

ПОСЛЕДСТВИЯ ГЛОБАЛЬНОГО ПОТЕПЛЕНИЯ И ИЗМЕНЕНИЯ КЛИМАТА НА ЗЕМЛЕ

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Аннотация: в статье анализируются последствия и факторы изменения климата и следствие глобального потепления. Термин «глобальное потепление» или «изменение климата» относится к повышению средней глобальной температуры. Считается, что естественные и антропогенные явления связаны с повышением средней глобальной температуры. Во многом это связано с выбросами «парниковых» газов, таких как углекислый газ (CO₂). Ясно, что человеческая деятельность усугубила большую часть потепления века, внося в атмосферу удерживающие тепло выбросы, известные как парниковые газы.

Ключевые слова: изменение климата, глобальное потепление, окружающая среда.

THE EFFECTS OF GLOBAL WARMING AND CLIMATE CHANGE ON THE EARTH

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Abstract: the article analyzes the global warming and environmental changes. The term "global warming" or "climate change" refers to an uptick in global average temperatures. Natural and human-caused phenomena are thought to be due to a rise in average global temperatures. This is largely due to spikes in "greenhouse" gases like carbon dioxide (CO₂). It is clear that human activities have exacerbated the majority of the century's warming by introducing heat-trapping emissions into the atmosphere known as greenhouse gases.

Keywords: climate change, global warming, environment.

UDC 632.15

Introduction

Global climate change is now having an effect on the atmosphere. Glaciers have narrowed, ice on rivers and streams is melting earlier, plant and animal ranges have changed, and trees are blooming earlier. Scientists expected that global climate change would result in the following effects: melting of sea ice, increased sea level rise, and prolonged, more frequent heat waves.

The earth's atmosphere has long served as a greenhouse, capturing the sun's heat and allowing the evolution of life forms as we know them, including humans. The planet would be very cold if we did not have our atmospheric greenhouse. Global warming, on the other hand, is the equivalent to a greenhouse with high efficiency reflective glass built backwards. Ironically, the best data may come from a horrific cooling incident that occurred about 1,500 years ago. Two major volcanic eruptions, one year apart, deposited so much black dust in the upper atmosphere that sunlight could not reach. Temperatures dropped precipitously. Crops did not thrive. People died as a result of starvation, and the Black Death began its march. When the dust settled, the sun was able to warn the planet once again, and life returned to normal. Today, we face the inverse dilemma [1]. Today's issue isn't so much a lack of solar warmth touching the planet as it is so much being stuck in our atmosphere. Since so much heat is trapped within greenhouse earth, the planet's temperature is that higher than at any other point in history.

Main causes of Global Warming

According to my research and surveys there are 3 main causes of Global Warming, which are pollution, overpopulation, deforestation. The majority of surveyed people think that the main cause is the over usage of oil and pollution (Table 1).

Table 1. People's opinions on the reasons for the deterioration of the city's ecology

Causes	Number of votes	Percentage
Pollution	32	64%
Overpopulation	9	18%
Deforestation	9	18%

The greatest ways of solving those problems are: usage of paper instead of plastic (15), use alternative energy sources like wind, sun and water (20), recycling (10) and forestation (5). The survey asked students about effectiveness of these solutions (Bar Chart 1).

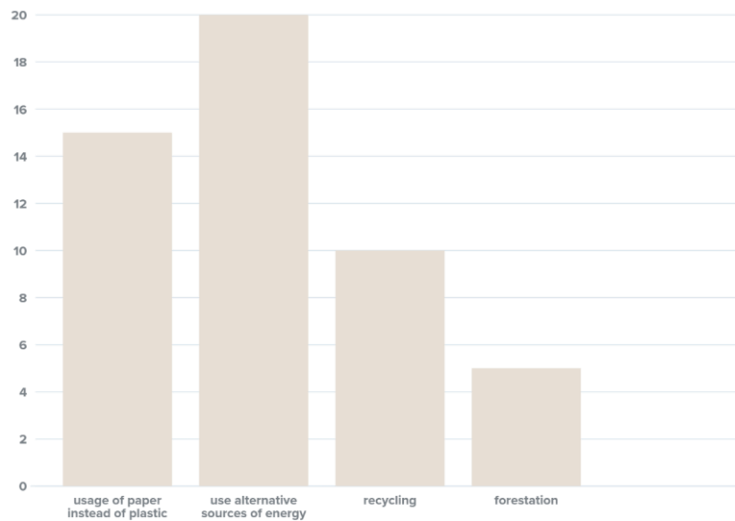


Fig. 1. Bar Chart. Effectiveness of the most popular methods to solve ecological problems

Majority of surveyed students believe that **pollution** is the main cause of this problem (Table 2).

