

## Climate Crisis and Human Psychology: Profound Impacts on Economic Concerns and Psychological Health



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**ABSTRACT:** The climate crisis is an increasingly evident threat around the world. The economic and psychological effects of this crisis deepen the difficulties experienced by individuals and societies and create a complex network of interactions. This study aims to comprehensively examine the effects of climate change on economic concerns and individuals' psychological health.

First, the economic effects of climate change are discussed. The direct effects of the climate crisis on the agriculture, energy and health sectors, as well as indirect consequences such as unemployment, income inequality and economic uncertainty, are analyzed. These economic effects may be more pronounced, especially on individuals living in low-income and developing regions. Secondly, the effects of economic concerns on individuals' psychological health are examined. Research shows that economic uncertainty and crises can lead to psychological problems such as anxiety, depression and burnout. In addition, the effects of natural disasters and environmental degradation due to climate change on stress, trauma and psychological resilience are also evaluated.

Finally, this study offers policy recommendations on how the climate crisis and economic uncertainty affect individuals' mental health. Social support systems, psychological intervention strategies and sustainable economic policies play a critical role in reducing these effects. This article aims to make a significant contribution to understanding the complex relationship between climate change and economic and psychological impacts. The results will guide policymakers, psychologists and economic planners in developing holistic and effective solutions to problems in this area.

**KEYWORDS:** Climate change, economic impacts, psychological health, economic concerns, climate crisis, psychological impacts, economic uncertainty, natural disasters, mental health, environmental degradation, stress and anxiety, depression, burnout syndrome.

### INTRODUCTION

The climate crisis has been accepted as a global emergency in the last few decades and creates fundamental changes over ecosystems around the world. These changes have various consequences such as climatic imbalances, increase in natural disasters and environmental deterioration. However, the effects of the climate crisis leave deep traces not only in environmental, but also in economic and psychological dimensions. This article aims to examine the complex relationship between the climate crisis and the psychological health of individuals and the role of economic concerns in this process.

Climate change leads to serious economic deterioration, especially in critical sectors such as agriculture, energy, health and transportation. Efficiency decreases in the field of agriculture, increases in energy costs and pressures on health systems threaten economic stability and deepen social inequalities. These economic uncertainties increase social tensions by triggering problems such as unemployment, income inequality and regional differences.

The effects of these economic concerns on the psychological health of individuals are increasingly remarkable. Research shows that economic uncertainties and crises fueled psychological problems such as anxiety, depression and burnout in individuals. In addition, natural disasters and environmental deteriorations due to climate change bring about mental health problems such as trauma and stress. The psychological strength of individuals plays a critical role in the management of these crises and reducing their effects.

In this article, the economic effects of the climate crisis and the reflections of these effects on the psychological health of individuals will be examined extensively. The relationship between the economic concerns caused by climate change and the effects of these concerns on psychological health will be evaluated in the light of the current literature. In addition, policy suggestions and solution strategies will be presented to manage these effects. In this context, it is of great importance to understand the relationship between climate crisis and psychological health and to develop more effective interventions both at individual and social level.

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## AIM

The main purpose of this article is to examine in depth the effects of the climate crisis on economic and psychological health. In particular, the following four main objectives will be focused on:

**Determining the Economic Impacts of Climate Change:** Analyzing the economic disruptions caused by climate change in agriculture, energy, health and other critical sectors. In this context, to reveal how economic concerns manifest in areas such as unemployment, income inequality and regional differences.

**Examining the Effects of Economic Anxieties on Psychological Health:** To evaluate the effects of economic uncertainties and crises on individuals' mental health. Exploring how psychological problems such as anxiety, depression, burnout and stress are related to economic concerns.

**Investigating the Psychological Consequences of Natural Disasters and Environmental Deterioration:** To examine the traumatic effects of natural disasters and environmental degradation due to climate change on individuals and the reflections of these effects on mental health.

**Providing Policy Recommendations and Solution Strategies:** To make suggestions to manage the economic and psychological effects of climate change, in line with the findings. To evaluate solution suggestions such as social support systems, psychological intervention strategies and sustainable economic policies and to discuss the effective applicability of these suggestions.

This article aims to make both academic and practical contributions to understand the complex interaction between the climate crisis and economic and psychological impacts and to develop effective strategies for these interactions. This comprehensive analysis in social science and environmental policy will provide an important foundation for understanding the broad impacts of climate change on individuals and societies.

## METHOD

In this study, a literature review was conducted to examine the effects of economic concerns about the climate crisis on psychological health. Literature review has been used to comprehensively cover various aspects of the subject by compiling existing academic knowledge and findings. The research was conducted using academic journals, books, reports and reliable online databases (such as Google Scholar, JSTOR, PubMed, Web of Science). Additionally, information obtained from important academic journals and publications in the field of climate crisis and psychology was evaluated. Keywords used in the screening process include terms such as "climate crisis," "psychological health," "economic concerns," "environmental stress," "climate change and psychology." Studies published in the last 20 years were preferred. This period allows the psychological effects of the climate crisis and economic concerns to be analyzed with more current and valid data. First of all, articles, books and reports obtained as a result of searches with the specified keywords created an extensive list. These documents were scanned based on title, abstract and keywords and their suitability was evaluated. Summaries of suitable sources were examined and an idea of the general scope of the literature was obtained. The suitability of the abstracts for the purpose of the study and research questions was taken into consideration. In line with the summaries, the full texts of the selected documents were analyzed in detail. At this stage, studies, findings and methodologies examining the effects of the climate crisis on economic concerns and psychological health are discussed. Findings in the literature were examined with a thematic analysis method, and main themes revealing the effects of the climate crisis on economic concerns and psychological health were identified. Themes include economic stress, anxiety disorders, environmental anxiety, and resilience. Similarities and differences between different studies were compared, and consistency and contradictions among various research findings were evaluated.

## RESULTS

### A. Concept of Climate Change

From the first emergence of humanity, approximately 20-25 million years ago, until today, individuals have constantly undergone change and transformation in consumption, production and technological fields (Şimşek, 2017: 68). In parallel with this process, humanity's energy demand increased proportionally over the years and reached its peak during the Industrial Revolution. It is known that humanity has encountered climate changes many times. However, in the post-Industrial Revolution period, these changes began to be considered human-induced (Kadioğlu, 2012: 1). With the revolution, the intensive use of natural resources, the understanding of growth with fossil fuels, and wrong food and animal husbandry practices have led to the emergence of various environmental problems. Chief among these environmental problems is climate change and, accordingly, global warming. Climate change generally refers to the direct and indirect deterioration of the atmospheric structure by human actions, with unusual temperature increases and decreases that can be analyzed within comparable time periods (UNFCCC, 1992). The Intergovernmental Panel on Climate Change (IPCC) defines climate change as sudden changes in climate data that can be analyzed with statistical data (IPCC, 2007). In another definition, climate change is stated as serious changes in long-term climate conditions that affect living life at the global and local level (Türkeş, Sümer & Çetiner, 2000: 9).

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The main source of these situations is global warming, which is included under the heading of climate change. Although climate change and global warming are terms often used interchangeably in the literature, they have different meanings. As can be seen from the definitions above, climate change refers to extraordinary temperature increases and decreases, while global warming is explained as an extraordinary increase in temperature on the earth's surface above the average and this situation negatively affects living and non-living life (Aksay, Ketenoğlu & Kurt, 2005). :31).

