GLOBAL WARMING: PROBLEMS AND PRECAUTIONS

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PREFACE

Azerbaijan is a country located at the crossroads of Europe and Asia, characterized by its beautiful climate and abundant underground and surface resources. Our country exports oil and gas to various parts of the world. Even during the years when Azerbaijan was part of the USSR, the production of these resources continued using scientific methods, and Azerbaijani scientists made significant contributions to this field on a global scale. During that years, major achievements were realized by the Azerbaijan Academy of Sciences in the discovery and development of oil and gas fields, addressing the scientific challenges of deep drilling in complex geological conditions, and creating a raw material base for the development of the chemical and petrochemical industries. Notable advancements were also made in chemical technology, geographical, geological, and geophysical surveys, exploration of ore and non-ore deposits, and other mineral resources. Furthermore, essential research was conducted in energy, mechanics, physics, mathematics, astronomy, informatics, biology, agriculture, and the establishment of prestigious scientific schools. Today, various fields of science in Azerbaijan continue to develop rapidly. Although Azerbaijani science experienced stagnation in the 1990s, it has entered a new phase of progress, with notable achievements. For instance, the implementation of the "State Program on the Implementation of the National Strategy for the Development of Science in the Republic of Azerbaijan for 2009-2015" demonstrates the state's commitment to scientific advancement. Azerbaijani science is now flourishing across multiple disciplines and addressing global challenges, particularly environmental issues linked to climate change. Climate change includes both global warming caused by greenhouse gas emissions from anthropogenic activities and large-scale shifts in weather patterns. While climate changes occurred in the past, since the mid-20th century, industrialization, wars, and other human factors have exerted unprecedented influence on the Earth's climate system, resulting in global-scale transformations. Phenomena such as floods, forest fires, soil erosion, extreme heat, and severe cold spells have rendered parts of the planet increasingly

uninhabitable. Recognizing the urgency of these issues, world leaders are actively seeking solutions. Initiatives like "Green World," "Smart Cities," and "Green Energy" represent efforts to address these challenges. The Conference of the Parties (COP) under the United Nations Framework Convention on Climate Change is held annually. Azerbaijan hosted the 29th session of the Conference named COP29 in Baku this year. The participation of world leaders in Baku highlighted that, despite being an oil-producing country, Azerbaijan is committed to clean energy and environmental sustainability. Inspired by the outcomes of COP29, the Department of Biology and Ecology at Odlar Yurdu University prepared this multidisciplinary book, incorporating contributions from academics worldwide on global ecological challenges. The book comprises 18 chapters, each addressing a specific topic. As an interdisciplinary work, it explores the fundamentals of combating climate change from diverse scientific perspectives and addresses contemporary ecological concerns. We hope this book will serve as a valuable resource for the global scientific community.

