

CONSTRUCTIVE-GEOGRAPHICAL AND ENVIRONMENTAL RESEARCH OF LAND RESOURCES: METHODOLOGICAL PRINCIPLES

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The problems of land use are both geographical and ecological in nature, since the peculiarities of land resources are their territorial limitations and the impossibility of replacing them with other means of production. Any plot of land is confined to a specific fragment of geospace characterized by certain natural conditions. These conditions largely determine the place of the territory in the structure of land resources and its assessment from the point of view of probable crop yields. Therefore, the issue of land use falls within the competence of both geographical and environmental sciences. Among the methodological principles of research of land use problems, the leading places are occupied by dialectics, system approach, fundamental provisions of modern constructive geography and ecology. An important role in the study of geographical aspects of land use issues is played by logical methods of cognition – analysis, synthesis, induction, deduction. It is important to take into account the latest research approaches in geography – ecoevolutionary, synergetic, noosphere. In particular, the concepts of modern ecology are an important component of the methodological basis for research on land use problems. Also, it is necessary to note the ideas of G. O. Bachinsky, M. M. Moiseev, Y. Odum, M. F. Reimers and other scientists, the essence of which is to find ways to achieve harmonious relations between man and nature. An important part of the methodological basis of the study is the theory of genetic soil science, since it is the soil that determines the possibility of using land in agricultural production. We believe that the most important practical measures in the development of an environmentally sound land use strategy in a particular region are the development of a land cadastre system, the identification of geospatial features in the manifestation of adverse effects of irrational land use on the landscape, the development of the main directions for improving the territorial structure of the region's economy in order to improve the ecological situation and preserve the diversity of natural and economic landscape systems, as well as the rationalization of the land structure. *Key words*: land use, constructive-geographical research, systematic approach, methodology, scientific approach, method.

Конструктивно-географічні та екологічні дослідження земельних ресурсів: методологічні засади. Сопов Д.С., Сопова Н.В.

Проблеми землекористування є як географічними так і екологічними за своєю суттю, оскільки особливостями земельних ресурсів є їхня територіальна обмеженість і неможливість заміни іншими засобами виробництва. Будь-яка ділянка землі приурочена до конкретного фрагменту геопростору, що характеризується певними природними умовами. Цими умовами великою мірою визначається місце території у структурі земельних ресурсів та її оцінка з позиції ймовірної врожайності сільськогосподарських культур. Тому питання землекористування належить до компетенції і географічних і екологічних наук. Серед методологічних засад досліджень проблем землекористування провідні місця посідають діалектика, системний підхід, фундаментальні положення сучасної конструктивної географії та екології. Важливу роль у вивченні географічних аспектів питань землекористування відіграють логічні методи пізнання – аналіз, синтез, індукція, дедукція. Вагоме значення має врахування новітніх дослідницьких підходів у географії – ековолюційного, синергетичного, ноосферного. Зокрема, важливою складовою методологічної основи досліджень проблем землекористування є концепції сучасної екології. Також, слід відзначити ідеї Г. О. Бачинського, М. М. Моїсєєва, Ю. Одума, М. Ф. Реймерса та інших учених, суть яких полягає в пошуку шляхів досягнення гармонійних взаємин людини з природою. Вагомою частиною методологічної основи дослідження є теорія генетичного ґрунтознавства, оскільки саме ґрунт визначає можливості використання земель у сільськогосподарському виробництві. Найважливішими практичними заходами при напрацюванні екологічно обґрунтованої стратегії землекористування в певному регіоні ми вважаємо розроблення системи кадастру земельних угідь, виявлення геопросторових особливостей у прояві несприятливих для ландшафту наслідків нераціонального землекористування, розроблення головних напрямків удосконалення територіальної структури господарства регіону з метою поліпшення екологічної ситуації та збереження різноманіття природно-господарських ландшафтних систем, а також раціоналізацію структури землекористування. *Ключові слова*: землекористування, конструктивно-географічні дослідження, системний підхід, методологія, науковий підхід, метод.

Relevance of research. A feature of the methodology of constructive-geographical and environmental studies of land resources is that, unlike other types of natural resources, they have certain exclusive properties. Among the latter, the feature that land resources are geographically limited and cannot be replaced by other means of production deserves special attention

[20; 22]. In addition, land resources are associated with natural conditions that determine their quality. At the same time, the rational use of land resources can not only preserve them, at least partially, but also improve their characteristics. First of all, this will be possible with a reasonable approach to the formation of the land use structure.

These features inherent in land resources determine the particular importance of the problem we have raised for many regions of our country. Land resources of Ukraine are marked by a high level of land withdrawal from agricultural production, which is associated with the action of both objective and subjective factors. In addition, the natural conditions of the territory as a whole, cause intensive development and erosion processes, which, in turn, causes significant problems associated with land use. All this determines the pronounced relevance of our chosen topic.

The purpose of the article is to formulate the methodological foundations of constructive-geographical and environmental studies of land use problems in connection with their features inherent in many regions of our country.

On the way to achieve the goal of our scientific research, we set ourselves the following tasks (figure 1).

Presentation of the main material. The fundamental methodological basis of geographical studies of nature management are the laws and principles of dialectics.

In particular, the law of unity and struggle of opposites is manifested through the interaction of natural preconditions of agriculture and socio-historical factors of its development. Often the influence of these factors is opposite in its consequences (for example, in the presence of fertile soils, irrational land use can lead to deterioration of their properties; the result is a steady decline in crop yields). The mentioned law also applies to the following example: anthropogenically enhanced water erosion, the scale of which significantly exceeds natural values, is usually a consequence of the dominance of certain social relations in the agricultural sector; therefore, there are grounds to assert the dialectic of natural and social in the phenomenon of nature use and its research.