As can be seen from the above definitions, the term climate change generally refers to a negative concept from an anthropogenic perspective. When the harms that climate change would cause to human life were first expressed, these views were not widely accepted neither in the political arena nor among the public. The negative effects of climate change on living and non-living beings were first emphasized by the French doctor Jean Fourier in 1824 in the article 'Annales de la Chimie et de Physique' (Vlassopoulos, 2012: 106). Approximately 50 years after Fourier, Arrhenius published the first calculations of global warming based on the amount of carbon dioxide in the atmosphere (Arrhenius, 1896: 242-245). However, research conducted during this period could not accurately calculate the effects of greenhouse gases. In 1960, Keeling made the first comprehensive calculation of global warming by clearly measuring the amount of carbon dioxide in the atmosphere (Climate Gov, 2017). Following these studies, temperature changes, which have become more evident as human activities increase greenhouse gases, have reached damaging levels on all living and non-living creatures on earth (Merican & Karakaya, 2013: 125). As of 2020;

- The amount of carbon dioxide, one of the most abundant greenhouse gases in the atmosphere, has reached its highest level in the last 650,000 years.
- Between 2001 and 2020, the 20 hottest years on record were experienced.
- The average temperature increase between 1980-2020 was observed to be approximately 0.9°C.
- Every year around the world, 426 Gigatons of ice cover melts and mixes with the seas and oceans (NASA, 2020).

After the rays from the sun fall on the Earth's surface, most of the unabsorbed part is reflected back into space. If this process continues naturally, it does not cause any harm to the atmosphere and the Earth. However, as the rate of greenhouse gases constantly increases as a result of human activities, these gases begin to surround the atmosphere like a blanket and prevent the flow of heat and radiation between space and the earth. This situation constitutes the main cause of global warming. In short, the disproportionate increase in greenhouse gases as a result of human-induced activities is the main cause of global warming (Shahzad, 2015: 1-3).

Today, climate change is manifested by extreme temperatures around the world. Global warming negatively affects human life in various aspects. Scientists emphasize that global warming will lead to rising sea levels and significant increases in temperatures, as well as climate events such as hurricanes, storms, tornadoes and floods. These changes will cause food shortages in agricultural countries that cannot adapt to climate change, decrease in clean water resources worldwide, damage to animal, plant and other living species, submergence of coastal areas and various negative effects on human health (Davis, Joroff & Jenks, 2007). The negative effects of climate change on human health can be classified as follows (Kiraz, 2019: 9, 10):

- Increase in heart, circulatory, vascular and respiratory diseases due to increasing temperatures
- Lung diseases that occur in connection with air pollution as a result of fires caused by hot weather conditions
- The increase in greenhouse gases leads to an increase in premature infant deaths.
- Hygiene problems due to water scarcity
- Increase in the prevalence of epidemic diseases
- Increased incidence of psychological disorders

When the international literature is examined, many studies have been conducted on the environment and human health. The book *The Nonhuman Environment*, written by psychoanalyst Harold F. Searles in 1960, is considered the first study to address the effects of ecological crises in a modern sense. This work also influenced the book *Nature and Anxiety* written by Paul Shepard in 1982; This book examines the psychic effects of environmental problems on human life. A more recent study is the book *Environmental Melancholia: Psychoanalytic Dimensions of Engagement* published in 2015 by Renee Lertzman, who defines the relationship between climate change and psychology with the term *eco-melancholia* (Fisher, 2016: 1). Expanding research on climate change and mental health reveals that changing climate conditions can increase post-traumatic stress disorder (PTSD), major depressive disorder (MDD), anxiety, depression, complex grief, guilt, emotional trauma, difficult recovery processes, substance use and suicidal thoughts. (Berry, 2009: 453; Doherty & Clayton, 2011: 268; Coyle & Susteren, 2012: 11). In this study, the effects of global warming on psychological disorders will be examined. The aim of the study is to show that climate change can create psychological effects. In this context, *eco-anxiety*, a relatively new concept, will be the main focus of our study. Although *eco-anxiety* briefly expresses the concern that climate change creates in individuals, it is claimed that this concept supports the view that climate change can lead to serious mental health problems in advanced stages (Arcanjo, 2019: 2).

### B. Effects of Climate Change on the Economy

The first effects of climate change on the economy are manifested by temperature increases and fluctuations in precipitation regimes. Extremes in these climate factors increase the frequency and severity of climate-related natural disasters such as drought, floods and storms, leading to major economic losses. For example, approximately 87% of natural disasters that occurred between 1980 and

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2012 were climate-related natural disasters. 44% of these disasters are caused by storms, 41% by floods and 15% by droughts. In the same period, the economic loss caused by these natural disasters reached approximately 2.8 trillion dollars (Munich RE, 2013: 52-53). When examined on an annual basis, it is seen that this loss corresponds to 85 billion dollars. It is estimated that economic losses caused by climate change will approach 1 trillion dollars annually on average in the 2050s (Hallegatte et al., 2013: 802).

Agriculture, tourism and energy sectors, which are of critical importance for economies, are directly or indirectly exposed to the effects of climate change. While agriculture and tourism directly depend on climatic conditions, the energy sector is affected indirectly. While in some regions, moderate climate changes can be expected to have initial positive effects on agriculture and tourism, it is anticipated that these effects will generally be negative on a global scale. This will also negatively affect employment levels. All these developments will have various effects on economic growth, which determines the success of economies.

Considering that climate change will continue in the future, it is expected that some countries that are not currently affected by these changes or even benefit from them will also face negative effects over time. Although there is no consensus both in practice and theory on the mechanism that explains the potential effects of climate change on the economy, some indicators can be helpful in determining the extent of these effects. Some of these indicators are the share of climate-sensitive sectors in the economy and the indirect effects of climate change on non-climate-sensitive sectors (Lecocq and Shazili, 2007: 41).

### 1. Agricultural Sector

Climate is the main factor that enables agricultural production. Therefore, changes in temperature, precipitation and CO<sub>2</sub> levels in the atmosphere, the frequency and severity of extreme weather events and increases in sea water levels affect the agricultural sector. These effects can be summarized as follows (Dellal and McCarl, 2007 cited in Dellal, 2008: 105):

- Temperature, rainfall, CO<sub>2</sub> level and extreme weather events can affect the productivity of plants, harvest time and grazing efficiency in pastures. Agricultural losses increase when drought or excessive rainfall occurs frequently and severely. These changes affect the production amount and also affect the prices of agricultural products.
- Increase in temperature may disrupt the balance between heat production and use of heat by animals. This can affect mortality rates, feed consumption rate, live weight gain and milk production.
- Increase in temperature may increase evaporation, causing irrigation water volume to decrease. Additionally, temperature increases may affect the time and duration of snowfall, reducing the amount of water required for the summer period.

In addition, climate change may cause sea water levels to rise, exposing coastal agricultural areas to floods and saltwater inundation. This may result in reduced productivity in these areas; Increasing storms and flood events may cause damage to arable lands due to erosion. Additionally, these problems may also negatively affect groundwater resources. High temperatures and drought can increase the risk of forest fires, cause the proliferation of harmful pests and cause desertification of agricultural lands (Reti, 2007: 54-55).

