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# ECOLOGIZATION OF GEOGRAPHY AND SOME THEORETICAL ASPECTS OF GEOECOLOGY

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**Abstract**
The ecologization of science is aimed at ensuring the active participation of various sciences in solving existing ecological problems. The ecologization of geography, i.e., the introduction of ecological principles and methods into geographical research, involves using an ecological approach, formed as a result of the integration of ecology and geography. In other words, the ecologization of geography is nothing more than the appluying an ecological approach to it. On this basis, a new scientific direction was formed - geoecology. This article shows the processes of ecologization geographical science and some theoretical aspects of geoecology.

**Keywords** Geography, ecology, object, subject, ecologization, ecological approach, geoecology, geosystem, geoecosystem, theory, practice.

## INTRODUCTION

It is known that a person turns to regular science so that he\she better adapts to the natural and social environment, does not become helpless in the face of the unruly forces of nature. Science is a system of scientific knowledge, the main elements of empirical and theoretical scientific knowledge include facts, laws, theories, methods and scientific landscapes of the universe. Objectivity, reliability, systemicity, logicity, determination of scientific thought validity in experience, ownership of field methods and concept-terminology apparatus are important signs of any discipline. The description, systematization, explanation, application in practice and forecasting of new aspects of the reality of Nature, Society and thinking and knowledge are included in the main tasks of the sciences [1; 2]. All the features mentioned above also fully apply to the science of geography.

Geography is a system of natural and social, i.e. natural-geographical and economic-geographical sciences that study the geographical shell of the Earth, territorial natural and industrial complexes and their components. In other words, geography is a set of natural and social sciences that study the structure, functioning and evolution of the geographical crust, the relationship and distribution of natural and natural-social geosystems and their components in space. Due to the fact that natural geography belongs to the natural sciences, socio-economic geography belongs to the socio-humanitarian sciences, geographical science is simultaneously included in the system of both natural and socio-humanitarian sciences. Also, an integral part of geographical science is research cartography, which displays through geographical maps the territorial location, interrelation and interrelation of natural phenomena and society. According to N.N. Baranskiy, ”the map is the second language of

geography“, ”any geographical study begins with a map and ends with a map" [3; 42–p.].

Geography is the only fundamental science that comprehensively studies the territorial aspects of the interaction of nature and society, always being a companion to the evolution of man and humanity. There are concepts such as place, area, border, land, country, country or space, Territory that cannot be separated from each other, that is, geography means territory, territory means geography. After all, ”geography is a science that studies territorial differences, territorial composition and territorial systems at all times“[4],"... territorial thinking on various scales is a fundamental prerequisite of geographical science”, "a geographer is a doctor of the territory who must know and treat it" [5; 177-179-p.[6; 294 p.], ”When and where they talk about the territory, the science of geography is certainly considered as priority" [6; 294 p.].

From a pragmatic point of view, any territory means a resource, raw materials or habitat. Hence the problem of territory or geography – one of the eternal and eternal problems of mankind. However, the scientific misunderstanding of the true nature of geography, i.e. the view of it as a descriptive science that has existed all its life, somewhat limits the scientific nature of this ancient science. In particular, when understanding the unity and interrelation of nature and society, when developing a Strategy for the socio-economic development of a country or territories, geographical law, the consequences of ignoring or ignoring laws are taken into account (for example, a decrease in natural runoff in the Amu Darya and Syr Darya, the drying up of the Aral Sea, the crisis of Aral ecosystems (landscapes), a man-made disaster on a tank, becoming a desert - Dust storms observed in Uzbekistan, increased processes of secondary soil salinization, etc.) occur in front of today's generations. All these processes are directly or indirectly related to man and his economic activities, with improper management, blind, merciless use of resources, irresponsible attitude to nature and the environment, in other words, Over the past half century, citizens, especially those responsible for state and economic management, lack geographical and ecological (geo-ecological) culture. this happens as a result of the fact that the level has not been formed.

Foreign scientists had different views on the common object of geography. For example, the zone of mutual penetration of the lithosphere, atmosphere, hydrosphere, biosphere and anthroposphere as an object of study of geographical science (P. James, J. Martin) or the spatial-territorial organization of human society and its relationship with the environment (P. Hagget) [7; 11].

Based on the analysis of the points that we have outlined above, geographical science studies geographical objects, processes and phenomena in a geographical shell, four main there are geospheres in this shell that are interconnected and interact – the atmosphere (an air shell consisting of a mixture of gases surrounding the Earth), the lithosphere (the solid shell of the Earth containing the crust and part of the upper mantle), the hydrosphere (the water shell of the Earth in a solid (icy), liquid (aqueous), gaseous (vapor) state) and the biosphere (the Earth's shell, in which living organisms live and includes natural and anthropogenic geosystems of various scales, which are formed in their interaction.

