

GLOBAL WARMING AND ITS EFFECTS ON THE GLOBAL ECONOMY

Ilkin Mammadov¹, Nihad Huseynli^{2*}

¹Istanbul University, Istanbul, Turkiye

²Azerbaijan State University of Economics (UNEC), Baku, Azerbaijan

Abstract. The paper discusses global warming, its effects and consequences. Global warming is emerging not only as an environmental problem, but also as an economic cost. The unconscious expansion of industrialization has begun to have a negative impact on human life, especially in recent times. The paper discusses the global warming problem not only from an environmental and also from social and economic points of view.

Keywords: *Global warming, economic impact, greenhouse gas, carbon dioxide, climate change.*

***Corresponding Author:** Nihad Huseynli, Azerbaijan State University of Economics (UNEC), Baku, Azerbaijan, e-mail: nihadhuseyn00@mail.ru

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1. Introduction

Global warming or global climate change has become a global problem for many years now. All countries are affected by this situation. It is predicted that the countries that do not pay enough attention to environmental problems, do not take measures and are underdeveloped will be more affected by the situation. Although the future of global warming in terms of consequences cannot be determined at the highest level, scientists believe that the situation will be more negative than expected (Letcher, 2021; Rustamov, 2023).

It is shown that the increase in the concentration of greenhouse gases in the atmosphere causes global warming. The reason for the increase in greenhouse emissions is related to economic activity. According to the result we obtained from here, it seems that there is a relationship between the development levels of countries and their emission volumes. Therefore, as a result of the Industrial Revolution, industrialized countries play an important role in the increase of greenhouse gases. However, in their future forecasts, scientists predict that the share of developed countries will decrease and the share of developing countries in the increase of greenhouse gases will increase (Bayrac, 2010).

As a result of global warming, it is inevitable that environmental changes such as melting of glaciers, rising temperatures and rising sea levels will lead to the extinction of some animal and plant species and increase in natural disasters. Many of these results are already being observed, but are expected to increase in the future. In addition to environmental effects, global warming will also have effects on countries' economies. Policies implemented by countries to mitigate the effects of global warming increase their costs and become a burden on their economies. Global warming is directly or indirectly affecting many sectors and this process will continue (Cruz & Rossi-Hansberg, 2021).

2. The Concept of Global Warming and its Evolution

As a result of the greenhouse effect of gases released into the atmosphere, the increase in temperature on Earth throughout the year is defined as global warming. Global climate change caused by global warming is one of the most important problems the world faces and poses a threat to human life (Bayrac, 2010). It is not natural greenhouse gases that cause global warming, but increased concentrations of greenhouse gases. Greenhouse gases, which have increased since the industrial revolution to the present day, accumulate in the atmosphere and reflect long-wave radiation from the earth. As a result, the temperature rises (House of Lords, 2005). Therefore, the increasing temperature in the lower layers of the atmosphere is defined as global warming. Greenhouse gases are produced as a result of metal, chemical, energy and other industrial activities.

Climate investigating scientists agree that the 21st century is getting warmer. Although there was no increase in temperature between 1860 and 1920, there was a steady increase in temperature between 1920 and 1945. Although there was a decrease in temperature between 1945 and 1965, a steady increase was observed after 1965 (House of Lords, 2005). According to the 2018 report by the Intergovernmental Panel on Climate Change (IPCC), the Earth's temperature has risen by 1C and will rise by 3-4C without intervention. In the report, the IPCC emphasizes the importance of limiting temperature to 1.5C and predicts that it will exceed 1.5C before 2050 if no action is taken. The report's limit of 1.5 degrees of increase was a more reasonable measure than the 2 degrees of warming projected by 2100, which would lower sea levels by 0.1 meters. It is also noted that within 1.5C of global warming, the probability of the Arctic Ocean becoming ice-free in summer is once in 100 years, but if an increase of 2C is achieved, this probability decreases to once in 10 years. Although these figures may seem low at first glance, it is possible to predict that small increases in temperature can lead to major disasters.