According to the IPCC (2007a: 11-12) report, regional temperature increases of 1-3°C in middle and high latitudes are expected to positively affect agricultural production. However, it is predicted that temperature increases of 1-2°C in low latitudes will negatively affect agricultural production. Additionally, it is stated that extreme variations in temperature and precipitation may have negative effects on the agricultural sector in all countries. Cline (2007), in his study based on the prediction that the average land temperature will increase by 4.5-5°C in the 2080s, revealed that agricultural productivity will decrease worldwide. Cline's (2007) research results are summarized in Table 1. According to these data, if the positive effects of CO<sub>2</sub> on plants are ignored, a temperature increase of 4.5-5°C will cause an approximately 16% decrease in global agricultural productivity. Developing countries are expected to be more affected by this temperature increase than developed countries. While the productivity loss is calculated as approximately 21% in developing countries, this rate is around 6% in developed countries. When examined on a regional basis, it is seen that the productivity loss in the regions within the scope of the study is above the world average. The region that will be most affected by climate change is determined to be Africa, with a productivity loss of 27.5%. Considering the positive effects of CO<sub>2</sub> on plants, productivity losses decrease; As can be seen in Table 1, when we consider the carbon impact and temperature increase together, there is a 7.7% increase in agricultural productivity in developed countries. However, despite the positive impact of carbon, declines in agricultural productivity will continue worldwide and in developing countries.

Similar to Cline's (2007) study, attention was drawn to agricultural price increases in the IPCC's last report published in 2013. According to IPCC (2013), if the positive effects of CO<sub>2</sub> on crop productivity are not taken into account, there may be an increase of up to 84% in global food prices due to climate change by 2050. When the CO<sub>2</sub> effect is taken into account, this increase decreases to 45% (Porter et al., 2014: 3). Losses in agricultural productivity and production due to climate change may lead to cost increases in processed food prices and other sectors related to the agricultural sector. Since 2007, significant increases in world food prices have been observed along with the decreases in agricultural production due to heat and drought.

Decreases in agricultural products increase processed food prices, causing an increase in the general price level and thus inflation pressure. The high rate of total consumer expenditures on food products in developing countries leads to a faster increase in consumer inflation in these countries than in developed countries. This situation makes it difficult for monetary authorities to control inflation in many countries (Başya et al., 2008: 2-3). For example, in 2006, the contribution of food prices to world inflation was 27%, 12.4% in developed countries, 37.7% in Asia and 22% in Europe. However, in 2007, when the food crisis occurred, these rates increased to 44%, 19.5%, 67.5% and 34.9%, respectively (International Monetary Fund [IMF], 2008: 62). It has been observed



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that supply-side factors rather than demand changes are more decisive in the recent high increases in processed food prices (Başya et al., 2008: 2-3). The magnitude of this supply-side effect is important for understanding the effects of climate change on the agricultural sector.

Turkey, like the rest of the world, is a sensitive country in terms of agriculture, which is one of the sectors that will be most affected by climate change. The economic and social importance of the agricultural sector within the country makes Turkey sensitive to the effects of climate change. The fact that Turkey is a semi-arid country in the Mediterranean climate zone further increases this sensitivity. Agriculture is a critical sector in Turkey in terms of food supply, raw material supply to agriculture-based industry, Gross Domestic Product (GDP), exports and employment (Ministry of Environment and Urbanization [MEU], 2013: 182). According to TÜİK data, 9.2% of GDP and 21.2% of employment were provided by the agricultural sector in 2013. In this context, the effects of climate change on agricultural production may have important consequences on the economic and social situations of individuals who earn their living from the agricultural sector and the country's economy (ÇŞB, 2012: 5). Decreases in agricultural productivity due to climate change and resulting price fluctuations create uncertainties and reduce the flexibility of central banks to fight inflation. This situation may create difficulties in ensuring price stability and may question the reliability of both central banks and the monetary policies they implement. Moreover, considering the share of the agricultural sector in total employment around 25%, the employment creation capacity of the agricultural sector may gradually decrease due to climate change.

### 2. Tourism Sector

The tourism sector, like the agricultural sector, is an area directly linked to climate change. Outdoor activities, clean environment and favorable weather conditions are critical for tourist satisfaction and sustainability of tourism regions (United Nations World Tourism Organization [UNWTO], 2007: 1). Therefore, the tourism sector and tourism regions are highly sensitive to climate variability and change. Climate indirectly affects tourism activities by affecting many natural resources, from winter conditions to biodiversity, from water level to weather conditions (UNWTO, 2008: 28).

Negative impacts of climate change on the tourism industry may include:

- **Infectious Disease Risk:** Climate change may encourage the spread of some infectious diseases, which can increase health risks in tourism areas.
- **Forest Fires and Harmful Insects:** Rising temperatures can increase the spread of forest fires and harmful insects, creating risks in tourism areas.
- **Invasion of Seas and Nature by Pests:** Changes in sea levels and pests in nature can create problems in coastal areas and natural parks (UNWTO, 2008: 28).

Tourism not only improves the quality of life of individuals, but also creates important economic consequences. Tourism plays an important role in the redistribution of wealth from rich countries to poor countries, from urban areas to rural areas and from north to south. In addition, tourism revenues are of great importance especially for the balance of payments of island countries and developing countries. 46 of 50 underdeveloped countries obtain their foreign exchange income from the tourism sector. Therefore, tourism in developing countries offers significant employment opportunities and is seen as a potential tool for preventing poverty. As an income-generating activity, tourism also encourages the protection of natural beauties and cultural heritage (UNWTO, 2007: 2).

Climate change is expected to have significant impacts, especially on winter and summer tourism activities. Winter tourism is predicted to be the type of tourism that will potentially be most affected by the effects of global warming. Due to increasing temperatures, demand in winter tourism regions may decrease significantly and this demand may shift to higher latitudes (UNWTO, 2003: 8). For example, it is estimated that a 2°C temperature increase will cause the snow cover in the Northern Alps to become unusable for 40 days in a 5-month period and 60% of the winter sports potential in the German Bavarian Alps will be lost (UNWTO, 2007: 7). On the other hand, tourism activities such as conferences and business travels may be among the activities that will be least affected by climate change (UNWTO, 2003: 22).

The effects of climate change on the tourism sector may trigger widespread effects of this sector on the economic and social structure. The decrease in tourism demand may lead to a decrease in labor demand, thus increasing sectoral unemployment. Additionally, there may be a noticeable decline in tourism-related infrastructure and construction investments. These reductions may create wider economic and social impacts by affecting the tourism sector's demand for agricultural products, regional handicrafts and small businesses (UNWTO, 2003: 8).

We can explain its role in the Turkish economy as follows; The tourism sector in Turkey has an important place in economic and social terms. As of 2013, Turkey's income from tourism activities exceeds 30 billion dollars, which corresponds to 4% of GDP. The share of registered employees in the tourism sector in total employment is approximately 7.3% (Turkish Hoteliers Federation [TÜROFED], 2014: 26). In addition to creating income and employment, tourism also contributes positively to the current account balance of countries and helps finance foreign trade deficits. For example, according to the data of the Association of Turkish Travel Agencies, the ratio of tourism revenues to covering foreign trade deficits was 58% on average in the 1996-2012 period. This situation shows how important the contribution of tourism to the country's economy is.

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Possible effects in the future are; Negativities in the tourism sector due to climate change may lead to both employment and income losses. In addition, the positive contribution of tourism revenues to the balance of payments is likely to decrease. This could have negative effects on both economic growth and regional development.

Economic and social knock-on effects:

- Decrease in Labor Demand: The decrease in labor demand related to the tourism sector may increase sectoral unemployment.
- Decline in Infrastructure and Construction Investments: The decrease in tourism investments may affect regional development and sectoral growth.
- Impacts on Agricultural and Regional Economies: The decline in the tourism sector may indirectly affect the demand for agricultural products, regional handicrafts and small businesses.

These effects can lead to radical changes in the economic and social structure of the tourism sector and disrupt the general economic balance of the country. Considering these potential impacts of climate change on the tourism sector, strategic measures and adaptation plans should be developed at both local and national levels.