Table 2. The biggest cause of the Global Warming is pollution

Agree/Disagree	Number of votes	Percentage
A	45	90%
D	5	10%

How citizens of Almaty satisfied by it's Ecology (Pie Chart 2)

Pie Chart 2

Satisfaction of citizens by ecology of Almaty

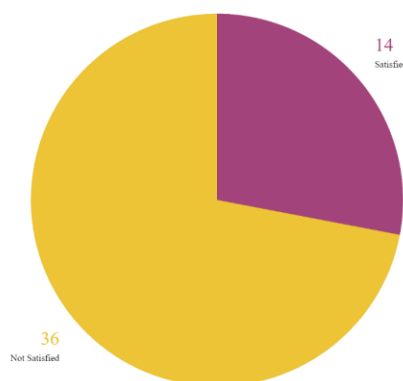


Fig. 2. Pie Chart. Satisfaction of citizens by ecology of Almaty

According to this chart it seems that majority of surveyed students are not satisfied by ecology of Almaty.

Interview

There were 3 people interviewed about how many years they think will be enough to Global Warming become an insoluble problem if no actions taken in order to stop the problem (Bar chart).

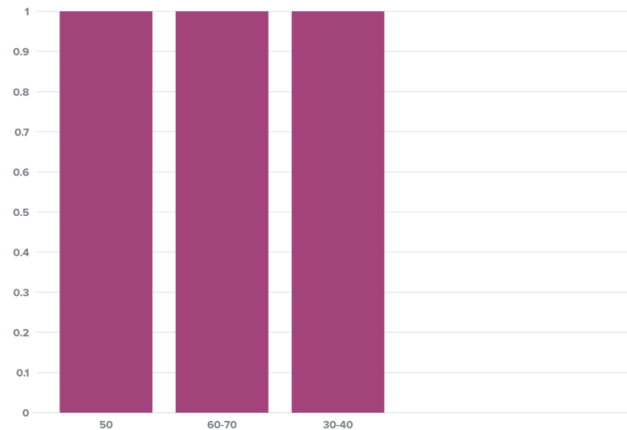


Fig. 3. Poll results

Method Section

The participants of the survey with the topic “What are the consequences of the Global Climate Change” were high school student and university students. This survey did not have demographic characteristics such as gender and ethnicity limitations. The remaining participants included people who are dealing with biology, chemistry and geography.

Materials

There were 8 questions in the survey: 4 multiple-choice questions, 3 open short questions, and 1 rating scale question. The survey was organized and understandable for every participant. Questions are placed in a logical order. It was started by asking general information about all comers and finished with some solutions which would play important role in solving given problem. By rate scale answers we can understand the real rate of citizens about worlds ecology and their points of view. Their answers would help to identify the main causes and future consequences.

The survey was taken in an online format because it was faster and more comfortable. The current situation in our country is not good for taking surveys in offline format because of COVID-19. All comers were familiar with the format of the survey, and it was straightforward for them to answer questions. It took about 5 minutes to answer the questions, and give their solutions for this problem.

Materials

There were 10 questions, which are ordered logically and well-organized. Answers had good structure and were given in detail. It would help understand the main causes, and important thoughts, which would solve some aspects of the problem.

Procedure

For take an interview all comers, a platform for online meetings such as Zoom was very useful. For comfort, there were prepared pretty presentations with questions from 1 to 10. It helped guests to understand the order of questions and answer clearly. The duration of the interviews was about 7-10 minutes.

Discussion

Overall research investigates the problem of Climate Change and Global Warming and their effects on the Earth. At first, what is Global Warming and how it drives the Climate Change? Heat is energy, and as energy is added to every device, changes occur. Since all processes in the global climate system are connected, incorporating heat energy creates a shift in the global climate as a whole. The ocean covers most of the globe, which causes it to heat up. More water evaporates into clouds as the ocean warms. Where storms such as hurricanes and typhoons form, more energy-intensive storms form. When the atmosphere warms, glaciers and mountain snow packs melt, as does the Polar ice cap and the great ice shield jutting off Antarctica, raising sea levels. Temperature changes alter the great wind patterns that carry the monsoons to Asia and rain and snow all over the world, making drought and erratic weather more normal. This is why scientists have shifted their attention away from global warming and toward the broader issue of climate change [2].

Since the global climate is a linked mechanism, the effects of climate change are felt everywhere. It causes such problems like:

Increasing Sea Levels

Rising sea levels are being influenced by climate change. The global average sea level has risen around 8 inches (20 cm) in the last 100 years, and climate experts predict that it will increase much further in the next 100 years as a result of climate change impacts. Coastal cities such as New York are now seeing a rise in the number of flooding incidents, and many of these cities may need seawalls to survive by 2050. Sea levels are forecast to

rise 1 to 4 feet (30 to 100 cm), enough to flood several small Pacific island states (Vanuatu), popular beach resorts (Hilton Head), and coastal towns (Bangkok, Boston) [3].

Torrential rains and more strong storms are anticipated.

Although the specific conditions that cause flooding will not change, climate change will increase the volume of water in the atmosphere, resulting in intense downpours rather than steady rains when it does rain. The strength of hurricanes and typhoons will rise, and floods will become more frequent. Anyone in the United States who has attempted to purchase hurricane and flood insurance in recent years is well aware that the insurance company is fully persuaded that climate change is raising sea levels and increasing the frequency of severe storms and flooding.