According to some scientists, the whether heat wave that killed 50,000 people in 2003 will be considered a normal temperature in 2060. Rising temperatures will result in increased disease, forest fires, droughts and deaths. Although some parts of the world will not be adversely affected by a rise of up to 1C, the proportion of those adversely affected will be higher. According to estimates, the reaction of the atmosphere to greenhouse gases will be 50% higher. Considering that greenhouse gases remain in the atmosphere for a long time, countries must take urgent and rapid measures to prevent the effects of global warming from increasing by 2100. The atmosphere is a common space where individuals and companies can release pollution. Global pollution is a negative externality that affects everyone widely. Many countries around the world have laws that limit air pollution. Such laws only prevent air pollution to a certain extent. Because according to recent studies, the amount of carbon dioxide is still increasing dramatically (Harris *et al.*, 2017).

3. Environmental Effects of Global Warming

3.1. Sea level

The effects of climate change caused by global warming range from melting glaciers to rising sea levels. If the above mentioned temperatures occur, sea levels are predicted to rise between 15 cm and 95 cm (Joyce, 2017). As sea levels rise, coastlines will also change, affecting human habitations. Although coastlines have changed over billions of years, there have been small-scale changes. According to 2017 statistics, there is 448,000 square miles less sea ice in the North Pole. The ice sheet that melts more than

normal in the summer does not recover as much as it loses in the winter. Less ice means less snow. Experts predict that by 2050 there will be no Arctic ice in the summer. As a result, the dark ocean will absorb heat and the cold air wave will move south. Snow storms in the eastern region of America can be shown as an example. Freshwater intrusion from melting ice also affects global ocean circulation. Because fresh water is less dense than salt water, it does not sink, it stays at the surface of the ocean and the Ocean Conveyor, which brings tropical water to the UK and northern Europe, has slowed by 15% since 2008, the lowest result in 1,600 years. As a result, southern Greenland cools and the Atlantic coast of the United States warms. When Greenland stays cold in the summer, it allows warm air to reach Europe. One of the consequences of this is the heat wave that occurred in Europe in 2005.

Fresh and warm water from melting glaciers in Antarctica begins to melt the ice shelves from below. Before 1992, the ice sheet was melting at 3.8 cm per year, but now it is melting at 1.6 meters per year. 60-90% of the world's fresh water is contained in the Antarctic ice sheet. If they all melt, the sea level will rise 61 meters. In the last 100 years, the melting of the ice sheet has caused the sea level to rise by 23 cm. This situation will also affect the people living on the coastline and become a big danger (Amadeo, 2019).

3.2. Drought

Another effect of global warming can be seen in the increasing number of droughts. Drought is expected to increase in the next 100 years. By 2050, 40% of the world's population will face water threats. As temperatures rise due to global warming, the demand for water will increase day by day and managing this demand will be important and challenging. Even in areas with high rainfall, soils will dry out due to evaporation. An increase in heavy rainfall will also cause natural disasters such as floods. The agricultural sector, energy production and industrial sector are the sectors that use water the most. With increasing drought, 39 million people in South Africa suffer from malnutrition. The life of the people living in these regions will become more difficult day by day, it will make these people in a desperate situation. One option is to either move to a better place or face starvation. Poor countries are more affected by this situation both socially and economically (Bakır, 2016). As the planet warms, some species of plants and animals are becoming extinct. While this will not affect domestic animals, it will affect wild animals and polar bears. In addition to these animals, many species of animals that people do not care about and have no idea about will also become extinct. It is expected that the increase in temperature at the predicted level will not only lead to the destruction of a certain percentage of plant and animal species, but will also affect their geographical distribution in the ecosystem.

3.3. Energy production

The effects of global warming are also reflected in the supply and demand for energy production. In 2006, rising temperatures in both Europe and the Americas led to lower energy production and therefore higher energy prices. Human productivity has increased throughout history. This means doing more with fewer resources. Since the carbon dioxide produced by the use of fossil fuels leads to the intensification of greenhouse gas emissions and consequently global warming, people should reduce the use of these types of fuels in industry and exert due pressure on the industry. Due to this situation, efforts are being made to expand the use of renewable energy instead of fossil

fuels. Investments in this market are growing rapidly. The energy sector has some legal obligations to reduce fossil fuels. In addition, fossil fuels are likely to run out within the next hundred years. Therefore, the energy sector is investing in renewable energy technology.