### 3. Effects on Energy

Changes in temperature and precipitation patterns, decreases in water levels in some regions, increases in storms and floods, and increases in sea water levels can significantly affect energy supply and demand. Climate change can have direct impacts not only on energy supply and demand, but also on energy sources, infrastructures and transportation. Hydroelectric power plants may be negatively affected by climate change due to decreasing water levels caused by changes in precipitation patterns and increasing ambient and water temperatures reducing the cooling efficiency of water (Cuba et al., 1996: 367). In their study on hydroelectric production in California, Cayan et al. (2006: 32) predicted a 28% decrease in stream flows by the end of the century under a 4°C temperature increase scenario and determined that this would reduce energy production by 30%. Additionally, decreases in hydroelectric production due to decreases in water levels may impose an additional burden on the balance of payments of countries dependent on energy imports, such as Turkey. Such countries try to close the additional supply gap arising from the decrease in their current energy production capacity through imports, which may negatively affect the current account balance.

Energy facilities located on the coastline are at risk due to rising sea water levels and intensifying storms. Electricity, oil and gas production, refining processes and distribution services in these facilities may be negatively affected by renewable energy sources such as bioenergy, solar, wind and hydroelectricity due to changing precipitation patterns, increasing temperatures and drought. Because these types of energy have a direct or indirect connection with the climate (Ebinger and Vergara, 2011: 26). Rising temperatures can reduce the efficiency of electricity transportation and distribution facilities, and storms and floods can cause physical damage to these facilities (Zamuda et al., 2013). This situation may lead to long-term power outages, which may have negative effects on economic activities.

Although solar energy production is not directly affected by climate change, rising temperatures can increase the water vapor density and cloudiness in the atmosphere. Due to the reflective properties of clouds, solar radiation may decrease, which may affect energy production. Although oil and oil products are not directly related to climate change, transportation, processing and distribution of oil and the infrastructures for these processes may be negatively affected by climate change (Ebinger and Vergara, 2011: 29-30; Zamuda et al., 2013: 9). Nuclear power plants use large amounts of water for cooling purposes. Decreases in water levels due to climate change may disrupt the effective operation and energy production of such power plants (Griffiths et al., 2009: 15). These facilities may suffer serious damage under the threats of events such as floods, storms and droughts (Keskin, 2011: 69). For example, the drought in 2002 affected electricity production in Queensland, Australia, and the heat wave in Europe in 2003 caused river waters to warm up, significantly reducing nuclear energy production in France (Stern, 2007: 143).

Climate change can reshape the energy use pattern and affect energy demand by creating changes in the heating and cooling requirements of spaces. While increasing temperatures reduce energy demand for heating needs, they can also increase energy demand by increasing cooling needs (Morrisson and Mendelsohn, 2004: 209). In this context, while the energy demand for heating needs decreases in high latitudes, the energy demand for cooling needs increases in low latitudes (Stern, 2007: 142). For example, a temperature increase of 1.3-2.9°C could reduce natural gas use in the UK by 7-10% in 2050. Similarly, a temperature increase of 0.8°C could reduce fossil fuel demand in the MINK region of the USA by 7-16% (Cuba et al., 1996: 337). A temperature increase of 3°C could reduce energy demand for heating by 20% in Italy by 2080, while increasing energy demand for cooling by 50% (Hanson et al., 2007: 172-173).

Climate change may also play a role on energy prices by affecting energy supply and demand. For example, the disruptions in energy production and distribution in the USA during Hurricane Katrina and the increase in energy prices are examples of this situation. Additionally, snow in the winter and a decrease in precipitation in the spring can lower water levels, reducing hydroelectric power production. This may lead to an increase in energy prices. However, in the long term, the development of new technologies may relieve the pressure on energy prices. Therefore, it remains unclear what course energy prices will follow in the future (Bhatt et al., 2006: 78).

### 4. Effects on Workforce Productivity

Health problems caused by climate change and heat stress due to increasing temperatures, humidity and other extreme weather conditions can have an impact on work efficiency. Especially in low- and middle-income countries, workers are more exposed to temperature effects due to inadequate ventilation conditions. Increases in daily temperatures and humidity rates and variability in precipitation patterns as a result of global warming cause these effects to be experienced more frequently and intensely. The two traditional ways to increase production are to increase the productivity of production factors or the amount of inputs. An increase in productivity can make growth possible without changing the amount of input. However, climate change may reduce production at the current level of capital input and technology by negatively affecting the performance and therefore the productivity of employees, especially in underdeveloped and developing countries.

Today, the ratio of the negative effects of climate change on business productivity to world GDP is approximately 0.5% and is around 300 billion dollars annually. Among the countries most affected by the decline in labor productivity are countries with developing economies such as China, India, Indonesia and Mexico. The loss of productivity in these countries causes a loss of approximately 200 billion dollars annually, and this affects the development potential of the countries. By 2030, losses for each country in China and India are projected to be approximately half a trillion dollars. In addition, it is estimated that if the temperature increases by 0.6°C, the global cost caused by decreases in labor productivity will reach approximately 2.5 trillion dollars in 2030 (DARA, 2012: 139).

### 5. Effects on the Employment Process

Changes in climate conditions can affect employment both directly and indirectly through government policies. In addition, climatic conditions and government regulations can have various effects on employment by affecting consumer habits and preferences. The direct effects of climate change on the labor market are manifested by changing climatic conditions and severe weather events. The decrease in capacity in business environments and economic activities as a result of climate change will significantly reduce labor demand. This situation will be felt especially in the agriculture, tourism and energy sectors, which have high sensitivity to climate (Medhurst, 2009: 4; Miranda and Larcombe, 2012: 33). The agricultural sector is the field that provides the most employment worldwide after the services sector, and more than 1 billion people work in this sector (International Labor Office [ILO], 2008: 27-28). More than 70% of this employment is in Asia, and approximately 20% is in the Sub-Saharan Africa region. The workforce in these regions may be more affected by climate change. On the other hand, the accommodation, food and tourism sector is among the fastest growing sectors on a global scale. The tourism sector accounts for approximately 10% of world GDP and has the potential to create large-scale jobs, providing 8% of the total global workforce. However, the negative effects of climate change, such as sea level rise, coastal erosion and water scarcity, may negatively affect the tourism sector and employment in this sector (Olsen, 2009: 4-5). Regulations and policies to be made within the scope of combating climate change will affect the supply and demand of goods and services, and these effects will be reflected in the labor market. For example, a carbon tax or emissions trading system will send price signals to markets by increasing costs. A carbon tax can affect the demand for both final and intermediate goods and the demand for labor by creating significant changes in relative prices. In this context, prices of energy and energy-intensive goods and services may rise (Chateau, 2011: 6). The price mechanism may direct producers and consumers to more environmentally friendly products, which may lead to unemployment, especially in energy-intensive and polluting sectors. The demand for labor depends on the demand for the goods it participates in producing, so a decrease in the demand for polluting products can reduce employment levels in the sectors where these products are produced. Additionally, changes in the move towards environmentally friendly products may occur not only through public regulations but also through increased global awareness. This social consciousness can be a factor influencing policies and regulations, consumer preferences, industries and ultimately the labor market (Martinez-Fernandez et al., 2010: 7; Miranda and Larcombe, 2012: 34-35). Despite the negative effects of climate change on employment, new job opportunities may also emerge (Miranda and Larcombe, 2012: 33-34). These new job opportunities may arise as a result of investments in areas such as climate change adaptation, coastal protection, infrastructure strengthening, water management and emission reduction initiatives, renewable energy and low carbon technologies. However, it is still unclear what the net impact of these investments will be on employment (Martinez-Fernandez et al., 2010: 9). In the short term, tackling climate change could lead to job losses in carbon-intensive sectors. Low-carbon sectors are expected to be more labor intensive than traditional sectors and provide new job opportunities (IPCC, 2007b: 47). However, it is possible that the job creation capacity of low-carbon sectors will gradually decrease due to their competitive and technological structures. Additionally, it may take time to acquire the knowledge and skills required to adapt to developing technologies, which may lead to structural unemployment (Bretschger and Valente, 2011: 834; Martinez-Fernandez et al., 2010: 17).