The subject of geographical science is the study of the territorial-temporal (or spatially modern) features of the emergence, functioning, pace of change and development processes of natural and social geosystems.

The concept of “Geosystem” in this definition covers the components of a geographical shell that are interconnected and interconnected with the flows of matter, energy and information, more precisely, a set of relatively integral territorial formations formed as a result of the interaction and unity of nature, population and economy, while the concept of "geographical environment" refers to a set of structures of a geographical shell, in that or to some extent assimilated by a person involved in social production. It represents a part of human society that participates and forms the material basis of its existence. In particular, E.B. According to Alaev, the geographical environment is a part of the geographical shell, to one degree or another assimilated by a person (society) and participating

in social production [8].

The complexity of the object and the breadth of the subject of geographical science, as we can see, led to the differentiation of groups and specialized branches of specific areas in this science. In particular, within the framework of science, groups of general geographical, natural geographical and socio-economic geographical sciences, as well as mixed and interdisciplinary scientific directions have been formed.

At the modern civilizational stage, when scientific and technological progress, differentiation of the needs and interests of mankind are increasing, geographical science is undergoing fundamental changes both in content and in structural terms. If earlier it was traditionally believed that geography consists of natural and economic directions, now in geographical science, as a result of the intensive processes of environmentalization, socialization and politicization, new directions with general geographical and integrative (borderline, close, interrelated) content appear, on which research is conducted. Modern geographical science is, in fact, a complex of sciences, which remain characterized by the processes of stratification and integration into a common scientific system. However, despite this, controversial and contradictory opinions have arisen about the internal structure of modern geographical science.

As A.G. Isachenko very correctly noted, "geography is a science rich in changes, which develops without abandoning previously proven theories and proven methodological principles, but constantly enriching itself with new approaches, ideas and theories. Life poses new challenges for him, especially in the field of studying the interaction of society and nature. It is in this area that we should look for a point of growth and prospects for the integration of this science" [9, 4-p.].

From this point of view, a new scientific direction in the system of geographical sciences, studying the geographical environment, territorial aspects of the interaction of nature and society, is geoecology, i.e. the formation of geographical ecology is a natural process, the object of which is the geographical shell or geoecosystems in the geographical environment, the subject is natural, natural–anthropogenic and anthropogenic geoecosystems [10; 11]. Therefore, due to the fact that the object and subject of geoecology are changes caused by human activity in the geographical (natural) environment, territorial environmental problems, their inseparable unity and interrelation with all geographical scientific directions, it is advisable to include it in the block of natural and social sciences in the system of geographical sciences.

The formation of geoecology is associated with the greening of geographical science, a process that determines the current trends in its development. Greening is an unprecedented process in the history of science and society, encompassing not only all sciences, but also modern public consciousness. This process arose as a result of the global systemic, crisis development of civilization of the XX century. The greening of human economic activity, that is, environmental management, is carried out in various sectors (industry, agriculture and forestry, transport, etc.).k.) provides for the introduction of special approaches, environmentally friendly methods and technologies.

Ecologization of environmental management is the implementation of environmental management based on the principles of preserving the quality of the environment, aimed at preserving resources and fully ensuring the existence of a healthy society. When ecologizing environmental management, the following principles are used:

1) harmonization of relations between nature and production through the creation and functioning of various systems (natural-technical, geotechnical, ecological-economic) formed from elements of the production and natural environment;

2) consolidation of production by creating territorial production complexes based on the rational integrated use of raw materials, energy and natural resources available in a particular economic area;

3) by reducing the amount of waste generated in the production process and the full use of raw materials, the rate of production of useful products is faster than the rate of preparation and extraction

of raw materials;

4) optimization of environmental management - making optimal decisions on the use of certain resources based on simultaneous environmental and economic approaches and forecasting the development of industries and geographical regions;

5) rational use of renewable (with precise consideration of the scale of annual reproduction) and non-renewable (through economical use or replacement with other) resources;

6) the principle of regionality - the need for strict consideration of local and regional conditions for the use and protection of natural resources;

7) a systematic approach is the use and protection of available resources based on a comprehensive assessment of the impact and consequences of production on the environment, their interrelationships.

The main meaning of the word ”ecologization" refers to the consistent introduction of the ideas of ecology, rational nature management, nature and environmental protection and sustainable development into the worldview system, into legislation, management, technology, economics, science, education (education, upbringing), spirituality, culture and other fields [12].

According to V.A. Vronskшy, ecologization is the strengthening of the ecological orientation of various branches of science and human economic activity aimed at preserving nature and the effective use of its resources [13, 381-p.].