Professor Fahraddin Mammadov

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PREFACE

Azərbaycan Avropa ilə Asiyanın qovşağında yerləşən, əlverişli iqlimi, yeraltı və yerüstü sərvətlərinin zənginliyi ilə seçilən ölkədir. Ölkəmiz dünyanın müxtəlif bölgələrinə neft və qaz ixrac edir. Azərbaycanın SSRİ-nin tərkibində olduğu illərdə də bu ehtiyatların istehsalı elmi metodlara əsaslanaraq aparılmışdır. Azərbaycan alimləri bu sahəyə dünya miqyasında mühüm töhfələr vermişlər. Həmin dövrdə Elmlər Akademiyası neft və qaz yataqlarının kəşfi və işlənməsi istiqamətində, mürəkkəb geoloji şəraitdə dərin qazma işlərinin elmi yöndə həllində, kimya və neft-kimya sənayesinin inkişafı üçün xammal bazasının yaradılmasında böyük nailiyyətlər əldə etmişdir. Kimya texnologiyası, coğrafi, geoloji və geofiziki tədqiqatlar, filiz və qeyri-filiz yataqlarının kəşfiyyatı və digər faydalı qazıntı ehtiyatlarında da nəzərəçarpacaq irəliləyişlər əldə edilmişdir. Bundan əlavə, energetika, mexanika, fizika, riyaziyyat, astronomiya, informatika, biologiya, kənd təsərrüfatı sahələrində mühüm tədqiqatlar aparılmış və nüfuzlu elmi məktəblərin yaradılmasına nail olunmuşdur. Bu gün Azərbaycanda elmin müxtəlif sahələri sürətlə inkişaf etməkdə davam edir. 1990-cı illərdə Azərbaycanda elm sahəsində durğunluq yaşansa da, bu gün artıq nəzərəçarpacaq nailiyyətlərlə yeni tərəqqi mərhələsinə qədəm qoylmuşdur. Məsələn, "Azərbaycan Respublikasında 2009-2015-ci illərdə elmin inkişafı üzrə Milli Strategiyanın həyata keçirilməsinə dair Dövlət Proqramı"nın icrası dövlətin elmi tərəqqiyə sadiqliyini nümayiş etdirir. Azərbaycan elmin bir çox istiqamətlər üzrə inkişafı qlobal çağırışları, xüsusən də iqlim dəyişikliyi ilə əlaqəli ekoloji problemləri həll edir. İqlim dəyişikliyinə həm antropogen fəaliyyətlərdən qaynaqlanan istixana qazları emissiyalarının səbəb olduğu qlobal istiləşmə, həm də hava modellərində genişmiqyaslı dəyişikliklər daxildir. Keçmişdə iqlim dəyişiklikləri baş versə də, 20-ci əsrin ortalarından etibarən sənayeləşmə, müharibələr və digər insan amilləri yerin iqlim sisteminə görünməmiş təsir göstərmiş və nəticədə qlobal miqyasda dəyişikliklər yaratmışdır. Daşqınlar, meşə yanğınları, torpaq eroziyası, həddindən artıq istilər və kəskin soyuqlar planetin bəzi hissələrini getdikcə yaşayış üçün yararsız hala salmışdır. Bu problemlərin aktuallığı dünya liderlərini fəal şəkildə məsələnin həlli

yollarını axtarmağa təşviq etdi. "Yaşıl dünya", "Ağıllı şəhərlər" və "Yaşıl enerji" kimi təşəbbüslər bu problemlərin həlli üçün müvafiq yol açır. Birləşmiş Millətlər Təşkilatının İqlim Dəyişikliyi üzrə Çərçivə Konvensiyasına əsasən Tərəflərin Konfransı (COP) hər il keçirilir və sədrliyi BMT-nin beş regionu arasında dəyişir. Azərbaycan bu il Bakıda Tərəflər Konfransının (COP 29) 29-cu sessiyasına ev sahibliyi etmişdir. Ölkəmizdə keçirilən bu tədbirdə dünya liderlərinin iştirakı bir daha sübut etdi ki, Azərbaycan neft hasil edən ölkə olmasına baxmayaraq, təmiz enerji və ekoloji dayanıqlılığa sadiqdir. COP 29-un nəticələrinə əsaslanaraq, Odlar Yurdu Universitetinin Biologiya və Ekologiya kafedrası qlobal ekoloji problemlərə dair dünya miqyaslı alimlərin töhfələrini özündə birləşdirən bu fənlərarası kitabı hazırladı. Kitab, hər biri müəyyən mövzunu əhatə etməklə 18 fəsildən ibarətdir. Bu fəsillərdə müxtəlif elmi perspektivlərə əsaslanaraq iqlim dəyişikliyi ilə mübarizənin istiqamətlərini araşdıran müasir ekoloji problemlərə toxunulur. Ümid edirik ki, bu kitab dünya elmi ictimaiyyəti üçün dəyərli mənbə rolunu oynayacaqdır.

Professor Fəxrəddin Məmmədov

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1. Part

ANALYSIS OF THE ECOLOGICAL CHARACTERISTICS AND ECONOMIC IMPACTS OF IDENTIFIED TERRESTRIAL AND AQUATIC INVASIVE SPECIES IN TURKEY

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INTRODUCTION

BIOLOGICAL INVASIONS AND CURRENT STATUS OF TURKEY

Biological invasions have the potential to disrupt global ecosystems and economies and are an important known ecological phenomenon. They are therefore attracting more and more attention. (Hulme et al., 2008) Anthropogenic activities such as trade and travel are important factors in the spread of these invasions (Anderson et al., 2014; Essl et al., 2015) and lead to ecological degradation and socioeconomic problems (Bacher et al., 2018; Pranovi et al., 2006). The economic aspects of biological invasions, whose effects on ecosystems have been extensively researched (Ricciardi et al., 2013; Tarkan et al., 2024), are considered to be an area that is important in national decision-making processes and has not yet been sufficiently studied. (Aukema et al., 2011; Turbelin et al., 2023) Studies on the economic mpacts of biological invasions are considered important for management strategies such as effective policy development, monitoring (Wilson et al., 2018),