On the other hand, migration may occur from regions that are affected or expected to be affected by climate change. These migrations may lead to a loss of human capital in the affected regions, making the initial effects of climate change more pronounced. This will result from the migration of a workforce with high knowledge and productivity in response to the changing climate, as the negative economic effects of climate change begin to be felt. Because the mobility of high human capital is generally high (Hallegatte, 2012: 5).

### 6. Effects on the Growth Process

Economic growth refers to annual increases in real output. The main factors affecting economic growth are the quantity and efficiency of inputs. In a production function defined as  $Y=f(A,K,L,E,S)$ ,  $Y$  is the output amount (GDP);  $A$  is total factor productivity;  $K$  is physical capital;  $L$  is the workforce;  $E$  represents natural capital and  $S$  represents social capital. In this context, increases in physical and natural capital, labor and labor productivity, technological progress and strong institutional structures increase output and therefore economic growth. Otherwise, output and growth will decline. Changes in temperature and precipitation averages and frequent severe weather events that occur with climate change affect the quantity and efficiency of production factors. This situation may change the production level and the trend of production increase (World Bank, 2010: 40). Assuming the population is constant, increases in physical capital increase the capital stock, and this growing capital stock supports economic growth by increasing the amount of output. The capital stock is determined by new investments and depreciation of capital. However, depreciation of capital negatively affects the capital stock. Therefore, the effects of climate change on economic growth may be manifested in the capital stock. Extreme natural events such as increased storms, floods, heat waves and droughts can shorten the lifespan of physical capital. Fixed capital elements such as buildings, machinery and infrastructure have a designed lifespan under certain temperature and environmental conditions. For example, temperature rise, severe floods and storms can accelerate the depreciation of capital (Bretschger and Valente, 2011: 826). Additionally, the persistent negative effects of climate change may require more frequent capital investment adjustments (Fankhauser and Tol, 2005: 4). Such effects can lead to major capital losses, especially in developed countries that invest around 20% of their GDP in fixed capital annually (Stern, 2007: 149).

When the savings rate remains constant in an economy, the total investment rate may decrease as a result of the negative effects of climate change on output. In the long run, this reduction in the level of investment can reduce the capital stock, leading to lower GDP and consumption per capita. According to the endogenous growth model, if the low level of investment is likely to reduce technological progress, labor productivity and labor force, the decrease in the amount of capital may have greater effects on the economy (Fankhauser and Tol, 2005: 2).

However, savings rates may vary across the economy. The adverse effects of climate change, such as loss of primary production resources and reductions in productivity, can reduce GDP, reducing savings and therefore demand for capital. This situation may affect the external debt stock and foreign trade balance (Eboli et al., 2010: 6).

Sea level rise can increase the risk of damage to infrastructure facilities, especially in coastal areas, and accelerate the depreciation of capital. Additionally, sea level rise may lead to eventual land loss and a decrease in natural capital endowment (Darwin and Tol, 2001: 126). In addition, threats may arise to ecosystem services and natural life that have market value, such as fisheries. Since soil and ecosystem services are natural capital ( $E$ ) and production inputs, a decrease in  $E$  leads to a decrease in capital, which in turn has a negative impact on output. Losses in the total capital stock may reduce economic growth. For example, Strobl (2008) showed that soil losses caused by storms reduced economic growth in America's coastal states by an average of 0.8%. Natural capital losses can be offset by physical capital investments so that economic growth may be less affected by natural capital losses. However, the resources required for these investments may require increased savings or additional tax burden. This may lead to a decrease in consumption and therefore a loss of welfare (Hallegatte, 2012: 2).

Climate change can negatively affect the population, and therefore the workforce and labor productivity, through problems such as diseases, malnutrition, water scarcity and premature deaths. This situation has important consequences on economic growth through human capital in the short and medium term. Population decline or adverse effects from climate change simultaneously reduce human capital. As a result, both physical output and new human capital growth may be limited. On the other hand, a one-time decrease in human capital may not affect growth in the long run, which depends on high investments in education (Lecocq and Shazili, 2007: 35-40). However, poor economic performance caused by adverse climate conditions can reduce the potential revenues that governments can generate. A decrease in public revenues may constrain government expenditures and negatively affect the resources allocated to human capital investments.

This may lead to a reduction in services such as education, nutrition and health expenditures that increase living standards. These decreases may negatively affect economic growth by reducing human capital and labor productivity, which are important factors of economic growth (Bernauer et al., 2010: 11). Climate change can pose an obstacle to sustainable growth by affecting not only physical, human and natural capital, but also institutional structures. Particularly in some countries, additional expenses may be required to protect against rises in sea water levels. These additional expenses could increase social and political tensions. The failure of a part of the population to support these expenditures and the failure to make other necessary investments may cause social divisions (Hallegatte, 2012: 3). Such a situation may disrupt the social and political stability necessary for a good economic structure, leading to lower economic performance compared to countries with better institutional structures (Rodrick, 1998: 407). Alternative costs may arise as countries exposed to the negative effects of climate change spend some of their resources for protection and adaptation. Such investments can increase GDP through demand. However, since these expenditures are for protection purposes, they may not increase welfare and may have a crowding out effect on other productive investments and R&D expenditures. This crowding out effect may negatively affect economic growth by reducing productivity growth in the future (Hallegatte, 2012: 3-4).



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Despite the concern that climate change may negatively affect economic growth, it is also argued that efforts to protect the environment from climate change can directly contribute to economic growth. The environment, or more technically, natural capital, is included as an input in the production function. Protecting the environment means improving environmental quality, which can increase output and income levels by increasing the amount of natural capital (Tol, 2009: 29).

The use of environmental assets is often characterized by externalities and market failures. Today's global warming and climate change are seen as the biggest sources of these externalities. In this context, correcting market failures can increase the effective supply of natural capital. An increase in the supply of natural capital will increase the amount of output as an important component of the production function. Although environmental quality is not directly included in traditional GDP calculations, it is an important source of well-being. Improvements in environmental quality will have positive effects on well-being by improving air, water and soil quality (Hallegatte et al., 2011: 3).

Efforts to reduce the effects of climate change can increase the productivity of capital, labor, and the environment. While policies to protect the environment improve environmental quality, increases in air and water quality can also positively affect the health of employees, which can increase workforce and productivity. Additionally, a well-managed environment can reduce physical capital losses and depreciation resulting from natural disasters. Environmental protection efforts can contribute to increased production efficiency by helping to correct market failures and increase resource use efficiency. This can play an encouraging role in reducing production costs and increasing efficiency and competitiveness. Zenghelis (2011: 13) suggests that countries should encourage the economy by introducing environmental protection policies during periods of economic recession.

