



GENERAL SITUATION OF AGGRAVATION OF ENVIRONMENTAL PROBLEMS IN AZERBAIJAN

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Abstract: Global environmental challenges have received a lot of attention in recent years. It is apparent that Azerbaijan's sustainable growth is inextricably linked to environmental challenges. Nonetheless, it is commonly accepted that comprehending specific ecosystems (biogeocenoses) and obtaining objective information about them is critical for effectively addressing the broader breadth of changes and trends within these ecosystems. Nature conservation is impossible to achieve without this understanding.

Keywords: global environmental challenges, sustainable growth, Azerbaijan, ecosystems, biogeocenoses, objective information, changes, trends, nature conservation.

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Introduction:

Throughout history, Azerbaijan has been in the center of global political and economic interests, with little respite from the tremendous problems that have arisen. Natural resources, both above and below ground, have played a critical part in the nation's historical trajectory. The mesmerizing natural beauty of the region has long served as an inspiration for incredibly gifted artists, contributing to the development of the country's rich cultural and spiritual history. Throughout the turbulent twentieth century, Azerbaijan faced numerous economic and spiritual issues.

Azerbaijan has faced a new set of environmental challenges since declaring independence. The previous century's environmental worries have now grown into global challenges. These challenges transcend national boundaries and have political, economic, legal, and spiritual elements, requiring global reflection.

As a result, when addressing Azerbaijan's eco-ethical quandaries, there is an urgent need for a scientific analysis that considers both

global and national dimensions (Mammadov G.S. and Motuzova G.V., Bezuglova O.S., 2007.).

Materials and Methods:

G.Sh.Mammadov's approach includes identifying three unique ecological zones using recognized methodology. Following that, the study concentrated on following long-term changes in variables associated with potentially productive soil qualities inside one of these ecological zones. Meanwhile, S.Z. Mammadova investigated the long-term dynamics of particular potential fertility indicators in Lankaran black yellow soils.

Results and discussion:

Today, Azerbaijani society places a high value on the environment, natural ecosystems, and our subterranean and surface resources. The informatization of ecotoxic connections is quickly becoming a hot topic. Pollution of water and atmospheric basins, destruction of tropical forests, regarded as the "lungs" of our world, ozone layer breaking, global climate



change, global desertification, and reduction of global biodiversity have all reached unacceptably high levels. These are also critical challenges for Azerbaijan. The expansion of industry, transportation, and agriculture in the last 100-150 years, particularly during the twentieth century, has influenced Azerbaijan's socioeconomic development and cultural growth.

However, this growth has resulted in changes to the natural environment. The extensive use of both subterranean and surface resources, the construction of large industrial complexes, the construction of reservoirs, canals, and drainage networks, advances in energy and communication infrastructure, road construction in mountainous regions, urban expansion, and agricultural expansion due to deforestation in lowland and foothill regions have all contributed to increased anthropogenic pressures on the environment. This has resulted in significant environmental degradation and an increasing load on the environment's separate components: air, water, and soil.

As a consequence, in some areas, soil, air, and water bodies have become heavily polluted, reaching hazardous levels for human health. The result of these changes includes intensified erosion, salinization, and the transformation of land into desert areas. The coverage of soil, both for agricultural use and seasonal pastures, has been significantly affected. Furthermore, forest ecosystems in certain regions have faced either complete destruction or profound alterations in their natural-historical structure and distribution.

Concurrently, the ramifications of these changes in Azerbaijan have seen a notable increase. These consequences are linked to the reduction of biodiversity, desertification, aridization, fluctuations in the Caspian Sea's water level, the release of nitrogen gases, and other large-scale processes (Mammadov, 2017).

Forest cover holds a distinct and crucial place within Azerbaijan's natural resources. In comparison to other natural environments, the nation's forests have been relatively resilient to the impacts of human influence. Recent research, however, reveals a significant decline in forest coverage. While more than 30% of the

country's territory was once covered by forests, this rate has seen a dramatic decrease.

It is evident that the lowland and foothill forests in various regions of Azerbaijan, with the exception of the extensive relict forests on the northeastern slopes of the Greater Caucasus and in the Gusar Plain, have either been entirely deforested or undergone significant alterations in their natural and historical structures, leaving only fragments behind. The geographical complexity of the Caucasus region further compounds the challenges faced by lowland forests in the Lankaran region. The combined factors of human economic activities, urban expansion, global climate changes, and the general state of these forests have severely deteriorated conditions in all natural and geographical zones, reaching hazardous levels for human health.

