https://doi.org/10.36719/2789-6919/39/81-87

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Climatic changes and their impact on living organisms

Abstract

One of the issues that the world is currently concerned about is climate change. Climate change and its impact on the living world are of even greater concern to the world community. The recent changes in the atmosphere and unstable weather conditions are felt not only in Azerbaijan but also in many countries of the world. From numerous studies conducted over the last five years, it has become known that over the last hundred years, the average temperature on Earth has increased by 0.7 degrees Celsius (Mammadov, Khalilov, 2006: 222; 318).

However, anthropogenic factors are mainly involved in the temperature rise. And the basis of anthropogenic factors are gases, nitrous oxide, nitrogen oxide, chlorofluoride compounds, carbon, methane, etc., causing thermal effects. For this reason, blizzards, thunderstorms, droughts, floods, and heavy rains, which are occurring everywhere, have intensified. Whereas in the oceans the water surface has warmed to a depth of 1,000 meters, this has recently changed to a depth of 2,000 meters. This leads to the formation of hot streams. Climate underlies all changes in general.

These processes are also taking place in Azerbaijan. Only for the last hundred years has the average annual temperature on the territory of Azerbaijan increased by 0.4-1.3 degrees. Also, the number and strength of floods in mountain rivers in Azerbaijan increase every year. The factors influencing temperature changes in Azerbaijan are the Caspian Sea and the Greater and Lesser Caucasus Mountains. The presence of the Caspian Sea mitigates the effects of climate change in Azerbaijan (Kurayev, 2006: 16). There are also changes that occur independently of human activity. These changes fundamentally affect the processes occurring in the atmosphere and the health of living organisms, including humans. Increased solar activity, displacement of the Earth, the Moon, and other planets, methane entering the atmosphere, volcanic eruptions, etc. are examples of this. One of the most pressing problems on Earth is global warming and its complications. Global climate variability is based on the inexorable rise in temperature. Warming leads to climate change, ecosystem disruption, extreme weather variability, sea level rise due to melting ice, and loss of biodiversity. This has a negative impact on human health, agricultural and food security, and the economy. To this purpose, our state is fully prepared for COP-29, the 29th session of the Conference of the Parties to the UN Framework Convention on Climate Change, which it will host in 2024. All these activities will contribute in the near future. The different interactions of climate-forming factors in the world give rise to a rather large diversity of climates.

The recent decrease in the amount of precipitation may lead to desertification in some areas of our republic.

Keywords: *anthropogenic factor, global, local, greenhouse (heat) effect, freon, alternative energy*

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Atmosferdə baş verən dəyişkənliklərin canlılara təsiri

Xülasə

Müasir dövrdə dünyanı narahat edən problemlərdən biri də iqlim dəyişməsidir. Bu hadisə və onun canlı aləmə təsiri dünya birliyini daha çox narahat edir. Son zamanlar atmosferdə baş verən dəyişikliklər qeyri-sabit hava şəraiti, təkçə Azərbaycan ərazisində deyil, dünyanın bir çox ölkələrində hiss olunmaqdadır. Son beş ildə aparılan bir çox araşdırmalardan məlum olmuşdur ki, son yüz ildə yer kürəsində orta temperatur 0,7 dərəcə artıb. Temperaturun artmasında isə əsasən antropogen amillər öndə durur. Antropogen faktorların əsasını isə istilik effekti yaradan qazlar, azot oksidi, azot bir oksid, xlor-fülor birləşmələri, karbon, metan və s. təşkil edir. Bu səbəbdən də ətrafda baş verən çovğunlar, tufanlar, quraqlıq, sellər, güclü yağışlar artıb. Okeanlarda suyun səthi 1000 m dərinlikdə qızırdısa, son zamanlar 2000 m dərinliyə qədər bu hal dəyişir. Bu isə isti axınların əmələ gəlməsinə səbəb olur. Bütövlükdə bütün dəyişkənliklərin əsasında iqlim durur. Azərbaycanda da bu proseslər baş verməkdədir. Təkcə son yüz ildə Azərbaycan ərazisində orta illik temperatur 0,4-1,3 dərəcəyə qədər artmışdır. Həmçinin Azərbaycan ərazisində dağ çaylarında sel və daşqınların sayı və gücü artmışdır. Azərbaycanda temperatur dəyişməsinə təsir edən amillərdən Xəzər dənizi, Böyük və Kiçik Qafqaz dağlarıdır. Xəzərin mövcudluğu Azərbaycanda iqlim dəyişmələrinin təsirini yumşaldır.