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of 320,000 tons in 2020. The highest fig production occurs in Aydın Province, averaging 190,000 tons annually, followed by İzmir (43,000 tons) and Bursa (28,000 tons). If the population density of *Amnestus pusillus*, which reduces fig yield and quality, increases, fig production and consequently exports will be adversely affected. Additionally, if the population of *Coridius viduatus* (Fabricius, 1794) (Dinidoridae) rises in cities such as Adana, Bafra, and Diyarbakır, where a significant portion of watermelon, melon, and squash production occurs, serious economic losses may ensue.

The presence of invasive species in terrestrial and marine environments in Turkey poses significant threats to ecosystems, local biodiversity, and economic sectors. Marine invasive species are primarily transported through maritime shipping and ballast water, spreading rapidly in local ecosystems and negatively impacting marine biodiversity and the fishing industry. Key species recorded in areas with heavy maritime traffic, such as the Sea of Marmara, the Black Sea, and the Aegean Sea, include the lionfish (*Pterois volitans*), the comb jelly (*Mnemiopsis leidyi*), and the rapa whelk (*Rapana venosa*). These species threaten native species, disrupt food chains and ecosystem balance, and cause economic losses by damaging fishing gear. Addressing these challenges with coordinated strategies is essential for the conservation of Turkey's rich biodiversity and the achievement of sustainable economic development. The recent adoption of a national strategy reflects a commitment to raising awareness about these issues and mitigating their impacts on both ecology and the economy.

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2. Part

IMPACT OF ECOLOGICAL PROBLEMS ON INSECT POPULATIONS

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INTRODUCTION

The environmental problems in Azerbaijan are concentrated in several main areas. These problems have significant impacts on both the use of natural resources and environmental protection:

Air pollution: Air pollution is at a high level in large cities, especially in industrial cities such as Baku and Sumgayit. Road transport, industrial enterprises and energy production are the main pollutants. The air is polluted with certain gases: Carbon dioxide (CO_2), Methane (CH_4), Nitrogen oxides (NO_x), Sulfur dioxide (SO_2), Volatile organic compounds (Simsek Z., 2016). Poor air quality has a serious impact on human health and leads to an increase in diseases.

Water pollution and depletion: Water pollution in the Caspian Sea and rivers is one of the main environmental problems. Oil and chemical industry waste, household waste and agricultural activities pollute water resources.

Soil degradation and erosion: Soil erosion is particularly widespread in mountainous and semi-desert regions. Improper agricultural practices, deforestation and overuse of pastures reduce soil fertility.

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their populations have been studied. Thermal preference depends on the physiological state of insects and abiotic factors of the environment. Environmental pollution and changes in the environment have a serious impact on insect species. The changes that, occur cause the population of some insect species to decrease or even become extinct. Climate change affects insects directly or indirectly. This effect manifests itself in different forms depending on the insect species. Insects are not as scary creatures as we think, but as we see, they also have useful properties. Therefore, various measures need to be taken to protect them.

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3. Part

THE MULTIFARIOUS ECOSYSTEM SERVICES OF ASIAN PALMYRA PALM

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INTRODUCTION

Since ancient times, plants have been essential to human existence by supplying food, shelter, crafts, medicine, and other necessities. Among others, the Palmyra palm has health and other benefits in all parts of the tree, including the roots, flowers, leaves, sprouts, kernel, and spadix. Common names for *Borassus flabellifer* include Palmyra palm, double palm, and toddy palm. Every component of the species offers a unique set of advantages to the people, medicinal benefits, food security, and economic advantages. Thiru Arunachalam's book "Thalavilasam" in Tamil tries to investigate the more than 801 uses of this tree and offers evidence of the bondage between Palmyra and ancient India. Palmyrah tree is an official tree of Tamilnadu and national tree of cambodia. Since Palmyra trees are the primary

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4. Part

PRELIMINARY EXPERIENCE OF USING ARBUTUS UNEDO L. SPECIE IN APSHERON CONDITIONS (AZERBAIJAN)