Moreover, there is a growing concern regarding the reduction of areas that fulfill vital roles in water and soil conservation in the middle and high mountainous regions. The intensive grazing and occasional practices in these regions, especially in border areas near Alpine, subalpine meadows, and the meadow-steppe belt, have had detrimental effects on their natural regeneration. These practices have led to an average drop in the border of high mountain areas (by 150-200 meters in some locations) by around 150-200 meters (Mammadov, 2012). Despite the fact that the oceans have not been subjected to major human interference, changes in species composition and the complicated web of natural-historical interactions within and between ecosystems have occurred. This phenomena is not limited to marine environments; similar changes can be seen in the Greater Caucasus and the Lankaran region of Azerbaijan. Examples of these ecological shifts include the replacement of mid-mountain Beech forests and beech-hornbeam-Oak compositions with hornbeam or hornbeam-Bush mixed communities, as well as the replacement of middle and low-mountain Oak and Oak-hornbeam compositions with tree-shrub plant formations of lesser significance.

Furthermore, as a result of economic activity in our country, rising symptoms of degradation



within natural ecosystems and large landscape complexes are evident in the soil cover. The degree and impact of erosion and salinization processes occupy center stage among these environmental change indicators.

In Azerbaijan, the complex relationship between nature and society can be categorized into three groups based on the nature of the environmental issues and the approaches to resolving them:

Group I: This group encompasses environmental problems that require internal solutions specific to Azerbaijan. These issues include the preservation and restoration of forests, addressing problems associated with soil erosion, effective management of natural grazing areas, rehabilitation of technically damaged soils, measures to mitigate soil contamination with radionuclides, combating issues related to soil salinization, and regulating the use of mineral fertilizers and pesticides.

Group II: This group includes organizations, scientific research, and practical efforts aimed at assisting in resolving environmental issues. These organizations are involved in environmental monitoring of land basins, conducting environmental assessments, and preparing documents related to soil ecological fertility.

Group III: This group comprises issues related to environmental culture, environmental law, education, and other aspects that influence and contribute to the resolution of environmental problems or the search for solutions. These problems involve fostering ecological awareness within society, enhancing environmental legislation and addressing environmental crimes, establishing Environmental Aid and Pension Funds, creating an Environmental Information Bank, and setting up an Environmental Coordination Center.

Environmental protection, which includes safeguarding land resources, has become a global concern transcending national borders. In recent years, the Republic of Azerbaijan has placed significant emphasis on environmental issues that affect all of humanity. Undoubtedly, the sustainable development of Azerbaijan is highly reliant on addressing environmental

challenges. However, it is essential to recognize that practical interventions to address changes, trends, and the broader course of nature are nearly impossible without objective information about individual ecosystems (biogeocenoses), encompassing the land, both at the level of the biosphere and within the country.

It is a well-established fact that soil plays an essential role in the biosphere and in human society. It's important to highlight that the participation of soil in biological processes is indispensable. Furthermore, the life of organisms inhabiting the Earth's surface is intricately linked to the soil.

Also, a person cannot live without soil, both biologically and socially. In recent years, significant strides have been taken to establish a comprehensive soil monitoring system in our country. Among these initiatives is the establishment of the "State Agency for Soil Monitoring and Management" in the Republic of Azerbaijan. As outlined in the law, soil monitoring is conducted within the Land Fund of the Republic of Azerbaijan as part of environmental monitoring. This comprehensive approach includes regular on-site observations, aerial photogeodesics, and cartography, utilizing data layers from state, municipal, and special property land areas, among other structural changes (Motuzova, 2007)

The objectives of this soil monitoring endeavor encompass a range of activities, such as the systematic assessment of soil conditions in relation to climate, agrochemical factors, geobotanical characteristics, geomorphological features, and more. Through soil monitoring, vital environmental data are collected, including information on land conditions, land use, and protection. This information is then used to prepare forecasts, programs, maps, bulletins, and other relevant documents.