3.4. Migration

The change caused by global warming in the ecosystem also affects people's lives. People start migrating from areas affected by global warming to areas less affected by global warming. These migrations will also have some negative effects. People who want to move to countries that do not want to accept migrants either enter the country secretly or if the need to migrate is strong, they attack. Migrants will start working at low wages in their new places and as a result housing prices will increase. After a certain period of time, people's income can also increase. Threats of natural resources and water shortages can lead to conflicts between countries and increase terrorist incidents. Like producers, consumers will be adversely affected by global warming. Since 2008, 22.5 million people have migrated as a result of global warming. This figure is expected to be 700 million by 2050. It is also inevitable that there will be an increase in food and energy prices and taxes on some products (Ford, 2017).

3.5. Natural disasters

Although it has not been scientifically proven that global warming causes an increase in natural disasters, there is a unanimous opinion in the studies conducted on the subject. Due to the warming of the ocean, the duration and speed of Atlantic hurricanes have recently increased. Apart from this, there is also an increase in floods. Developing and underdeveloped countries are more vulnerable to natural disasters. According to the Natural Disaster report published in 2021, the number of 156 natural disasters that occurred in the first 6 months of the year exceeded the number of 142 natural disasters that occurred in the last 18 years. The damage caused to the world economy was 45 billion dollars. Natural disasters not only kill hundreds of people, but also put a huge burden on countries' economies (Joyce, 2017).

3.6. Human health

Another area affected by global warming is human health. Climate change-related natural disasters and hot weather are increasing the number of deaths. Because children are more sensitive to air pollution, they are more at risk of getting sick than adults. In addition to all this, the increase in temperature leads to warming of the air in cold regions and reduces the number of deaths due to cold. According to research, heat does not always directly affect health, it triggers chronic diseases and causes people to die. According to death reports, heat waves are more likely to affect people over 65. Among the rising death rates due to climate change, a heat wave in Europe in 2003 that lasted just 5 days killed nearly 70,000 people. According to experts, if no measures are taken, the annual death toll in Europe will be 150,000 by the end of the century. At the same time, the number of coastal deaths due to flooding is 6 people per year, but by 2100 it will be 233 people per year. 99% of this will be due to rising temperatures, especially in Southern Europe. We can list the negative effects of global warming on human health as follows:

- As a result of global warming, the direction of infectious diseases has changed.
- Increase in temperature will lead to increase in human deaths.

- An increase in natural disasters caused by global warming will cause disease and death.
- Malnutrition and developmental disorders in children will emerge as one of the consequences of global warming.

4. Effects of Global Warming on the Global Economy

Global warming has a negative impact on the economy as well as other areas. If both developed and developing countries do not accelerate their efforts to reduce the impact of global warming, the increase in emissions will create an economic burden for these countries. In May 2018, Stanford University Environmental Scientists prepared a report on the effects of global warming. According to the report, if the countries of the world try to prevent global warming and the temperature rises by 2.5%, the Global Gross Domestic Product (GDP) will decrease by 15%. If the temperature increases by 3 C, the GDP may decrease by 25%. If the countries of the world do not take any measures, the air temperature will rise by 4 degrees towards the end of the century. This means that GDP will decrease by 30% compared to 2010, surpassing the rates of decline of the Great Depression. Global warming currently threatens 1.2 billion jobs, according to the World Employment report. Among these enterprises, agriculture, forestry and fishing occupy a leading place. Natural disasters have lost 23 million jobs since 2000. At the same time, efforts to stop global warming will create 24 million new jobs by 2030 (Amadeo, 2019).

The economic impact of global warming will be greater in less developed countries. Although the rise in temperature up to 2 degrees will not have a negative impact on developed countries, it will have a negative impact on developing countries. However, as the rate increases further, developing countries will be adversely affected first, followed by developed countries. Countries have done some research to determine the damage global warming is doing to their economies. Studies show that the economic costs of global warming have a large share of GDP in underdeveloped and developing countries. Damages can also be reduced if improvement policies are implemented in economy and production process. As America experiences warmer days, food prices will rise. One of the reasons for this is the decrease in productivity of soybeans and corn produced in America when the air temperature rises above 29 degrees. These products are a source of food for meat-based animals such as cattle and an increase in the price of the products causes the price of meat to increase as well. There is a proportional relationship between economic growth and the use of fossil fuels. For example, in the 1900s, about 90% of the energy used in America came from fossil fuel sources. With 20% of the world's population, OECD countries and former Soviet countries accounted for 80% of historical emissions. Therefore, the amount of fossil fuel use in developed countries is about 10 times higher than the amount used in developing countries. However, greenhouse gas emissions from developed countries are estimated to decrease over time, while those from developing countries are estimated to increase. China, India and Pakistan are predicted to lead among these countries (Harris, 2017). Under the Kyoto Protocol adopted by the United Nations (UN) in 1997, European countries and 37 industrialized countries reached a consensus to keep fossil fuel use below 5% of 1990 levels between 2008 and 2012. Later, this period was extended until 2020. Although the US did not accept it, it was decided to keep the volume of emissions reduction below 18% since 1990. In 2008, the International Energy Administration required countries to invest \$45 trillion over the next 50 years to reduce the effects of global warming. The measures include the construction