### **C. Economic Consequences of Climate Change**

The effects of climate change generally emerge after many years. However, temperature increases, changes in precipitation regimes and events such as drought, floods and storms due to these changes can cause these effects to be felt on living things, countries and economies in the short term. Today, climate change has become a global problem and is accepted as an inevitable reality that affects the whole world. This situation causes climate change in the world system to affect the economy and create various repercussions. Climate change has significant impacts on labor productivity, employment and economic growth in critical areas such as agriculture, tourism and energy sectors. Especially temperature increases and extreme fluctuations in precipitation can have serious consequences on economies. Although a moderate warming process may provide some positive effects in high latitudes, overall the global effects of climate change are negative. Today, these negative effects are felt clearly in some countries and regions, and it is inevitable that these effects will have significant global consequences in the future.

In this context, the need for an effective and urgent fight against climate change emerges. Although reducing energy and water consumption and environmentally friendly actions and demands are among the things that can be done individually, a legally binding, determined and sincere international cooperation is essential for the success of the fight against climate change. However, it cannot be said that the steps taken at national and international levels are sufficient yet. The Kyoto Protocol stands out as the only binding international agreement at this point, and at the 19th Meeting of the Parties held in Warsaw in 2013, no agreement was reached after the Kyoto Protocol and it was decided to implement new emission targets by 2020. This situation calls into question the sincerity and determination of countries in the fight against climate change.

In addition, in the fight against climate change, it is necessary to abandon the view of the environment as a subsystem of the economy and to adopt the idea that the economy is a subsystem of the environment and that the boundaries of the economy are determined by its ecological carrying capacity. It is important to shape economic policies by taking into account the natural capital supply function of the environment as well as the waste storage function. While Boulding (1966) defines the current production and consumption structure as "Cowboy Economy", he points out that this structure will exceed the ecological carrying capacity. For this reason, he advocates the need to transition to an economic structure called "Spaceman Economy" that makes production and consumption qualitatively sustainable.

### **D. Effects of Climate Change on Human Health and Mental Health**

The negative effects of climate change on human health are multifaceted and profound. The most important of these effects is that individuals are forced to eat unhealthy and inadequate nutrition. Nutritional deficiencies can increase vulnerability to diseases such as diarrhea and malaria. Especially individuals living in rural and urban areas with low income levels are more susceptible to such diseases. Increasing temperatures along with climate change may also trigger the spread of diseases such as fever. The positive correlation between temperature and fever is an indication of this situation. In the reports prepared by the World Health Organization, other diseases that are likely to increase with climate change, such as bird flu, tick, ebola, tuberculosis and sleeping sickness, are also stated (Telecommunications Branch Directorate, 2008).

The psychological effects of climate change are more indirect and complex. The increase in mental disorders such as depression, antisocial behavior and suicide is among the potential psychological effects of climate change (Clayton et al., 2017: 7). The stress, anxiety and uncertainty that climate change adds to individuals' lives can have negative consequences on mental health. Environmental uncertainties can be a risk factor for psychological stress (Greco & Roger, 2003 as cited in Clayton et al., 2017: 14).

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Natural disasters and extreme weather events can have acute effects on both physical and mental health, while long-term changes in climate can have chronic effects (Clayton et al., 2017: 22). Mental health problems can also have negative effects on physical health, such as changes in sleeping, eating and exercise habits, and decreased immune system function. Therefore, comprehensively addressing the health impacts of climate change, both direct and indirect, is an important part of strategies to protect and improve public health.

### 1. Acute Effects

**a. Trauma and Shock:** Disasters related to climate change can create conditions that predispose to severe psychological trauma such as personal injury, harm or death of a loved one or pet, damage to personal property, or loss of occupation (Neria & Schultz, 2012: 1; Simpson, Weissbecker & Sephton, 2011: 64). Such disasters can deeply affect the mental health of individuals and cause various psychological problems to occur. Studies examining the relationship between climate change-related disasters and psychological health have revealed that 7% to 40% of people exposed to these disasters experience various psychological problems (Rubonis & Bickman, 1991: 384). This rate shows that climate change-related disasters can have a serious impact on individuals' psychological well-being. This highlights the importance of understanding the psychological consequences of disasters and developing comprehensive strategies to mitigate these effects.

**b. PTSD:** It has been emphasized that depression, general anxiety and suicide tend to increase after a disaster. These disasters can also cause many psychological problems such as post-traumatic stress disorder (PTSD), substance use, violence, aggression, interpersonal difficulties and work-related difficulties (Simpson et al., 2011: 70). For example, it has been shown that climate refugees exposed to traumatic events have a higher lifetime rate of PTSD and that these individuals have a lower recovery status than refugees who experience less traumatic events (Kolassa et al., 2010: 169). These findings provide an important basis for understanding the long-term effects of climate change and natural disasters on psychological health, especially after trauma, and taking the necessary measures to reduce these effects.

**c. Suppressed Stress:** Stress is defined as a physiological response that occurs when a person feels that his/her capacity to respond and adapt to a particular situation is inadequate. In this context, climate-related stress is likely to lead to an increase in stress-related problems such as substance abuse, anxiety disorders, and depression. Additionally, feelings such as vulnerability, helplessness, mourning, grief and hopelessness may be experienced due to stress (Neria & Schultz, 2012: 2). For example, a study conducted in a drought-affected region stated that residents were concerned about ongoing drought conditions. In addition, it has been found that suicide rates increase among male farmers in Australia during long periods of drought (Hanigan et al., 2012: 13950). These findings highlight the effects of climate change on not only physical health but also psychological health.

**d. Effects of Stress on Physical Health:** It has been observed that high levels of stress and anxiety have significant negative effects on physical health. Chronic stress weakens the immune system, making individuals more vulnerable to pathogens in the air and water, which poses a great risk for various physical disorders (Alderman et al., 2012 as cited in Clayton et al., 2017: 23; Simpson et al., 2011: 66, 68). Additionally, sleep disorders may increase with chronic psychological distress (Han et al., 2012: 145). This reveals that stress and anxiety have significant effects not only on psychological but also on physical health.

**e. Loss of Personally Significant Places:** One of the best ways to understand the effects of climate change on perceptions is to characterize the feeling of "loss." A sense of belonging is of great importance to people, and when climate changes irreversibly alter these places, many feel the places that are important to them are being lost. This situation creates a psychological effect similar to the feeling of desolation and loss experienced by people who have to migrate from their home environment. Climate change can be difficult to identify as a causal factor in a complex set of events affecting migration. However, some estimates predict that 200 million people will be displaced due to climate change by 2050 (Fritze et al., 2008: 5). This type of migration and sense of loss can have a huge psychological impact as people's places of residence and cultural affiliations change.

**f. Loss of Personal and Professional Identity:** Climate change can create loss of personal identity and ordinary aspects of daily life. Especially if houses are damaged or destroyed, individuals may lose valuable belongings, and these items may have a significant psychological impact because they symbolize the person's true self and identity. These objects generally represent important moments of life and family relationships (Dittmar, 2011 as cited in Clayton et al., 2017: 26). The loss of professional identity associated with climate change can also negatively impact individuals' psychology. Especially those working in professions such as farming and fishing are directly affected by climate change due to the identity and place-based structures of these professions. Severe storms and high temperatures can disrupt economic activities and therefore affect occupational identity (Hsiang, 2010: 15371). Job loss is associated with an increased risk of depression following climate change and natural disasters (Warsini et al., 2014 as cited in Clayton et al., 2017: 27). This can lead to widespread psychological effects and social problems at both individual and societal levels.

**g. Helplessness, Depression, Fear, Fatalism, Denial, Abandonment and Eco - Anxiety:** Gradual and long-term changes in climate can have various effects on people's emotional and psychological states. These changes can lead to emotions such as fear, anger, powerlessness and burnout in individuals (Moser, 2007: 67). These feelings often stem from uncertainty and anxiety about the long-term effects of climate change.