Aynur Huseynova[1]

INTRODUCTION

Arbutus unedo L. – large-fruited strawberry tree is naturally distributed in Western Europe. *Arbutus unedo* L. – large-fruited strawberry tree specie, *Eriaceaea* Juss. It belongs to the genus *Arbutus* L. of the family, 14 species are known. *Arbutus unedo* L. and *Arbutus andrachne* L. are the most common species of *Arbutus* L. genus. Another species of the *Arbutus* L. genus, the tall strawberry tree – *Arbutus andrachne* L., *Arbutus unedo* L. – differs from the large-fruited strawberry tree species in that, it is taller and has smaller berries.*Arbutus unedo* L. is an evergreen tree with a height of 5-10 m. The diameter of the trunk is 50-80 cm at a height of 1 m, it is branched and has a large umbrella (Figure 4.1).

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made from its leaves reduces stomach spasms and normalizes intestinal function (Oliveyra, Baptista, Bento, Pereyra 2011). *Arbutus unedo* L. contains important biologically active compounds that are beneficial to human health. Lotions made from the bark and roots of the tree are used for wounds, burns, and some skin diseases. The plant can be used in various commercial fields in the pharmaceutical and chemical industries.

CONCLUSION

The germination of *Arbutus unedo* L. seeds collected from local conditions was 56.0% and the germination of seeds obtained through exchange was 40%. It is necessary to stratify the seeds for sowing. After checking for rooting in the stem pods, rooted seedlings were identified and 6 seedlings were planted in the protected area in october 2019. Root binding in trunk flowers was 15-30%.The highest result in propagation by cuttings was observed in pens planted in open field in spring, kept in 0.05% IST solution for 24 hours. In autumn and spring of 2019, plants were dug up and a total of 15 and 19 rooted seedlings were obtained. 25 saplings were planted in different areas of the garden, and 9 saplings were planted in a specially protected area.

The root formation of autumn planted cultivars was 28%, and the root formation of spring planted cultivars was 30%. As a result of the research, it was found that the most efficient reproduction method is regenerative reproduction.

Evaluation of flowering and fruiting on a 3-point scale using the method of V G Kapper – flowering and fruiting in large quantities.

According to the E. O. Iskander scale "Assessment of Prospects", the viability index of the *Arbutus unedo* L. specie was estimated within 81-90 points.

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5. Part

THE EFFECT OF ECOLOGY ON THE HUMAN ORGANISM

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INTRODUCTION

Health, illness and recovery are closely related to ecology. If the same effect is positive in a particular ecosystem, it may be negative in another environment. That is why the preservation and even improvement of the environment attracts the attention of individual specialists (Akhundov, 1997; 2000).

Ecology directly affects various trace elements, heavy metals, etc. is related to the amount of chemicals (Taqdisi, 1985; 1987; Abbasov, 2005).

As it is known, many microelements have a positive effect in optimal doses, but when they affect the body in high doses for a long time, they can cause a number of serious pathological conditions, among which allergies occupy one of the main places. Therefore, preventing the accumulation of high doses of trace elements in the body of people living in large industrial centers or regions where agricultural fertilizers are widely used should be considered one of the main measures in the fight against allergic diseases (Taqdisi, 1977; 1980; Taqdisi, et. al., 1999; 1983).

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The rising prevalence of allergic diseases is attributed to increased allergens from industrialization and chemical use in agriculture, exemplifying "cultural" diseases. The role of microelements is crucial; while they are essential in small amounts, their imbalance can lead to numerous health issues, affecting both the elderly and children significantly. The article stresses the importance of protecting natural environments to safeguard human health, pointing out the detrimental effects of anthropogenic pollution. It also delves into the concept of adaptation and cultural diseases, linking them to the stresses and environmental challenges faced in industrialized societies. Medical ecology emerges as a critical field, focusing on the prevention of diseases by ensuring a healthy environment. The results indicate a strong need for early diagnosis and effective measures to address health issues arising from environmental factors. The study reinforces the importance of biogeochemical research in understanding the health impacts on different populations, especially in diverse geochemical zones. Overall, the article underscores the necessity of integrated ecological and medical approaches to enhance public health and prevent disease through environmental preservation and management.