N.F.Reimers believes that the only way to solve global environmental problems is integrated greening, that is, the ecological reorientation of all types of human activity: science and knowledge, industry, agriculture, transport, urban development and demographic policy [14, 57 – b].

The greening of sciences is ensuring the active participation of various sciences in solving environmental problems. In other words, the greening of geography is nothing more than the introduction of an ecological approach into it. The ecological approach in geographical science as a method of cognition, like other scientific approaches, is based on the objective unity of the principles of interaction of a geosystem (or geoecosystem) with a geographical shell (environment) of any level belonging to the geographical form or organizational structure of the movement of matter.

I.P. Gerasimov paid great attention to this issue. In his scientific article ”methodological problems of ecologization of modern science“, published in the journal ” Problems of Philosophy “ in 1978, the concept of ecology and its genesis are analyzed in detail, it is argued that ”the ecological approach to the study of wildlife has long gone beyond the biological sciences and has a clear tendency to spread to other fields of scientific knowledge“, therefore,"the interpretation of ecology as a specific general approach to the study of various objects of nature and society for example, the systemic and cybernetic approaches, in my opinion, the ecological approach”, and also "the purpose of the ecological approach is to identify and study the existing links between the object studied by a particular science and its environment" [15].

If the interaction of nature and society is analyzed from the point of view of a geographically changing equilibrium, they talk about a geoecological approach. I.P. Gerasimov defined the content of the geoecological approach as [16]:

1) control of environmental changes, i.e. conducting anthropogenic monitoring;

2) forecasting the effects of human economic activity on the environment;

3) prevention of natural disasters, reduction and elimination of their consequences;

4) optimization of the environment of the created natural and technical systems.

In the world scientific education, the greening of modern geography is rightfully considered its most important direction. The increase in the scale and level of the practice of transforming nature by man has led to the emergence of catastrophic situations in various regions of the planet Earth, such as the Aral Sea and the Aral Sea region, and this process has been assessed as an environmental crisis of a planetary

scale [17]. Understanding such dangers and the need to eliminate them in a timely manner have made the main focus of geographical research the territorial aspects of the relationship between nature and society.

Geographical science in Uzbekistan, unlike the geography of the countries of America and Europe or Russia, was somewhat scientifically and theoretically ready to accept progressive environmental ideas, solve regional, national and local environmental problems (for example, the problems of the Aral Sea and the Aral Sea region), but the greening of this science began relatively late. The reason for this, in our opinion, was a subjective factor, i.e. the political and ideological control of the leadership of sciences during the period of the former salt regime. Because under the conditions of the socialist system and the economy, there can be no unresolved environmental problem; it has been firmly established that such problems arise as a result of the abuse of natural resources under the capitalist regime. After the removal of political and administrative control over the sciences during the period of independence, geographical science in Uzbekistan went through a process of literal greening, a new scientific direction arose -geoecology, combining the interests of natural and socio-economic geography.

Knowledge or understanding of the true nature, scientific and theoretical foundations of geoecology begins with a scientific explanation of the origin of this term. After all, the word “geoecology” has three bases: geo/ECO/logy. The kernels of this word can be considered as specific features explaining the concept of "geoecology". Simply put, the core of “geo” supposedly refers to abiotic (inanimate) nature, and the core of "ECO" refers to biotic (living) nature. In this sense, the combination of “geoeco” reflects the unity of inanimate (dead) and living (living) nature, and this combination also reminds us of the dependence of the state of our "home", that is, planet Earth, on human activity. On the other hand, the core of the "Logos" in "geoecology" means teaching or science.

The emergence of the term "geoecology" in geography is directly related to the emergence of the scientific field landscape ecology in 1939. The founder of landscape ecology is the German natural geographer K.A troll. He believes that the analysis of environmental changes occurring in landscapes by region is a process that “landscape ecology” should study, and uses the word “geoecology" as a synonym [18]. K.Troll believes that any landscape should be studied based on an analysis of the ecological relations between plants and the abiotic environment, as well as the extent of natural and anthropogenic impacts on landscape components through an analysis of the balance of matter and energy. This approach closely links the biological productivity of landscapes with the edaphic and climatic conditions of the environment.

Actually, the term "geoecology" K. Troll introduced two approaches, namely the “recumbent” (horizontal) approach, studying the territorial relationship of natural phenomena, and the “vertical” (vertical) approach, studying the relationship between phenomena occurring in ecosystems of various spatial scales, in order to prove the necessity and expediency of their unification. The main reason was that both of these approaches are partially considered in the context of landscape science and biogeocenology. The term was introduced at that time to compare with fully branched structural bioecology (ecology of plants, animals and microorganisms), that is, in contrast to them.

