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GEOECOLOGY

Textbook



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GEOECOLOGY

REPUBLIC OF KAZAKHSTAN
MINISTRY OF EDUCATION AND SCIENCE

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Textbook

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This textbook, developed based on a standard textbook of the discipline “Geoecology”, presents the theoretical foundations and methodological principles of geoecology, considers elements of the natural environment – the lithosphere, hydrosphere, atmosphere, pedosphere, and landscape layer, taking into account natural and anthropogenic processes. Special attention is paid to the relationship between human society and the natural environment that surrounds it. Information on the current global problems, as well as the problems of climate change, damage to the natural environment as a result of anthropogenic impacts and technogenesis, as well as the rational use of natural resources of the Republic of Kazakhstan is presented.

The textbook is intended for students majoring in “Ecology”, “Geoecology”, “Environmental Protection”, as well as specialists, teachers, and scientists engaged in the environmental and rational use of nature.

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Introduction

The growth of the world's population, its demand, the increase in the use of natural resources of the planet, the introduction of new technologies and increased production in energy, industry, agriculture, transport, anthropogenic changes in world landscapes, the complexity of international economic relations and other factors increased anthropogenic pressure and strengthened the connection between the environment and society.

In XX century, especially in the second half, rapidly growing anthropogenic influences have become a major factor in the survival of society. At the same time, new interdisciplinary tasks appeared. There was neither background experience nor methodology to address them.

For example, due to the constant increase in anthropogenic loads, objectives have been settled at different hierarchical levels in the Earth's geosphere. Due to the need for a comprehensive solution to such problems, a new interdisciplinary direction "Geoecology" has emerged. Although new, it has long been a study of the impact of human society and its consequences on the geographical environment and its inhabitants.

Geoecology is a complex scientific discipline created on the basis of ecological laws and patterns within the framework of natural and natural-anthropogenic high hierarchical geosystems: landscape zones, physical-geographical zones, areas, regions, and provinces. The importance of the geoecological approach is the assessment of changes in nature and the regulation of its consequences, the preservation of the ecological situation in the territory of a particular geographical system. Ability to properly prevent the global environmental crisis through the interaction of society and nature. The main task here is the use of natural resources and ecological stabilization of the environment on the basis of scientific and technical recommendations of geographical systems.

Many elements of geo-, eco- and social systems intersect in territorial systems. The space of their interaction is the object of geoecological (geographical-ecological or ecological-geographical) research.

Features of geoecology at the regional and topological levels are interconnected geographical, ecological (biological), and social systems (natural and economic). On a global scale, this means the trinity (integrity) of the geographical envelope, the biosphere, and the technosphere. This definition of geoecology corresponds to the similar (essentially) methodological principle of the system-forming role of the elements of each group of the set: geo-, eco- and social systems are interconnected and interdependent. This leads to the conclusion that geographical determinism, in which social systems depend on the conditions of nature in which they are formed. There is a social determinism that such natural systems change under the influence of human activity.

The purpose of the proposed geoecology textbook is to highlight the special place of the area in the field of geography and ecology, to show the priority of issues in global and regional ecology, to develop competence in environmental hazards, natural and man-made disasters, environmental safety and sustainable development.

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