Drastic changes in ecosystems

As the world warms, entire ecosystems will move. Rising equatorial temperatures have also driven staple crops like rice north into previously cooler regions, and many fish species have moved long distances to survive in waters that are the proper temperature for them. In formerly cooler seas, this may raise fisherman's catches; in warmer waters, it may eliminate fishing; and in certain areas, such as the US East Coast, fishermen may have to travel farther to find fishing grounds. Farmers in temperate areas are struggling with drier weather for crops like corn and wheat, and once-prime growing zones are now endangered [4].

Diseases and various illnesses

Increasing temperatures are beneficial to agricultural pests, viruses, and disease vectors. Pest populations are increasing, and illnesses that were formerly only present in tropical areas are now becoming endemic in even larger areas. In Southeast Asia, for example, where malaria had been limited to a wet season disease in most regions, it is now widespread almost all year. Similarly, dengue fever, which was previously restricted to tropical countries, has become widespread in the country.

The decrease in meal security

One of the most noticeable effects of increasing temperatures is felt in global agriculture, but the effects vary greatly between the largely temperate developed world and the more tropical developing world. Different crops grow better at certain temperatures, and as those temperatures change, so does their productivity. Growing temperatures in North America, for example, can reduce corn and wheat productivity in the Midwest, but increase production and productivity north of the border in Canada [5]. Rice productivity, the staple food of more than one-third of the world's population, decreases by 10% with every 10 degrees Celsius increase in temperature. Past climate-related issues have been mitigated by significant developments in rice technologies and ever-increasing fertilizer applications; however, potential temperature fluctuations are expected to cut rice production by 25% by 2050 in Thailand, the world's largest exporter of rice. Simultaneously, global demographic projections predict that the developed world will add 3 billion people by 2050, implying that developing-world food farmers will need to double staple crop production by then only to sustain current rate of food intake [6].

Recommendation

Climate change is largely caused by the use of fossil fuels, and secondarily by greenhouse gas pollution caused by deforestation, irrigation, and other less visible sources.

The primary solution to global warming is to eradicate the involvement of fossil fuels in western civilization whenever possible. This entails shifting to renewable and carbon-free energy sources such as solar, wind, and hydro, which emit less than 3% of the greenhouse gases emitted from fossil fuel energy sources.

Second, deforestation can be avoided and replaced by environmentally sound forestry and land-use activities. Since plants absorb and accumulate carbon dioxide, they actually extract it from the atmosphere. In a nutshell, there are two approaches to addressing climate change.

First, to reduce and eliminate emissions of greenhouse gases such as carbon dioxide, methane, and nitrous oxide.

Next is to remove carbon dioxide from the environment by encouraging trees, seas, and other natural processes to serve as carbon sinks, as they do naturally. We will promote the reduction of greenhouse gases from the environment by halting deforestation, destroying ocean habitats, and encouraging sustainable forestry.

In fact, preventing greenhouse gas pollution necessitates the following actions:

1. Transportation must be fueled by renewable energy rather than fossil fuels. Transportation accounted for 28.5 percent of total pollution in the United States in 2016.

2. Clean energy sources such as hydro, wind, and solar must be used to generate electricity. Electricity generation accounts for 28.4 percent of total pollution in the United States in 2016.

3. Industry must learn to trap carbon from chemical and cement manufacturing, as well as to use renewable technology for all of its energy needs. Industry accounted for 22% of the greenhouse gas emissions in the United States in 2016.

4. Building owners, both residential and commercial, must become more effective in terms of heating and cooling, as well as using renewable energy sources such as solar and wind. Residential and industrial uses accounted for 11% of greenhouse gas emissions in the United States in 2016, mainly by heating and power use.

5. Agriculture has to be changed to use less fertilizers, less industrial beef processing, and more ecological agricultural practices such as crop rotation and soil tilling (which releases carbon). Agriculture accounted for 9% of the greenhouse gas emissions in the United States in 2016.

6. Usage of Land and Forestry – felling trees not only releases the carbon trapped in the tree and soil, it also stops the tree from removing carbon dioxide from the environment throughout its lifetime. Carbon dioxide is removed from the environment as a result of sustainable logging and land use.

Conclusion

As a conclusion, Climate Change and Global Warming harms our planet, people's health and devastates ecosystems. So, if we manage to solve it and create a climate-friendly, low-carbon environment and economy it will be a massive obstacle, but it is also going to be a huge opportunity. Many of the necessary technology already exist. The main challenge is putting them into practice. Solving Climate Change and Global Warming can also have such benefits like fresh and "green" employment, increased competition, economic prosperity, cleaner environment and more effective public transportation services in cities, new innovations such as electric or plug-in hybrid vehicles, energy-efficient homes or offices with intelligent heating and cooling systems, stable oil and other resource supplies – less reliant on imports [7].

According to studies, it is both possible and accessible. The economic and societal impacts of climate change would be significantly greater than the current costs of combating climate change. That's why Global Warming and Climate Change are the most important problems of the current world and has to solved ASAP.

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