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### 2. Chronic Effects

**a. Aggression and Violence:** Laboratory experiments and field research have revealed that there is a causal relationship between temperature and aggression (Anderson, 2001: 35; Simister & Cooper, 2005: 4). In other words, as temperature increases, aggression also increases. In addition, heat has a negative effect on cognitive functions, and this may lead the person to violence by reducing the ability to resolve a non-violent conflict (Pilcher, Nadler & Busch, 2002: 690, 693).

**b. Community Life and Social Continuity:** Stress caused by climate change is observed in various communities. For example, Cunsolo Willox and colleagues (2013) investigated the effects of climate change on a small Inuit community. Stating that they feel a deep commitment to the land, these community members stated that they noticed the changes in the local climate and that these changes had negative effects on them. As a result of changes in interaction with the environment, community members report experiencing food insecurity, sadness, anger, increased familial stress, and a decreased sense of personal worth and social connectedness. Elders have expressed particular concern, stating that climate events threaten the preservation of Inuit language and culture, thus directly affecting mental health and social cohesion (Ostapchuk, Harpers, Cunsolo Willox, Edge and Rigolet Inuit Community Government, 2015: 17, 19; Clayton et al., 2017: 29).

**c. Interindividual Violence:** High temperatures increase people's tendencies towards aggression. Aggression is exacerbated by reduced access to public green spaces and social support networks. Increasing frustrations in society trigger interpersonal aggression (such as domestic violence, assault and rape). A study revealed that rising average temperatures between 2010 and 2099 could lead to approximately 30,000 murders, 200,000 rapes and 3.2 million thefts (Ranson, 2012 as cited in Clayton et al., 2017: 30). Individuals with disabilities or those with chronic mental or physical health problems may be more affected by adverse climate-related impacts (Page et al., 2012: 488).

Often, individuals with disabilities have less chance of receiving assistance during and after climate-related disasters. People suffering from mental health disorders may also experience a variety of symptoms due to natural disasters. Infrastructure degradation can make it difficult for people with mental illness to receive necessary medical attention, leading to additional negative health consequences. For example, in a study conducted in Australia, it was stated that individuals' fears in the face of climate changes expected to occur in the future were documented and that this situation could affect their mental health (Charlson, 2019).

Following the 2012 Wisconsin heat wave, 52% of heat-related deaths were among people with at least one mental illness. Half of those with mental illness use psychotropic medications that inhibit the body's ability to regulate heat and are therefore more affected by heat. These drugs have been evaluated as one of the main causes of heat-related deaths (Dodgen et al., 2016: 226). In other words, many medications that treat mental health disorders can directly cause hyperthermia by inhibiting the body's ability to regulate temperature and expel heat (Martin-Latry et al., 2007 as cited in USGCRP, 2016: 226; Cusack et al., 2011). cited in USGCRP, 2016: 226; Stöllberger et al., 2009 cited in USGCRP, 2016: 226). Elderly people are highly vulnerable to climate impacts due to increased health and mobility challenges. Research shows that elderly people experience a decrease in cognitive skills, especially when exposed to air pollution in the long term (Dodgen et al., 2016: 225). Heat can have a particularly intense impact on the elderly and people with pre-existing mental health problems (Martin-Latry et al., 2007 as cited in Clayton et al., 2017: 38). Women are more likely than men to experience post-traumatic mental health problems. For example, it is known that post-traumatic stress disorder is approximately twice as common in women as in men in the general population (Somasundaram & Van De Put, 2006: 65).

Another concern is that the effects of climate change may be more pronounced, especially in socioeconomically disadvantaged communities where the healthcare system is unequal (Friel et al., 2008 as cited in Berry et al., 2010: 124). Individuals with socioeconomic disadvantages may suffer more from such effects (Salick & Byg, 2007: 26). Mental health can be defined as the individual's ability to think, learn and live by evaluating his own emotions and the reactions of others (Herrman, 2001 as cited in Berry et al., 2010: 124). This definition emphasizes that psychology reflects a dynamic continuum. Mental health issues are part of this continuum. Although their causes, symptoms, effects, and treatments vary, all are characterized by changes in thought, mood, or behavior and the distress or functional impairments they cause (Berry et al., 2007 as cited in Berry et al., 2010: 124). Researchers agree that climate change will have both direct and indirect effects on mental health; However, there is no comprehensive framework to guide research or policy-making on this subject.

### E. Consequences of Climate Change on Mental Health

Mental health problems and stress-related disorders associated with climate changes occur during geographic relocation, loss of property, death or injury of loved ones, and recovery processes (Ebi et al., 2008: 43). Psychological disorders associated with climate change include stress disorder, complex grief, depression, anxiety disorders, somatic complaints, poor concentration, sleep problems, sexual dysfunction, social avoidance, irritability, and drug or alcohol abuse, and these vary depending on the person's mental state. It can develop in different ways (Silove & Steel, 2006: 124; Weisler et al., 2006: 586). Climate change affects the social, economic and environmental determinants of mental health, causing the most serious consequences to be felt by disadvantaged communities (Fritze et al., 2008: 1, 2). Groups most affected by the effects of climate change on both mental and physical health include: emergency workers, rural communities, children, seniors, women, individuals with low socioeconomic status, the homeless, outdoor workers, those exposed to racism, immigrants, and those with existing health conditions (IPCC, 2012:

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83, 493; Costello et al., 2009: 1721; Berry et al., 2014: 212; Berry et al., 2008: 11; Clayton et al., 2014: 14; Clayton et al., 2017: 38 ; Trombly et al., 2017: 44; Page et al., 2012: 489; Heat waves further exacerbate various mental disorders, especially in individuals in low- and middle-income countries (Hansen et al., 2008: 1373; Trang et al., 2016: 1). There is increasing evidence that droughts and heatwaves increase rates of self-harm and suicide (Doherty & Clayton, 2011: 268). For example, heat waves in Adelaide, South Australia, led to an increase in psychiatric hospital admissions, and an increase in self-harm and suicide was also observed on hot days (Nitschke et al., 2007: 662; Qi et al., 2014: 1, 2). Similarly, Qi's study linking suicide rates to socio-environmental factors in Australia from 1986 to 2005 found that sudden increases in temperature could be considered a suicide risk factor in some cities. The study examined 28,501 suicide cases from eight cities and found a 3% increase in suicide rates with an increase in average temperature in a month in Sydney and Brisbane. These findings suggest that higher temperatures in these cities lead to higher suicide rates (Qi, 2014). Some other research has found that higher temperatures may be associated with more aggressive and antisocial behavior (Anderson, 2001: 33). It is known that heat waves affect mood, mental health, disrupt concentration and make people feel more tired (Braganza & Church, 2011: 3).