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6. Part

GREEN BANGLE MOVEMENT: A MOVEMENT OF CLIMATE RESILIENCE, WOMEN EMPOWERMENT, AND COASTAL ECOSYSTEM OF BANGLADESH AND ASIA

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INTRODUCTION

Bangladesh, being one of the most climate vulnerable countries in the world, experiences a wide range of climate adversities in different geographical locations within the country. Due to its location in the coast of the Bay of Bengal, Bangladesh faces coastal climate adversities almost on a daily basis. Coastal regions face unfavorable conditions due to sea level rise and its negative effects, such as erosion, floods, and storm surge, as a result of ongoing climate change. Bangladesh is among the most vulnerable nations to the effects of climate change and global warming due to its unique geographic location, low topography, relatively high population density, and excessive reliance on natural resources (Islam et al., 2015). These activities, most of the time occur without warning, hampering the quality

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7. Bölüm

PROBLEMS OF CONSERVATİON OF FLORA AND FAUNA

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INTRODUCTION

Currently, the protection of environmental components and the use of progressive methods to solve existing environmental problems are being implemented in the international world.

The World Health Assembly has approved a roadmap to reduce the negative impact of air pollution on the environment. This roadmap includes such activities as expanding the database on the impact of air pollution on health, monitoring and reporting aimed at achieving the Sustainable Development Goals on air pollution, as well as expanding opportunities for cooperation at all levels – local, national, regional and global (Avramenko, 2005).

In order to protect biological diversity, the area of protected areas is expanding. In countries around the world, the relevant agencies involved in the protection of biological diversity implement numerous environmental projects and various information and educational programs to develop public awareness, including environmental values in society. Monitoring and assessment are also carried out in order to protect biological diversity (Gorelov A.A., 2009).

One of the global problems that worries the world is climate change. Climate change and its impact on the living world are increasingly worrying the world

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8. Part

CAUSES, CONSEQUENCES AND PREDICTION OF GLOBAL CLIMATE CHANGE AS A SOURCE OF NATURAL HAZARDS

Munavvar Safarova[1]
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INTRODUCTION

Starting from the 19th century, in connection with the development of industrial areas, toxic gases released into the air as a result of the activities of factories and plants with large production areas, petrochemical industry areas, and thermal power plants caused air pollution. At a height of 15-35 km above the Earth's surface, free oxygen in the atmosphere turns into ozone under the influence of sunlight. This causes the creation of an ozone screen. The ozone screen protects living organisms from the effects of various cosmic rays. The increase in the amount of toxic gases in the atmosphere causes thinning and perforation of the ozone layer that protects the Earth from the sun's ultraviolet rays. One of the main factors leading to the destruction of the ozone layer is the increase in the amount of greenhouse gases in the air. The most common greenhouse gases in the atmosphere are carbon dioxide – (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfate-hexafluoride (SF_6) gases (Framework for Action. Retrieved 2024-09-09). The amount of carbon dioxide in the air can vary due to various natural processes. Examples of these include respiration of living organisms, volcanic eruptions, mineralization processes,

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on Climate Change in October 2015, and as a contribution to global climate change prevention initiatives. It aimed to reduce greenhouse gas emissions (GHG) by 35% by 2030 compared to the base year of 1990. During the 26th Session of the Conference of the Parties to the UN Framework Convention on Climate Change (COP 26), which was held in Glasgow in 2021, our republic officially contributed to initiatives aimed at reducing the impact of global climate change, and by 2050, as a target, 40% reduction has taken (UN Climate Change Conference Baku – November 2024).

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9. Part

THE EFFECT OF CLIMATE AND DISEASE FACTORS ON *JUGLANS REGIA* L.

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INTRODUCTION

Zangilan District is located in the southwestern part of Azerbaijan and is known for its diverse ecological conditions. The geographic location and climate of this district have contributed to the formation and development of a unique dendroflora. The territory of Zangilan is one of the important floristic regions of the South Caucasus, encompassing rare and valuable tree species. The natural forests of the district are rich in oak, pistachio, and walnut trees (Mamedov & Khalilov, 2002). The species *Juglans regia* L. also holds a significant place in the region's ecosystem, noted for its sensitivity to climate changes (Niyazova, 2012). Zangilan's climate is characterized by semi-arid and foothill steppe conditions. Winters are

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10. Part

TRANSLANGUAGING IN BILINGUAL AND MULTILINGUAL CLASSES USING ICTS TO ADDRESS CLIMATE CHANGE CONTEXT

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INTRODUCTION

Translanguaging is the practice of using multiple languages fluidly within communication. It is especially prominent in bilingual or multilingual contexts, where speakers may switch between languages within conversations to enhance understanding, express complex ideas, or connect culturally.