Key tasks of modern soil environmental monitoring include:

Assessing and evaluating annual soil loss due to erosion.

Monitoring the distribution or reduction of humus and essential nutrients.

Identifying regions experiencing a negative balance of organic substances and nutrients.

Monitoring the use of pesticides. transportation routes, particularly concerning
 Controlling soil pollution in areas heavy metals and radionuclides.
 surrounding industrial facilities and major

Table 1. Soil Health Assessment Parameters and Measurement Methods

Controlled process	Indicator	Measurement method
I. Primary diagnostic indicators		
1. Soil reduction	Enzymatic activity (catalase, dehydrogenase); “Breathing” of the soil; Nitrogen fixation	- chemical; - gasometric; - photometric; - titrometric; - acetylene
2. Soil hardening or alkalization	pH	- Potentiometric
3. Development of recovery processes		- Potentiometric
4. Physical properties	Density, porosity	According to Kaczynski
5. Change in the quality of humus	Water-soluble humus, carbohydrate, phenol	-
II. Average attendance indicators (sizing duration every 2-5 years)		
6. Reduction of humus	Humus, in %	According to Tyurin
7. Change in the quality of humus	Fractional composition	According to Tyurin, Ponomarev
8. Balance of nutrients	-	-
9. Change of soil composition	Nitrogen, potassium, calcium, magnesium, iron, etc. engine forms	-
10. Soil pollution with heavy metals	Lead, cadmium, copper, zinc, etc.	-
III For a long period of difficult indicators (measurement from 5-10 years and more)		
11 Dehumidification	Humus Reserve, pH	According to Tyurin
12. Reduction of nitrogen reserves	pH	According to kyeldal
13. Mineralogical composition	Quantitative and qualitative analysis of large and circular refractions	- micromorphology; - mineralogical
14. Main page	Chemical composition of the soil	- chemical; - spectrametric

Table 2. Monitoring fertility indicators of Lankaran River Basin transit ecological region

Fertility indicators	Yellow mountain-forest			Pseudopodzol yellow		
	1985-1990	2014-2019	fərq	1985-1990	2014-2019	fərq
1	2	3	4	5	6	7
Amount of hummus, %	3,1	2,5	-0,6	2,4	1,9	-0,5
Humus Reserve, pH						
0-20 sm	130,4	101,7	-28,7	105,8	79,4	-26,4
0-50 sm	199,9	161,2	-38,7	154,8	132,1	-22,7
0-100 sm	236,3	200,1	-36,2	211,3	196,6	-14,7
Total nitrogen, %	0,19	0,14	-0,05	0,17	0,13	-0,04
Total phosphorus, %	0,20	0,17	-0,03	0,16	0,13	-0,03
Total potassium, %	3,62	3,48	-0,14	2,55	2,42	-0,13
Total exchangeable bases, cmol(+)/100 g	31,4	27,7	-3,74	26,6	23,1	-3,62
Ca ⁺ +M ⁺ , %	97,3	94,5	-2,8	95,8	92,6	-3,2
Al ⁺ , %	0,68	0,93	+0,25	0,75	1,00	+0,28
pH (water)	6,0	5,5	-0,5	5,9	5,3	-0,6
pH (salt)	4,9	4,5	-0,4	4,8	4,3	-0,5



Supervising irrigation agriculture and land improvement processes related to water-physical characteristics of the soil.

Overseeing the use of soil in different contexts.

Efforts to organize environmental monitoring based on various environmental indicators in different regions of the Republic have been initiated. Notably, Z. Mammadova provided comprehensive insights into the multi-year dynamics of yellow soil areas and highlighted the impact of these changes on tea plant productivity. Furthermore, subsequent research by Sh. Mammadov, which involved the allocation of three ecological regions, explored long-term changes in biodiversity indicators specific to each ecological region.

Conclusion:

Our republic's environmental status has deteriorated substantially in recent decades, and this trend is continuing. The degradation of the lands and their fertility has become a nearly insurmountable plague. However, the insufficient level of environmental management - soil monitoring - prevents us from obtaining entire information about the activities taking

place, their magnitude and intensity. The absence of environmental monitoring does not diminish the significance of environmental protection work. This problem can only be solved holistically, with an approach to legal, socioeconomic, and property issues relating to land from an environmental standpoint.

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