Since the 80s of the XX century, geoecology has begun to study systemic territorial phenomena and processes resulting from the interaction of nature and society, namely geoecosystems (natural, natural-anthropogenic and anthropogenic geoecosystems), their interrelation, dynamics and stability. However, there are different points of view and definitions of the object, subject, purpose and objectives of geoecology (K.Troll (1972), E.B.Alaev (1983), N.F.Reimers (1990), V.S.Preobrazhensky (1990), S.V.Clubs (1993), L.L.Prozorov (1993), V.I.Osipov (1993), A.A.Rafikov (1997), S.P.Gorshkov (1998), B.I.Kochurov (1999), A.I.Zhirov (2001), N.M.Davidenko (2003), N.A.Yasamanov (2003), K.M.Petrov (2004), V.B.Pozdeev (2004), I.A.Karlovich (2005), G.N.Golubev (2006), L.L.Rozanov (2006), V.M.Kotlyakov (2007),

A.I.Komarova (2007), S.Babbasov (2007), I.Ye . Timashev (2008), V.T.Trofimov (2014), O.A.Klimanova (2014), Y.I.Akhmadaliev (2014), Sh.M.Sharipov (2014), A.N.Nigmatov (2018, etc.), and so far the only generally accepted definition has not been fully formulated [19].

In particular, B.I. According to Kochurov, geoecology is the science of territorial-temporal (spatio-temporal) patterns of interaction of living organisms with the abiotic environment in which they live [20]. If this is the most complete definition, then the object of geoecology is the environment of the geographical shell in which the activity of living organisms (including humans) takes place, and the geoecosystems of various scales of which it consists. Then the goal of geoecology becomes to coordinate the negative and positive effects of human economic activity on the environment in order to effectively use geoecosystems. This implies an ecological balance that supports the physical, biological possibility of life processes in the environment. In our opinion, modern geoecology, as an interdisciplinary scientific field that studies geoecosystems of various scales in the integration of natural, social and technical sciences, is engaged in research and environmental assessment of the geographical consequences of natural, anthropogenic and man-made environmental changes.

Currently, several following points of view have been formed, allowing us to understand geoecology as a science (or scientific direction)::

1. Geoecology as a branch of general ecology belongs to the category of environmental sciences. The object of geoecology research in this case is large-scale ecosystems, the subject of which is to study the general patterns of interaction of abiotic and biotic components in such high-level ecosystems as the biosphere, mainland, ocean, biome.

2. Geoecology as a geographical science belongs to the category of geographical sciences. Currently, geoecology is considered by some scientists as the fourth component of geography (such as natural geography, economic and social geography, cartography). The object of geoecology research in this case is geoecosystems, the subject is the study of the patterns of natural, natural-anthropogenic and anthropogenic geoecosystems.

3. Geoecology is a scientific field formed at the junction of the sciences of geology and ecology -a section of ecological geology that studies man-made changes in the geological environment. The object of geoecology research in this case will be the geological environment, and the subject is the study of the natural relationship of the geological environment with other environments in the atmosphere, hydrosphere and biosphere and the assessment of the impact of human economic activity on the geological environment.

4. Geoecology is an independent branch of environmental science, at the junction of which geography, ecology, biogeography, soil science and geological sciences go hand in hand, at the junction of which the object of research is a natural system (geoecosystem), and the subject is natural systems that have undergone anthropogenic transformation, i.e. geoecosystems - integrated (synthetic) science.

The object of modern geoecology, according to most scientists and our opinion, is the geoecosystem. A geoecosystem is understood as a natural system under the direct and indirect influence of human economic activity, as well as an anthropogenic (completely man-made) system, which is a set of naturally anthropogenic (naturally modified) or interconnected three (nature, population, economy).

Geoecosystems such as “natural-socio-economic system”, “natural-socio-production system”, “natural-economic system”, “geoecosocial system”, “integrated Geosystem", "complex ecological-economic system", in the interaction of two major systems called "nature" and "society they distinguish. Also, according to the organizational structure, global, regional, national or local geo-ecosystems can be distinguished. Geoecosystems are characterized by such characteristics as that they are in a state of internal variable equilibrium, have few significant changes, are resistant to external influences, restore their original state, and also transition from one state to another.

The main task of geoecological research is the

search for optimal, rational interaction between nature, the population and the economy, whose interests contradict each other. One of the important aspects of the theory of geoecology is the methodology of science and practice. This means that while the methodology of science in geoecology defines the conditions, directions and methods of solving geoecological problems for practice (society), the methodology of practice provides geoecologists with information about the expediency of methodological complexes, technologies for transforming geoecological reality. The interrelation of the methodology of science and practice makes it possible to introduce innovations in geoecological activities (practice).

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