In bilingual groups, translanguaging can be a natural and effective strategy. It allows individuals to draw on all their linguistic resources to express themselves fully, communicate nuances, and strengthen social bonds. For instance, bilingual speakers may switch between languages to use culturally relevant expressions, adjust to the language proficiency of the listener, or simply because certain terms

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11. Part

DEVELOPMENT OF FRUIT GROWING IN AZERBAIJAN. IMPACT OF ECOLOGY ON FRUIT GROWING

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INTRODUCTION

A branch of horticulture is the science that, deals with the cultivation of useful, fruit-bearing and perennial plants. In our republic, Guba-Khachmaz for stone fruits, Sheki-Zagatala for hard fruits (chestnuts, walnuts, hazelnuts), Nakhchivan MR for pitted fruits (apricots, peaches), Kura-Araz for dry subtropical fruits (pomegranates, quinces), citrus fruits (tangerine , orange, feijoa, lemon) it is possible to mention the name of Lankaran, southern plants (figs, olives, pistachios, almonds, etc.) Absheron peninsula. The most specialized region of our republic in fruit growing is Guba region. Thus, 2/3 of the produced fruits fall on the share of Guba region and surrounding areas. The location of our republic in 9 climate zones can be considered the best natural feature for horticulture. As a result, all fruit plants, except for tropical fruit plants, grow naturally in our country. According to experts, proper use of natural factors is one of the important conditions for the further development of fruit growing economically and agriculturally. Since 2016, purposeful activities have been carried out in this field, and as a result, the "Made in Azerbaijan" brand has taken a special place in foreign markets with its high quality. Fruit growing is of great importance in increasing the export of our republic in the field of agriculture and making the country more popular in foreign markets. As a result, there is an increase in production in our regions.

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12. Part

CONSTRUCTION OF DETERMINISTIC MODELS OF NONSTATIONARY PHENOMENA IN POROUS MEDIA

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INTRODUCTION

Therefore, the study of flows in porous media, considered as a continuum, is based on the introduction of fields of special parameters characterizing the process in macrophysically small volume elements with average statistical characteristics.

We defined the average volume value of porosity in the form

$$\varepsilon = \frac{\int \varepsilon'(\upsilon) d\upsilon}{\upsilon_0} \qquad (1)$$

where $\varepsilon'(\upsilon)$ – the distribution of porosity over the entire volume of the stratum, υ_0 – the volume of the porous medium. Determining the distribution of porosity in the volume of a porous medium $\varepsilon'(\upsilon)$ is associated with the composition and distribution of various natural rocks, their number and location in

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across the reservoir. These considerations not only improve model fidelity but also expand their utility across diverse geological formations, supporting better-informed decision-making in the field.

CONCLUSION

The research demonstrates that the proposed deterministic models effectively simulate the impact of porosity and compositional changes on fluid dynamics in porous media. By capturing the variability in permeability due to structural and compositional factors, the models provide insights into nonlinear flow behaviors, validating their application in predicting fluid flow in heterogeneous media. Future research could expand on these findings by applying the models to different reservoir types, optimizing them for specific geological formations, and further refining predictions for enhanced oil recovery and field management strategies.

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13. Part

THE IMPACT OF THE ECOLOGICAL CHANGE ON THE FOOD SAFETY

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INTRODUCTION

Ecological change encompasses a wide range of environmental changes, including climate change, biodiversity loss, and increasing pollution levels. These changes are primarily driven by human activities such as deforestation, urbanization, and industrialization, as well as natural phenomena. Climate change is one of the most pressing issues affecting food security today. Rising temperatures, changing rainfall patterns, and the frequency of extreme weather events have direct impacts on agricultural production, food storage, and distribution. As these climate-related factors evolve, the risks associated with food-borne pathogens and contaminants also increase. Another critical aspect of ecological change, biodiversity loss, impacts food systems by reducing the diversity of available crops and livestock. This reduction in genetic diversity makes food systems more vulnerable to pests, diseases, and environmental stresses, ultimately jeopardizing food security and food safety. Pollution from agricultural system, industrial waste, and urban

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CONCLUSION

The interplay between ecological change and food security is intricate and crucial for public health. Climate change, biodiversity loss, and pollution significantly impact agricultural production, food safety, and the overall stability of food systems. Addressing these environmental challenges requires a multifaceted approach that includes enhancing food availability, access, utilization, and stability. Cultural factors also play a vital role in shaping food security and necessitate tailored strategies for different regions. Ensuring food security amidst ecological change is essential to safeguarding the health and well-being of global populations.