An example of the law of transition of quantitative changes into qualitative ones can be a gradual decrease in soil fertility due to constant cultivation of monoculture (in particular, in Ukraine, sunflower is actually such a monoculture on large areas); eventually, the land loses its fertility so much that it is no longer possible to grow wheat and other crops. Another example is the increase in the area of arable land on slopes steeper than 2° , which leads to the emergence or intensification of erosion processes and, consequently, to soil degradation.

The law of negation of negation, in our opinion, is manifested in the way that as a result of bringing the

land occupied for grain crops to unusability, the relevant plots do not completely lose their economic value and can be further used for growing less demanding crops or for pastures, hayfields, etc.

The core principle of research on land use problems is a systematic approach. As noted by Professors S. A. Moroz, V. I. Onoprienko and S. Yu. Bortnyk, the systematic approach is a concept that "in general reflects a strategic attempt to give research a comprehensive nature, to link the discovered and rediscovered facts and patterns into a system, to present knowledge in the form of a logically consistent single system or scheme" [12, p. 118]. Back in the first half of the twentieth century, a number of concepts were developed that had a distinctly systemic nature – in particular, about the landscape (L. S. Berg [2]), about the geographical shell (A. O. Grigoriev [6]), about the noosphere (E. Le Roy [27] and P. Teilhard de Chardin [24]), about the biosphere and the noosphere (V. I. Vernadsky [3; 4]). In the second half of the last century, the concepts of nature management (M. F. Reimers [19]), supported development (eco-evolution [15; 16; 18]), the idea of synergy (G. Hacken [25]), I. Prigozhin and I. Stengers [17] were developed, and allowed to improve systemological research in geography.

Significant contribution to the development of the systematic approach in the context of its application in natural geography was made by R. Chorley and B. Kennedy [26], J. Demek [7], E. Nef [13], V. B. Sochava [23] and other scientists.

A striking example of the application of a systematic approach in the study of the problem we have chosen can be the analysis of the structure and dynamics of land. These lands, consisting of pastures, hayfields, arable land, and the latter, in turn, of crops, are a complex object (hence, it can be considered as a system) with its characteristic properties (complexity, hierarchical structure, emergence, etc.).

A systematic approach in the study of land use problems is also manifested in the analysis of the correlation of spatial and temporal patterns of formation of the modern structure of land resources.

An important component of the methodological basis for research on land use problems is the concept of modern ecology. In particular, it should be noted the ideas of G. O. Bachinsky [1], M. M. Moiseev [11], Y. Odum [14], M. F. Reimers [19], the essence of which is to find ways to achieve harmonious relations between man and nature. Thus, M. M. Moiseev wrote: "...gradually came the understanding that man – his way of life, his destiny – is also inseparable from the environment and is its integral part. And his relationship with nature: the impact on nature in the process of life, especially production activities and, of course, the reverse impact of impoverished nature on man and the development of society – all this should be the subject of special study. Thus, a "parallel" science began

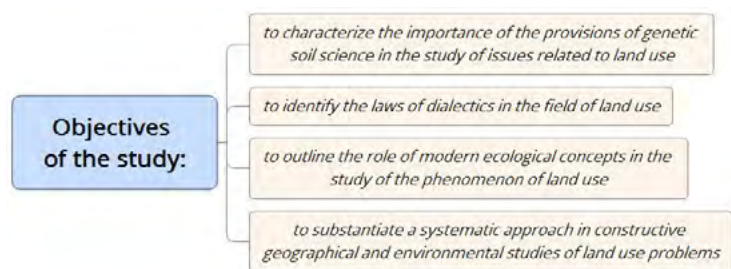


Fig. 1. Objectives of the study

to emerge – human ecology" [11, p. 4] (our translation – D. S., N. V.).

An important part of the methodological basis of our study is the theory of genetic soil science, developed in the late nineteenth century by V. V. Dokuchaev in his works "Russian Chernozem" [9] and "Our steppes before and now" [10]. The mentioned outstanding scientist formulated the definition of soil, which has not lost its relevance to this day: "Soils are ever-changing functions of: a) climate (water, temperature, oxygen, carbon dioxide, etc.); b) parent rocks; c) plant and animal organisms – especially lower ones; d) relief and altitude of the area and, finally, e) soil, and partly geological, age of the country..." [8; 21, p. 16] (our translation – D. S., N. V.). Another well-known definition of "soil" belongs to W. R. Williams: "When we speak of soil, we understand the loose surface horizon of the globe's land, capable of producing crops. The concept of soil and its fertility are inseparable. Fertility is an essential property, a qualitative feature of the soil, regardless of the degree of its quantitative manifestation. We oppose the concept of fertile soil to the concept of barren stone, or, in other words, to the concept of massive rock" [5; 21, p. 19] (our

translation – D. S., N. V.). Synthesizing both of the above definitions, B. Rozanov offers his own definition of soil: "Soil is a complex polyfunctional open four-phase structural system in the surface part of the weathering crust of rocks, which is a complex function of rocks, organisms, climate, relief and time and is characterized by fertility" [21, p. 27] (our translation – D. S., N. V.).

It is the soil that determines the possibility of using land in agricultural production. Accordingly, the territories occupied by the most fertile soils should under no circumstances be withdrawn from the category of agricultural land. On the contrary, the areas with less fertile soils should be used for non-agricultural needs (industrial production, construction, laying of roads, etc.).

Conclusions. The methodological basis of constructive-geographical and ecological studies of land use problems consists, on the one hand, of a philosophical component represented by the laws of dialectics and a systematic approach that define the general features of the study, and, on the other hand, of specific scientific natural (soil, ecological) concepts and ideas, the application of which allows to improve certain regional and methodological aspects of the study of these problems.

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