Qlobal iqlim dəyişkənliyinə bir çox antropogen faktor təsir edir. Onlardan atmosferdə qazların miqdarının artması, istilik effektinin yaranması (ilk növbədə CO_2) sənaye zonalarında və şəhərdə isti **adaların** yaranması insanın təbiətə təsirinin nəticəsidir (su anbarlarının yaradılması, meşələrin qırılması və s.). Dünyada iqlim əmələ gətirən faktorların müxtəlif əlaqələri olduqca çoxlu iqlim müxtəlifl ikləri yaradır. Son zamanlar yağıntıların azlığı respublikamızın bəzi ərazilərində səhralaşmaya səbəb ola bilər. Azərbaycan ərazisində meşə zonasının 11% təşkil etməsi, son zamanlar meşələrin kütləvi qırılması kəskin ekoloji dəyişikliklərə səbəb olur. Buna görə də meşə sahəsini 30%-ə çatdırmaq nəzərdə tutulur.

Açar sözlər: *antropogen faktor, qlobal, lokal, parnik (istilik) effekti, freon, alternativ enerji*

Introduction

It is of significant and grave concern that global climate variability, which is increasing in magnitude and impact on the Earth on a daily basis, poses a threat to the melting of our planet's existing glaciers. These glaciers play an invaluable role in shaping the climate and its factors in regulating air flows on our planet, as well as in ensuring the stability of the biosphere and ecosystems, and the accumulation of freshwater reserves.

Research

While other factors, including solar explosions, radiation background, alterations in the Earth's magnetic field and the imaginary axis, the distance between the Earth and the Sun, seismic activity and volcanic eruptions, among others, also contribute to global warming, the greenhouse effect is the leading one.

The global climate is subject to a number of anthropogenic influences, which contribute to its overall variability. These changes include an increase in atmospheric gases, the emergence of a

thermal effect (primarily CO_2) in industrial zones, and the formation of warm islands in urban areas. These effects are the result of human impact on the natural environment (e.g. the creation of water reservoirs and deforestation) (Madatzadeh, Shikhlinsky, 1986:128).

Table 1
The chemical composition of atmospheric air

	Gas	Total density %
1	Nitrogen N_2	78
2	Nitrogen N_2	21
3	Ozone O_3	10^{-6}
4	Carbon dioxide CO_2	0,04
5	CO	10^{-5}
6	Water vapour	0,1
7	Argon Ar	0,94

Climatic Factors

1. Variations in temperature and humidity
2. Solar activity

One of the most urgent issues currently facing humanity is the phenomenon of global warming and the associated complications. Global climate variability is contingent upon the unrelenting increase in temperature. An increase in temperature results in a number of consequences for the global climate, including changes to ecosystems, extreme weather events, a rise in sea levels due to the melting of glaciers and a loss of biodiversity. The diverse interactions of climate-forming factors across the globe give rise to a considerable range of climatic conditions.

The recent decline in precipitation levels may result in the expansion of arid zones in some regions of our republic.

Despite the fact that Azerbaijan's forest area constitutes 11% of the country's total land area, the recent extensive deforestation of forests has resulted in significant ecological changes. It is therefore anticipated that the forest area will increase by up to 30% (Kurayev, 2006: 16; Coln, 2010: 27). During the autumn season, a notable increase in temperature was observed in the Shamakhi zone, with an increase of 2-3 degrees, and in Ganja, with an increase of 1-5 degrees. Conversely, the southern zone exhibited a relatively weaker warming trend. Annual temperature fluctuations were also recorded in Nakhchivan and Baku.

The term 'heat effect' is used to describe the property of the atmosphere whereby solar radiation is released but terrestrial radiation is retained. This process contributes to the accumulation of heat on Earth. The phenomenon of the heat effect is significantly influenced by the presence of water vapour. It plays a significant role in the high concentration of gases present in the atmosphere. The following gases are of particular relevance in this context: CO_2; CN_4; NO_2; nitrogen oxides; tropospheric ozone. Furthermore, additional gases are emitted into the atmosphere, including synthetic chlorofluorocarbons (CFCs) produced by humans (Budyko, 1974: 247).

The proportion of carbon dioxide in the greenhouse effect is estimated to be between 65 and 70%. This gas is introduced into the atmosphere as a consequence of the combustion of fuels in industrial and automotive engines, as well as in thermal power plants. This is the reason why the prevalence of respiratory diseases and allergic reactions has increased among the general population in recent years. A survey of the area surrounding Baku and Absheron revealed that 75% of the population is affected by these similar negative phenomena. In the presence of strong winds, a number of symptoms may manifest, including lethargy, weakness, headaches, mood disorders, and angina pectoris-type pains. The impact of high air temperatures on the nervous system results in changes to reactivity and tone, as well as alterations in the activity of the glands of internal secretion. This is accompanied by a dilation of the blood vessels. This also results in a reduction in

blood pressure. The strength of the wind is correlated with an increase in pulse rate and blood pressure. An increase in wind speed in Azerbaijan has been linked to an uptick in hypertension and heart attacks.

