the presence of a significant number of socio-economic, organizational, legal and environmental problems that arose as a result of hostilities, which led to the unsuitability in the use of agricultural production of land masses on which heavy battles occurred (soil pollution, fires, mining and deep craters, etc.) [2]. The first group (socio-economic problems) is associated with the instability of the economic system and the social situation not only in certain territories, shows weak entrepreneurial activity and investment in agriculture, but also the migration of a significant part of rural residents, which leads to a shortage of personnel. This group of problems also includes a low level of intra-economic land management, as the main tool in preserving the fertility of land, which should solve the issues of rationalizing the use and protection of land on the basis of environmental,

economic and social measures, especially in the face of numerous risks of agricultural production. Organizational and legal problems include the complexity of the monitoring process in most regions in conditions of high speed of change of agro-landscapes with modern intensification. Environmental problems associated with the growth of degraded land, abandoned land; insufficient measures in the field of restoration and conservation of land resources, etc. These negative trends cause huge damage not only to the land potential of the country, but also create a real threat to food security in the country [4].

Modern scientific research shows that the stability of agricultural production, its economic and environmental efficiency are determined by the degree of stability of the agro-landscape, which is based on the qualitative state and rational use of the lands of the agrarian enterprise [7]. Unfortunately, in the economic practice of many agricultural enterprises, a small role is now assigned to the system of alternating fields in crop rotation, which as a result leads to depletion of soil fertility and a decrease in the efficiency of agricultural production. As a result, crop rotations should be considered as an autonomous ecological and economic system that ensures the efficiency of agricultural production, and their design should be carried out on the basis of the identified categories of land in terms of their suitability for agricultural production.

Development of land potential in the long term requires a systematic approach to its formation and use. First of all, in order to improve the use of the land potential of the agrarian sector, it is necessary to have an effective mechanism for state regulation of land relations, which also included the development of a system of measures to ensure sufficient state support, namely the redistribution of agricultural land in favor of effectively managing; strengthening control over the rational use of land for its intended purpose; partial compensation of costs to agricultural producers for work on the creation of reclamation systems, etc. Thus, in the conditions of hostilities in Ukraine, there were problems of maintaining the state land cadastre and compliance with the principles of sustainable land use, which was regulated by the Decree of the President of Ukraine of 30.09.2019 No. 722/2019 "On the Sustainable

Development Goals of Ukraine for the period up to 2030" [5]. During martial law, special rules for the circulation of land were introduced, which are aimed at ensuring food security in the country and continuing the economic use of agricultural land. However, the problems of returning to the economic circulation of damaged agricultural land remain a priority [2].

The next promising vector for the use of land potential in the agrarian spheres is greening, which should be implemented on the basis of its comprehensive analysis, to determine the real possibilities for the transition to this direction of production activity both at the regional level and at the level of the agrarian enterprise and on the basis of the information received to determine the economic feasibility of the transition to environmentally oriented agricultural production. Based on the world experience in the greening of agriculture, the creation and operation of environmentally oriented enterprises, their production activities should be organized in strict accordance with the norms of environmental standards with the complete rejection of chemicals, using only organic and natural-mineral fertilizer systems and plant protection products in the production of agricultural products. When switching to organic agricultural production in crop rotations, the specifics, quality and environmental condition of individual land plots, the availability of the necessary material and technical production base, market demand for organic products, dynamics and seasonal price fluctuations, and other factors should be taken into account. An important economic principle of the formation of the structure of crop rotation in the transition to environmentally oriented production is the reproduction of soil fertility due to the rational circulation of substances and energy.

One of the directions of increasing the efficiency of land resources use is also the introduction of a set of reclamation measures, which includes work on the operation and maintenance in the normative state of reclamation and water management systems; create zonal systems of reclamation agriculture, etc.