The relationship between environmental change and food security is becoming increasingly complex and critical. As climate change, pollution, and biodiversity loss continue to reshape ecosystems and agricultural practices, their impacts on food security are becoming more pronounced. Rising temperatures and extreme weather events increase the risk of foodborne pathogens, while industrial pollution introduces harmful chemical contaminants into the food supply. In addition, declining biodiversity threatens the resilience of food systems, making them more vulnerable to pests, diseases, and environmental stresses.

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14. Part

DIFFERENT BIOLOGICAL PROPERTIES OF ALGAE

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INTRODUCTION

Algae are quite different in structure and appearance. They are structurally divided into two large groups: eukaryotic (advanced cell type) and prokaryotic (simple cell type). Algae range from microscopic single-celled organisms to complex multicellular marine algae reaching meters in length. Blue-green algae have prokaryotic cell characteristics in terms of their cell

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Eom et al. (2015) stated for the first time that phlorotannins from seaweed demonstrated anti-MNV activity. The ethyl acetate (EtOAc)-extract from *Eisenia bicyclis* was determined to show strong antiviral activity against murine norovirus (MNV). In addition, the phlorotannins from E. *bicyclis*, dieckol (DE), and phlorofucofuroeckol-A (PFF) were found to exhibit strong anti-MNV activity (Eom et al., 2015)

CONCLUSION

Consumption of algae can offer nutritional and medicinal benefits to the human organism, especially due to their antioxidant activity. It is a fact that raw materials are obtained from algae for many drugs used in the treatment of cancer, Alzheimer's, diabetes, bacterial, viral, etc. similar diseases. Marine microalgae has been used in the food industry in the Far East countries since ancient times. Algae are also recognized as potentially new and valuable sources of biologically active substances for applications in the pharmaceutical, nutraceutical, and cosmetic industries. Also, more research is needed to extract other bioactive compounds from algae to develop new functional products.

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15. Part

ORNAMENTAL PEPPERS IMPORTANCE IN GENETIC AND ECOLOGICAL SUSTAINABILITY

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INTRODUCTION

Ornamental peppers are members of the genus *Capsicum* of the Solanaceae family (Stommel et al., 2018). The genus *Capsicum* is native to the tropics of Central and South America. The genus *Capsicum* is a plant group rich in genetic diversity. Ornamental peppers represent a special segment of this diversity, selected for decorative purposes. This genetic diversity increases the plant's adaptability to different ecological conditions and its resistance to stress factors (Pickersgill, 2007).

Pepper cultivation has a long history in the Americas, where it is valued for its culinary and medicinal properties. The tropical regions in the central and southern parts of America are known as the homeland of *Capsicum* (Pickersgill, 1969). Introduced to Europeans by the explorer Columbus, the pepper vegetable was carried to Africa and Asia by Spanish and Portuguese traders. At first, Europeans regarded this vegetable as an ornamental plant rather than a dietary staple. According to Stommel and Bosland (2005), ornamental peppers have not lost the-

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16. Part

CHANGES IN SOIL INDICATORS ALONG THE HIGHWAY DUE TO ANTHROPOGENIC EFFECTS

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INTRODUCTION

In the study of soils around the Ganja-Gazakh highway, the role of mineral fertilizers in increasing their fertility, the anthropogenic changes that occur during intensive use, especially the main morphological signs and diagnostic characteristics of the soils under vines, and the directions that occur in soil cultivation in connection with the cultivation works in the soils under vines were studied. As a result of long-term studies, the soils distributed in that area were classified according to their morphological and morphometric characteristics (Saliev, 1999).