The impact of climate variability is not limited to human life; it also affects plant development, crop yields and the productivity of farm animals. A reduction in precipitation, an insufficient moisture supply to crops, and the recurrence of droughts and dry winds have a detrimental impact on both plant and animal life.

It is probable that tropical and subtropical forests will be more vulnerable to alterations in precipitation levels resulting from fluctuations in temperature. The decomposition of soil organic matter will be accelerated by high air temperatures, which will also reduce soil fertility and increase the likelihood of pests and diseases (Kostin, Pokrovskaya, 1962: 187). The adverse effects of climate on human health are exemplified by the prevalence of cardiovascular diseases.

The introduction of gases into the atmosphere, which exert a thermal effect, has the potential to cause significant harm not only to the climate but also to human health.

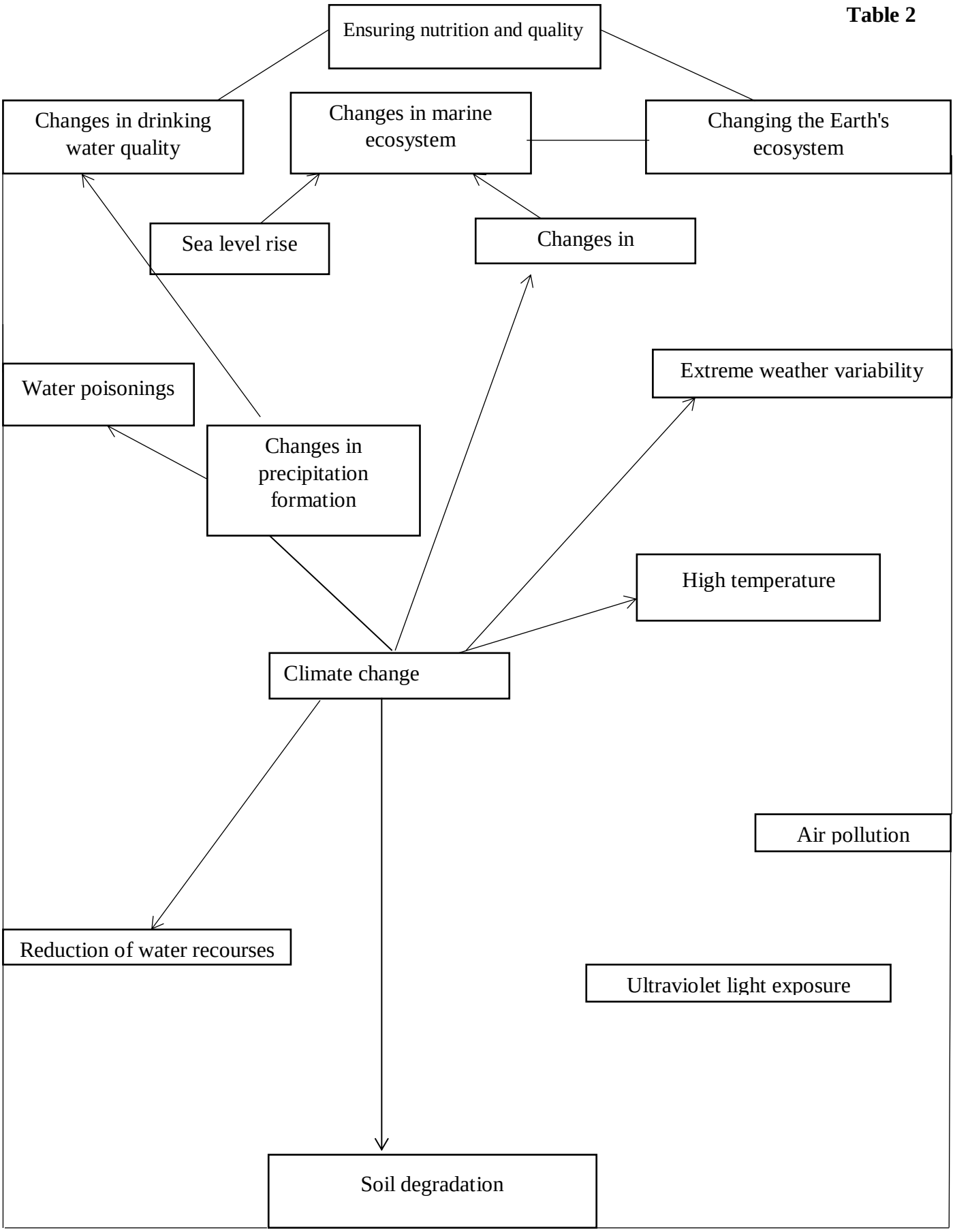
A study conducted by members of the Swedish and Norwegian Academies has revealed that thousands of individuals die prematurely each year. While one demographic succumbs to elevated temperatures in Europe, another perishes from the bites of exotic mosquitoes and the diseases they transmit. (Ruvinsten, Polozova, 1966: 239). Climate change exerts a significant influence on the dissemination of waterborne diseases. Conversely, certain diseases are transmitted through insects, molluscs and animals. As an illustration, in China, as a consequence of climate change, schistosomiasis is transmitted by molluscan vectors.