Particular attention in the use of land resources in the future should accelerate the process of transition to digitalization of the agricultural sector. The concept of "smart" land use is one of the stages of the transition to digital

agriculture and acts as the main factor of economic growth in the industry. Digitalization should lead to an increase in the profitability of agricultural production due to a verified and reasonable optimization of costs and a more rational distribution of funds [6]. Reproduction of land resources in agriculture through the implementation of the "smart" land use system should be aimed, first of all, at finding specific proposals for effective land use, as well as substantiating directions for improving the use and reproduction of land resources in the industry. Its use in the management and reproduction of land resources depends on the implementation in practice of the principles of "smart" agriculture. This is due to the following circumstances: the main directions of the development of digital agriculture directly depend on the general condition of the industry, the main system in which is agriculture and all sectors of agricultural production are territorially limited by the land use of a particular enterprise and are interconnected through economic and social ties, production infrastructure. Digitalization of agriculture covers the issues of land potential as part of the implementation of complex projects to increase its productivity. In smart agriculture, it is possible to track and analyze various parameters such as environmental conditions, soil condition, irrigation schedule, use of herbicides and pesticides to increase yields and improve product quality with modern systems [8].

Therefore, in modern conditions, when it comes to the digital transformation of all the agricultural sector, it must be remembered that when making managerial decisions in the production process, agricultural enterprises must take into account many factors. Among them are natural and climatic conditions, soil fertility, the condition of crops, the presence of diseases and pests, etc. Some of this information needs to be obtained and processed in real time in order to react in a timely manner and make changes to production plans, and some are accumulated over a number of years and used to analyze dynamics.

CONCLUSION

Thus, it can be concluded that the strategic objective of using the land potential of the agricultural sector is to determine the balance between economic, environmental and social interests. Such steps include the use of innovative methods of agriculture based on digitalization, the production of organic products,

which reduces the anthropogenic burden on the environment. The implementation of these processes is complex and lengthy, as it requires significant efforts and investments from agrarian enterprises and from the state. These changes should be based on a conceptual model of legal regulation of sustainable agriculture. However, the benefits that they can bring are significant and can ensure the competitiveness of agricultural products in the international market.

Література

1. Вініченко І.І., Кобець Є.А., Серeda О.О. Формування інструментів регулювання ефективного використання земельно-ресурсного потенціалу сільськогосподарських підприємств. *Агросвіт*. 2023. № 3-4. С. 4-9.
2. Грабчук І., Бугайчук В., Ткачу, В., Тимчак В. Стратегічне управління земельними ресурсами в умовах війни та повоєнного відновлення аграрного сектора України. *Актуальні питання економічних наук* 2024. №5. <https://doi.org/10.5281/zenodo.14231913>
3. Гунько Л. А. Формування сталого (збалансованого) землекористування — базова основа розвитку економіки землевпорядкування в Україні. *Агросвіт*. 2022. № 9-10. С. 51–61. DOI: 10.32702/2306-6792.2022.9-10.51
4. Купріянич І.П. Теоретико-методологічні засади організаційно-економічного забезпечення екологічнобезпечного аграрного землекористування. *Ефективна економіка*. 2020. №3. <https://doi.org/10.32702/2307-2105-2020.3.84>
5. Про Цілі сталого розвитку України на період до 2030 року: Указ Президента України від 30.09.2019 № 722/2019. URL: <https://zakon.rada.gov.ua/laws/show/722/2019#Text>.
6. Чепіль Г.В., Панченко А.В. Класифікація та тренди застосування технології 4.0 аграрними підприємствами. *Менеджмент та підприємництво в Україні: етапи становлення та проблеми розвитку*. 2024. №1(11). С. 153-163
7. Abbasi Rabiya, Martinez Pablo, Ahmad Rafiq. (2022). The digitization of agricultural industry – a systematic literature review on agriculture 4.0, *Smart Agricultural Technology* 2, No. 100042, pp. 10–13.