The Ganja-Gazakh zone of the Republic of Azerbaijan primarily covers the areas of Ganja, Shamkir, Tovuz, Agstafa, and Gazakh regions. The distance from Ganja to the Gazakh region is about 110-120 km. This zone is situated between the Greater and Lesser Caucasus mountains. In the west, the width of the zone is 40 km, expanding to 75 km towards the east. The western part of the zone has steep mountain slopes, while the eastern part is flatter. The soil is composed of sedimentary rocks from the Mesozoic and Cretaceous periods, with some areas also containing sediments from the Tertiary period (Mammadov, 2007; Hasanov, 2010).

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CONCLUSİON

The results of the analyzes show that, the studied soils are poorly supplied with nutrients, their granulometric composition varies from medium granular to medium clay, and the environment is alkaline. In order to improve these soils, it is suggested to use mineral and organic fertilizers in that area according to the needs of the plants to be planted, deep plowing, softening and progressive irrigation methods.

As a result of research, it was determined that, the amount of humus in the irrigated mountain-brown (chestnut) soils used under various crops in the Ganja-Gazakh massif is 3.05-0.43 %; nitrogen 0.23-0.06 %; CaCO3 7-18.59 %; pH 7.9-8.6; the amount of salts is 0.09-0.22 %; the price of physical clay varied between 38.04-69.23 %. Taking into account the obtained results, in order to improve the water-physical properties of the soil in that area and obtain high productivity, applying organic and mineral fertilizers under the plow in accordance with the accepted norms, using deep plowing and softening, progressive irrigation methods (drip, raining, etc.) must be provided. If these measures are implemented, the land reclamation condition gradually improves and productivity can increase by 20-25%.

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17. Part

NATIONAL CHARACTERISTICS OF ENVIRONMENTAL SECURITY OF AZERBAIJAN

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INTRODUCTION

The Republic of Azerbaijan is a country with rich natural resources and developed industries. It is an important task to implement complex measures to solve environmental problems that, have been inherited by independent Azerbaijan for many years.

The current environmental situation has forced every country to put environmental problems into a global context. Currently, environmental protection issues are reflected in the program documents of leading international organizations. In 1992, at the international conference held in Rio de Janeiro on the initiative of the United Nations, it was noted that, the future development of the world will primarily depend on how environmental problems are solved. At this conference, solutions to environmental problems in the world were considered very seriously and important decisions were made, including the concept of "Sustainable development", which has already become a program document of all international environmental organizations (Mammadov G.S., Khalilov M.Y., 2003).

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18. Part

ENVIRONMENTAL EFFECTS THAT, NEGATIVELY AFFECTING ALCOHOL BEVERAGE PRODUCTION IN OUR COUNTRY AND THEIR REMOVAL WAYS

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INTRODUCTION

The negative effects of alcoholic beverages on the body are well known. Despite this, it is one of the most popular drinks in the world. The volume of production of alcoholic beverages around the world is growing at an incredible rate. Alcoholic beverages are not only consumed in their pure form, but also used as a component in the preparation of various cocktails, marinades and fruit desserts. According to research by the World Health Organization, a list of countries has been published by the amount of ethyl alcohol consumed by the population aged 15 and over in 2016-2018 (per 1 liter of pure ethyl alcohol). Seychelles 20.5; Uganda 15.1; Czech Republic 14.5; Lithuania 13.2; Germany 12.9; Ireland, Luxembourg, Latvia, Bulgaria, Spain, France, and Austria (12.0-12.9). Portugal, Slovenia, Poland, Romania, Belarus, Great Britain, Switzerland, Hungary, Moldova 11.4-12.0; Russia 11.2; America 9.9; Azerbaijan 4.4; The rest of the world consumes between 0.5-4. In Bangladesh, Kuwait, Lebanon, Mauritania, Somalia this figure is 0.0 (Tahirov S.H. et. al, 2020).

Excessive consumption of alcoholic beverages leads to various diseases. Excessive consumption of these beverages results in cirrhosis of the liver, chronic pancreatitis, alcoholic hepatitis and other diseases. This problem still causes huge

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3. The production technology of wine varieties with geographical names should be restored and established at a modern level.
4. Enterprises capable of producing and exporting cognac should begin to apply efficient technologies.
5. Enterprises producing occasional ethyl alcohol rectification should be licensed and operate under the terms of a production license.
6. Ethyl alcohol rectification should either be transferred to the State monopoly or an enterprise with a high level of technical equipment should be established.

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