of 32 nuclear power plants and a 50% reduction in waste volume by 2050. The value of the measures to be taken will increase from 100 billion to 200 billion dollars and then to 2 trillion dollars. The Copenhagen agreement adopted by the UN was prepared in 2009. This agreement has been adopted by developing and some underdeveloped countries, including EU member countries. The agreement limits global warming to 2 degrees C above pre-industrial levels. In addition, developed countries have agreed to provide \$100 billion in aid to poor countries most affected by global warming. The content of the assistance consists of improvement of regions affected by drought and natural disasters. Obama hoped that developed countries would agree to cut emissions to 80% of 1990 levels by 2020. Many countries, including China, refused to sign the treaty. Because the USA did not agree to reduce emissions by more than 4% by 2020. In 2010, China made some commitments. These included reducing emissions by 40% compared to 1995, increasing renewable energy consumption from 9.4% to 15% and increasing forest areas by 40 million hectares. In accordance with the Paris Agreement, signed by 195 countries in 2015, developed countries committed to provide 3 billion dollars in aid to poor countries to reduce the negative effects of climate change by 2020. Under the agreement, the rate of global warming will be kept at 2 C above pre-industrial levels. The United States is responsible for 20% of the world's carbon emissions, so it would be difficult for other countries to meet the agreement's requirements on their own without the United States. Even if countries comply with the agreement, temperatures will continue to rise. In August 2017, President Trump announced that the United States would withdraw from the Paris Agreement and wanted to reach a better agreement. Italy, France and Germany have opposed this situation and declared that the United States cannot legally withdraw from the agreement until 2020. In November 2017, the European Union agreed to reduce emissions by 30% between 2021 and 2030. The USA, China, Russia, India and Japan account for 60% of the world's waste volume. If these countries reduce the use of fossil fuels and increase the use of renewable energy, other countries will not need to make agreements on global warming. China, a producer of coal and other energy resources, is the largest emitter of carbon dioxide. However, the United States accounted for 35% of total greenhouse gas emissions since 1860. Since greenhouse gases are long-lived, 20% of these emissions remain in the atmosphere for years (Amadeo, 2019). Global warming is putting a heavy weight on the economy. In addition to bearing the costs of improvement efforts to prevent natural disasters, countries also bear the costs of ongoing natural disasters. Since underdeveloped countries have more limited financial resources, they are both at a greater disadvantage than developed countries and are more affected by global warming. Since global warming affects the entire earth, it is difficult to calculate all its consequences. Therefore, through research it is only possible to predict.

5. Conclusion

Global warming has a negative impact on the environment, people and the economy. Experts predict the long-term effects will be greater than they are now. The negative effects of global warming occur differently in different regions. Countries that do not take the necessary measures are more affected by global warming. The effects of global warming caused by fossil fuel use, energy production, industrialization and other human activities have increased with countries' economic growth and population growth. After the Industrial Revolution, temperatures rose in parallel with the increase in carbon dioxide. There is a linear relationship between the level of development of countries and

the use of fossil fuels. Developed countries have a significant share in the concentration of greenhouse gas emissions into the atmosphere since 1860. However, this situation will change in the long run and the amount of fossil fuel use of developing countries will increase. The consequences of global warming are also a burden on the economy of countries. The costs incurred by countries both to reduce the effects of global warming and to improve the results of existing effects are increasing year by year. The delay in taking measures against this situation by the countries of the world will further increase the negative effects of global warming.

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