PHYSIOGRAPHICAL CHALLENGES OF MOUNTAINOUS AREAS

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Abstract

The mountainous regions of the Earth have significant elevation differences even on small areas of the earth's surface, which is the main reason for the characteristic combination of natural conditions in these regions. This includes height as a leading factor, resulting in relief and a corresponding complex of natural components. All other components of development in these areas will be radically different from those in nearby plains, and the conditions of existence for the population will also be characteristic of these territories. These conditions affect lifestyle, occupation, and health. Altitude is most clearly traced in the variability of hydroclimatic, soil-biological, and landscape components vertically. As altitude and climatic components directly affect agricultural specialization, it is important to consider these factors when planning agricultural activities in mountainous areas. There is a change in the direction of reducing the duration of the vegetation period for plants. Agriculture is associated with growing cold-resistant plants, while heat-loving plants are grown on the plains and their growing season is shorter. The physical and geographical challenges of highlands involve determining the limits of disturbance or barrier that can cause instability, as well as forecasting the development of weak components. It is necessary to identify processes that affect the development of mountains. These include altitude, topography, climate, and weathering, which together determine the stability of natural complexes in highlands.

Keywords: mountainous areas, natural components, safety margin

I. Introduction

Mountainous countries are characterized by an unusually rich, diverse, and variegated vegetation cover. This is due to a variety of habitats and environmental conditions, including changes in temperature with altitude, lighting conditions depending on slope exposure, and humidification conditions depending on relief. Because of these factors, mountain biota surpasses lowland territories in terms of biodiversity. A person should be aware of the characteristics of the altitude zone because the natural nature of plains has been changed by agriculture. Mountains will remain in their natural state for a long time and their landscapes will influence nature management and development. These factors are necessary for the sustainable use of mountain resources. The study of mountain natural complexes and their patterns is important for understanding the ecological processes that occur there [1,2]. Distribution is impossible without a broad geological analysis, linking vegetation with the surrounding geographic landscape. Precisely because mountains with their rich plant, animal, aquatic, and fossil wealth, located in relatively small spaces, have been and remain, on an ever-increasing scale, suppliers of resources for lowland civilizations. Summer grazing, logging, mining, engineering, construction of dams, roads, and much more are areas of exploitation of mountains for the prosperity of the plains.

II. Methods

The 21st century, the century of mountains, is the United Nations' forecast for the future of humanity. It has been stated that in the near future, mountains will determine the quality of life for all of humanity. According to the prediction, in the near future, mountains will determine the quality of life for all mankind, despite the fact that they occupy only 1/5 of the Earth's surface and only 10% of the world's population lives in mountainous areas. Mountains contain a vast potential of natural resources, including hydropower, which is being almost untapped by humans. This makes them a storehouse of the Earth's interior that has been preserved from human interference. We can say that mountainous areas have a unique lifestyle, mentality, and cultural and biological diversity that seems to be frozen in time.

Only with a new approach to assessing mountains and their potential for providing natural and biological resources can we transition to a sustainable development policy for mountain ecosystems. this consideration of the issue will allow us to include the potential of mountain territories in the parameters of regional wealth. The degradation or destruction of mountains is still a major concern today [3, 4].

Despite this, mountains remain some of the most ecologically prosperous regions of the planet, where the STR (Scientific and Technical Revolution) has not taken over yet. Mountain regions are unique in many ways. They lack industrial enterprises with their harmful emissions and drains. Asphalt pavements have not sealed off the soil, allowing geochemical processes to continue. Vehicles are fewer, and the population is smaller than in nearby plains.

All of this does not imply that there are no challenges in mountainous regions. One of the issues is the expansion of grazing areas in the alpine meadow zone and the consequent depletion of flora and fauna in these areas.

Another, not less significant aspect, is the melting of glaciers in the snow zone due to a global warming.

If we talk about alpine meadows, this is a highly vulnerable ecosystem. In order to preserve this unique ecosystem, it is essential to immediately ban the grazing of domestic animals in this area. Domestic animals, such as hoofed mammals, can significantly affect the structure and productivity of plant communities in alpine meadows. It should be noted that the number of pets may increase. Wild animals also have an impact on the vegetation of mountain meadows.
Unregulated and haphazard use of pastures is prohibited by law given the current situation, which is one of the most pressing issues today [5,6].

One of the goals of comprehensive geographical research is to assess the natural resource potential of a territory, primarily in mountainous areas due to their vulnerability. Due to the potential resources of the territory the environment is not taken into account, and this leads to a deterioration in environmental conditions.

III. Results

The peculiarity of mountainous areas is the specific distribution and transformation of solar energy. The amount of solar radiation in the mountains increases in proportion to the increase in altitude, elevation difference, and steepness of the slopes.