Furthermore, the incidence of malaria is rising in response to climate change. Anopheles mosquitoes are responsible for the deaths of approximately 600,000 individuals annually, the majority of whom are young children.

Furthermore, climate change is exerting a significant influence on the cardiovascular system. The effects of hot summers on the function of the circulatory organs are significant, with adverse impacts observed in both healthy individuals and those with underlying health conditions. It is important to note, however, that even very cold winters have a negative impact on the functional state of the circulatory system. (Ruvinsten, Polozova, 1966: 239).

The condition of patients with hypertension is significantly affected by wind conditions. The direct and indirect impact of climatic shifts on the human body is illustrated in the table below (Soltanov, 2004: 187).

Table 2


Ensuring nutrition and quality
Changes in drinking water quality
Changes in marine ecosystem
Changing the Earth's ecosystem
Sea level rise
Changes in
Water poisonings
Extreme weather variability
Changes in precipitation formation
High temperature
Climate change
Air pollution
Reduction of water recourses
Ultraviolet light exposure
Soil degradation

The regular sequence of atmospheric processes resulting from the interaction of solar radiation, atmospheric circulation and physical phenomena in a particular region of the Earth's surface is defined as climate. Both global and local climates have undergone significant alterations in recent years.

The changes occurring in the contemporary world have a detrimental impact on the natural world. The rise in the average temperature threshold is a significant contributing factor to a number of serious issues, which impact both humans and the wider living world, including flora and fauna.

The introduction of gases into the atmosphere, which results in a thermal effect, has a detrimental impact on both climate change and human health. Recent studies demonstrate that a notable surge in the emission of industrial and motor transport waste into the atmosphere gives rise to alterations in its composition. This, in turn, leads to an increase in the quantity of active radioactive gases and aerosols present, resulting in a thermal effect. Furthermore, it has been observed that this phenomenon has the potential to pollute water bodies, exert a detrimental impact on the state of plant and animal organisms, and affect human health.

Conclusion

The occurrence of abrupt climatic changes in the environment is leading to an increase in the number of natural disasters in various regions of the Earth. This has a significant impact on the lifestyle and health of people in these areas. In recent years, there has been a notable increase in the frequency of extreme weather events, including hurricanes, warm winds, and above-normal rainfall.

The phenomenon of climate change has a significant impact on the ecosystem. As a consequence, animal habitats are undergoing a geographical shift, with forest vegetation also migrating towards higher elevations. In light of these observations, American biologist Roba Danna posits that by 2080, hundreds of species will have relocated to new territories or continents in order to ensure their continued survival.

The global climate change-induced warming can also exert an influence on the dispersal of insects. Consequently, the emergence of novel species of insect pests is a potential consequence, necessitating an increase in the quantity and composition of pesticides to prevent their proliferation. Consequently, this also has an adverse impact on those engaged in agricultural activities and those residing in the vicinity. Consequently, the proliferation of disease-transmitting ticks and mosquitoes is facilitated.

Our research demonstrates that humanity is confronted with a significant challenge. The feedback from international organisations makes it evident that climate change will have a global impact in the near future. The potential consequences of climate change are manifold and far-reaching. In tropical and subtropical countries, where agricultural land is particularly vulnerable, there is an increased risk of disease and death from a variety of causes. Furthermore, the melting of glaciers and the rising sea levels that result from climate change are a threat to neighbouring areas and their inhabitants. The loss of forests, which play a vital role in regulating the global climate, is another consequence of climate change that is likely to have severe and far-reaching impacts. It is therefore imperative that humanity takes action to prevent these adverse effects.

1. Replacement of conventional energy with non-conventional or alternative forms of energy

2. Development by experts of new more progressive and original methods to address the hazards of global climate change

3. Creating useful engines to reduce the amount of carbon dioxide emitted into the atmosphere, Organising mass production of hybrid cars powered by electricity and other harmless energy is one of the measures to combat global climate change.

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Received: 03.09.2024
Submitted for review: 14.09.2024
Approved: 21.10.2024
Published: 30.11.2024