8. Gacar A., Aktas H., Ozdogan B. (2017). Digital agriculture practices in the context of agriculture 4.0, *Pressacademia* 4, pp. 184–191.
9. Ólafur Arnalds Lecture 15 - Land Potential: What our land can do. Course on “coursera” Landscape Restoration for Sustainable Development: a Business Approach. Universidade Erasmus de Rotterdam. URL: <https://pt.coursera.org/lecture/landscape-restoration-sustainable-development/landpotential-what-our-land-can-do-cuxRs>
10. Parmakli D.M., Todorich L.P., Dudoglo T.D., Yanioglo, A.I. (2015), *Effektivnost zemlepolzovaniya: teoriya, metodika, praktika*. Monograph, Komrat, Moldova, 274 p.
11. Schallner, Jeremy W., et al. Measuring land potential and human impacts in rangelands. 2020: 99-106. <https://doi.org/10.1016/B978-0-12-409548-9.12421-2>
12. Van Vuuren, D.P., Kriegler, E., O'Neill, B.C., Ebi, K.L., Riahi, K., et al. A new scenario framework for climate change research: Scenario matrix architecture. *Climatic Change*. 2014. №122 (3): pp. 373-386.

References

1. Vinichenko, I.I. Kobets', Ye.A. and Sereda, O.O. (2023), “Formation of instruments for regulating the effective use of land and resource potential of agricultural enterprises”, *Ahrosvit*, vol. 3-4, pp. 4-9.
2. Hrabchuk, I. Buhajchuk, V. Tkachu, V. and Tymchak, V. (2024), “Strategic management of land resources in conditions of war and post-war restoration of the agricultural sector of Ukraine”, *Aktual'ni pytannia ekonomichnykh nauk*, vol. 5. <https://doi.org/10.5281/zenodo.14231913>.
3. Hun'ko, L.A. (2022), “The formation of sustainable (balanced) land use is the basic basis for the development of the land management economy in Ukraine”, *Ahrosvit*, vol. 9-10, pp. 51-61. DOI: 10.32702/2306-6792.2022.9-10.51
4. Kupriianchyk, I.P. (2020), “Theoretical and methodological principles of organizational and economic support of ecologically safe agrarian land use”, *Efektivna ekonomika*, vol. 3. <https://doi.org/10.32702/2307-2105-2020.3.84>.

5. The Verkhovna Rada of Ukraine (2019), The Law of Ukraine "On the Sustainable Development Goals of Ukraine for the period up to 2030", available at: <https://zakon.rada.gov.ua/laws/show/722/2019#Text> (Accessed 09 June 2025).
6. Chepil', H.V. and Panchenko, A.V. (2024), "Classification and trends in the use of technology 4.0 by agricultural enterprises", *Menedzhment ta pidpryiemnytstvo v Ukraini: etapy stanovlennia ta problemy rozvytku*, vol. 1 (11), pp. 153-163.
7. Abbasi, R. Martinez, P. and Ahmad, R. (2022), "The digitization of agricultural industry – a systematic literature review on agriculture 4.0", *Smart Agricultural Technology*, vol. 2, no. 100042, pp. 10-13.
8. Gacar, A. Aktas, H. and Ozdogan, B. (2017), "Digital agriculture practices in the context of agriculture 4.0", *Pressacademia*, vol. 4, pp. 184-191.
9. Arnalds, Ó. (2025), "Lecture 15 - Land Potential: What our land can do. Course on "coursera" Landscape Restoration for Sustainable Development: a Business Approach", *Universidade Erasmus de Rotterdam*, available at: <https://pt.coursera.org/lecture/landscape-restoration-sustainable-development/landpotential-what-our-land-can-do-cuxRs> (Accessed 09 June 2025).
10. Parmakli, D.M. Todorich, L.P. Dudoglo, T.D. and Yanioglo, A.I. (2015), *Effektivnost zemlepolzovaniya: teoriya, metodika, praktika* [Effektivnost zemlepolzovaniya: theory, methodology, practice], Komrat, Moldova.
11. Schallner, J.W. (2020), "Measuring land potential and human impacts in rangelands", available at: <https://doi.org/10.1016/B978-0-12-409548-9.12421-2> (Accessed 09 June 2025).
12. Van Vuuren, D.P. Kriegler, E. O'Neill, B.C. Ebi, K.L. and Riahi, K. (2014), "A new scenario framework for climate change research: Scenario matrix architecture", *Climatic Change*, vol. 122 (3), pp. 373-386.

Стаття надійшла до редакції 12.06.2025 р.