The rugged terrain creates an absence of large flat areas in the mountains, leading to high activity of slope processes and a concentration of vegetation in particular local areas.

We can identify the main causes of the vulnerability and extreme instability of mountain geosystems:

1. The geosystems in the highlands have relatively simple, direct, and rigid connections. This is because natural complexes develop in rugged terrain, where parameters such as altitude and associated temperature are important. This means that they are dependent on external influences.

2. Ecological relations in mountainous areas are disproportionate. This is due to the dominance of abiotic environmental factors, such as light, temperature, and humidity. These external factors are more influential than internal factors in mountainous ecosystems.

An ecosystem is a system composed of interrelated and interdependent parts that interact through the exchange of materials, energy, and information. As a result, internal connections within the system are more stable and help maintain the overall structure of the ecosystem. This is due to the inherent dynamism of mountainous environments, which can lead to changes in the composition and function of an ecosystem over time.

3. Inclined surfaces in mountainous areas can support various types of life, including plants, animals, and microorganisms. Provided that the flow of matter and energy follows a downward gradient, the physical and energetic properties of natural systems are closely interrelated and cannot exist independently of each other in natural environments. These include talus and mudflow deposits, which have an oval shape. Consequently, it can be observed that the boundaries between ecological systems will be fluid and will depend largely on climate change and human activities [7,8].

IV. Discussion

The physiographical issues of highland areas are associated with the need to determine the limit of disturbance or barrier, beyond which their stability is compromised. This involves identifying problems in the landscapes of the mountainous meadow zone and forecasting the development of weaker components. It is essential to identify the processes that influence the development of mountain areas. These include, primarily, altitude, topography, climate, weathering, and solar radiation. Together, these factors determine the safety margin for natural complexes in highlands.

Physiographical issues related to high-altitude zones can be grouped according to their factors of occurrence:

1. The ones related to the distinct mountainous terrain and the inclination of the mountains include landslides, debris slides, rock falls, mudflows, and avalanches.

2. The ones caused by climate and natural conditions, such as fog, precipitation in the form of rain and snow, thunderstorms, and wind, may also contribute to physiographical issues.

3. The ones caused by the anthropogenic activities

As previously noted, mountains possess a significant potential for natural resources, contributing to a quarter of the total biological diversity on land. This diverse range of plant and animal species can be attributed to several factors, with the most prominent being the extensive variety of climatic conditions over short distances and a diverse array of habitats. Consequently, it is essential to recognize that the conservation of mountain biodiversity is becoming an essential component of the sustainable development agenda for mountainous regions. Addressing this pressing issue necessitates socio-economic development in mountainous areas.

Therefore, one of the most significant challenges in the sustainable development of mountainous regions continues to be the preservation of landscapes and biological diversity, as well as the establishment of a natural and ecological foundation.

The natural and ecological framework should encompass all types of specially protected natural areas, ranging from nature reserves to pastures and hayfields, as well as certain types of disturbed lands. The justification for including disturbed lands within this framework lies in their potential for inclusion in the land fund [9].

A key aspect of environmental management within the territories encompassed by the natural and ecological framework is the careful handling of these areas. When combined with environmental measures, this can help to reduce the anthropogenic pressure on natural ecosystems, thereby promoting sustainable development.

To enhance the effectiveness of the measures implemented, it is essential to define a set of

actions aimed at establishing a special protection regime.

The mode of protection should vary depending on the specific natural landscape. For forested areas, deforestation should be prohibited, except for sanitary felling.

For leveled areas within protected areas, plowing, the use of mineral fertilizers, and pesticides should be banned [10].

Hunting and fishing are permitted only for species that are not protected. Water bodies should be protected from pollution.

It is necessary to impose a ban on land allocation for construction, horticulture, and other uses, including the construction of buildings and infrastructure that are not required for the needs of nearby communities.

All economic activities that may harm or endanger the functioning and preservation of the natural ecosystem should be prohibited. As representatives of the plant and animal kingdom, we should be protected by law. The attitude towards the natural environment, its components, increases the power of irrational pressure. In this case, it is necessary to talk about anthropogenic factors of influence on nature. In this case, it is necessary to separate two types of influence on nature and its components, in particular on the climate, unintentional - in the process of economic activity and intentional - with the aim of changing, in this case, the climate, according to certain parameters for certain purposes [11].

Caring for our natural environment is essential for sustainable development. This is why the Federal Law "On Environmental Protection" has been enacted to regulate relations between society and nature [12]. Any form of economic activity poses a threat to our natural surroundings, which provide us with natural conditions and resources. In this regard, the Federal Law aims to address the challenges of preserving our natural environment, prevent and eliminate the harmful effects of human activity on nature, and improve the quality of our environment as much as possible.

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