The prevalence of mental health problems globally is extremely high, even without considering the mental health consequences of climate change. A study conducted between 1990 and 2010 revealed that psychological diseases accounted for 7.8% of the global disease burden (Murray et al., 2013: 2211). Although the relationship between disasters and psychological health has been frequently emphasized in the literature, these studies are generally inadequate in associating psychological health with changing climate conditions. Most studies link psychological disorders to natural disasters rather than events directly linked to climate change. For example, studies focusing on the psychological effects of events such as the 2004 Malaysian Tsunami, 2005 Hurricane Katrina, and the 2013 Alberta flood have led to each disaster being considered independently of climate change (Hayes et al., 2018: 3). However, psychological anxiety can occur not only with disasters caused by climate change, but also with sudden changes in weather events (Hickie, 2011). Additionally, it is an important issue that existing psychological health conditions may be worsened or triggered by climate change (North & Pfefferbaum, 2013: 507). For example, research has shown that the incidence of psychological disorders increased within six months after the flood (Azuma et al., 2014 as cited in Hayes et al., 2018: 4). In a study conducted after Hurricane Katrina, it was observed that mental health problems increased among disaster victims even after a year (Kessler et al., 2008: 1). While psychological disorders increased by 14.9% in the 5-8 months after the hurricane, this rate increased to 20.9% one year later. Additionally, people who experienced floods reported long-term psychosocial effects 2.5 to 5 years after the flood (Tunstall et al., 2006: 370). It has been stated that even four years after a flood event in England, psychological effects continue and psychological disorders increase fourfold (Reacher et al., 2004: 5; Tapsell et al., 2003: 324). Disasters caused by climate change cause direct, indirect and general psychosocial consequences. Direct psychosocial impacts include trauma related to extreme weather events such as floods, hurricanes, wildfires and heat waves (Berry et al., 2010: 126; Fritze et al., 2008: 2). Indirect psychological effects occur through social, economic and environmental disruptions (e.g. hunger, conflict and migration) related to the changing climate (Berry et al., 2010: 127-128; Fritze et al., 2008: 2). Among the direct psychological effects of climate change, extreme heat events and humidity have been shown to increase hospital admissions for mood and behavioral disorders such as schizophrenia, mania and neurotic disorders (Chand & Murthy, 2008 as cited in Hayes et al., 2018: 6; Wang & Horton, 2015). cited in Hayes et al., 2018: 6). Research has revealed that heat-related psychological health problems are generally more common in people with impaired thermoregulation, that is, those with existing mental health problems, those who use prescription drugs, and those who experience substance addiction (Page et al., 2012: 485; Dodgen et al., 2016). Examining the psychological consequences of the "Black Saturday" bushfires in Victoria, Australia, Bryant and colleagues found cases of PTSD, psychological distress, and fire-related depression in the most at-risk communities (Bryant et al., 2014: 634). The direct psychological health effects of floods and hurricanes have been variously documented (Tunstall et al., 2006: 367; Waite et al., 2017: 1; Alderman et al., 2013: 380; Fernandez et al., 2014: 4; Stanke et al., 2012: 2 ; Neria & Schultz, 2012: 1; Schmeltz et al., 2008: 24; A study of residents affected by floods in England and Wales examined the effects of floods on psychological health in detail.

Research has revealed that psychological effects are reported more frequently than physical effects following disasters (Tunstall et al., 2006: 368). In a study conducted after Hurricane Katrina, it was estimated that 20-35% of survivors experienced various mental health problems after the disaster (Whaley, 2009 as cited in Hayes et al., 2018: 6). Galea and his team reported that the prevalence of anxiety and emotional disorders among victims of Hurricane Katrina was 31.2% (Galea et al., 2007: 5). In another study, Rhodes and Chan found that almost half (47.7%) of marginalized community members after the hurricane in New Orleans showed symptoms of PTSD (Rhodes et al., 2010: 1, 18). While PTSD is often reported as one of the most serious mental health effects of sudden climate change-related disasters, an increase in suicide attempts and suicidal thoughts has been observed following extreme climate events.

### **F. Indirect Mental Health Consequences of Climate Change**

The indirect psychological effects of climate change generally occur with factors such as the destruction of physical and social infrastructure, physical health problems, food and water scarcity, conflicts and spatial change (Berry et al., 2010: 126). Individuals may be indirectly affected by other effects of climate change, such as mental health problems, food shortages, insect-borne diseases (e.g., Lyme disease and malaria), and air pollution (U.S. Global Change Research Program, 2016). Drought is one of the best-



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documented dangers of climate change that indirectly affects mental health. Long-term droughts can have major impacts on economic and mental well-being, especially on those living in rural communities and land workers (Vins et al., 2015: 13259; Yusa et al., 2015: 8377; OBrien et al., 2014: 186). A seven-year quantitative analysis conducted in Australia found that rural residents suffered more from drought than their urban counterparts (OBrien et al., 2014: 186). A link has been found between extreme temperatures, low agricultural yields and an increase in suicide rates among farmers in India (Carleton, 2017: 8746).

The health effects of stress include conditions such as high blood pressure, heart disease, obesity and diabetes. However, a study by the Union of Concern Scientists stated that physical harms from climate change are generally lower than psychological harms. According to research, even if individuals are able to cope with climate disasters, they may occasionally experience serious mental health symptoms such as climate-induced post-traumatic stress, depression, and anxiety (UCS, 2010). This is because people are likely to experience psychologically traumatic effects if they lose their homes, businesses and property or witness deaths due to climate change. As psychologist and researcher Carl F. Weems, associate professor at the University of New Orleans, states, the greater the severity of a person's exposure to traumatic experiences, the more likely they are to experience serious mental health problems (UCS, 2010).

Although eco-anxiety is not considered a medical condition, it is defined by the American Psychological Association (APA) as "a chronic fear of environmental apocalypse." Eco-anxiety can lead to daily periods of grief and despair, or even sudden panic attacks, in some individuals due to beliefs that their future quality of life will decrease. Some people may even decide not to have children (Arcanjo, 2019: 3). With increasing studies on understanding the effects of climate change on well-being, the concept of eco-anxiety was included in the Intergovernmental Panel on Climate Change (IPCC) report in 2018 (Gustafson et al., 2019). Climate change can affect mental health in indirect ways such as exposure to extreme temperatures, psychological trauma, and damage to feelings of belonging and community due to attachment to the land (Higginbotham et al., 2007 as cited in Berry et al., 2010: 125).

Climate change can negatively affect the well-being and economic structure of communities by creating a variety of impacts such as heat waves, violence, diseases and food security problems. Increasing temperatures, especially prolonged periods of hot weather, can lead to an increase in crime rates and aggressive behavior, as well as an increase in suicide rates (Maes et al., 1994; as cited in Berry et al., 2010: 126; Brearley, 1929; as cited in Berry et al., 2010: 126; Cheatwood, 1995; cited in Berry et al., 2010: 126; cited in Berry et al., 2010: 126). Extreme temperatures are associated with an increase in suicides and other psychiatric illnesses and hospital admissions. A study found that individuals with existing mental health problems tripled their risk of death during a heatwave (Bouchama et al., 2007: 2170). In Adelaide, Australia, with increasing temperatures (Nitschke et al., 2007: 662), hospital for mental and behavioral disorders such as organic diseases, dementia, mood swings, anxiety, stress-related and somatoform disorders, psychological development problems and age-related disorders An increase in applications has been observed (Hansen et al., 2008: 1369). Besides temperatures, humidity is also associated with mental dysfunction. For example, high temperatures lead to poor concentration and increased fatigue (Howarth & Hoffman, 1984: 16). Physical health problems are in a mutual relationship with the emergence of mental health problems, especially among the elderly and vulnerable groups living in rural areas (Miller et al., 2009: 506; Prince et al., 2007; cited in Berry et al., 2010: 127). In agriculture-dependent communities, climate change may reduce agricultural productivity and sustainability of agriculture. Long-term drought can lead to a deterioration in economic conditions over time, causing depression and demoralization among parents and their children (Conger et al., 1992; cited in Berry et al., 2010: 128).

Tekirdağ Namık Kemal University Faculty of Medicine, Head of the Department of Mental Health and Diseases, Assoc. Dr. Yakup Albayrak stated that recent climatic changes in Turkey have had negative effects on human psychology. Albayrak stated that droughts resulting from climate change trigger psychological disorders and as a result, there is an increase in hospital admissions. He also added that climate changes, combined with economic concerns, have direct effects on farmers directly involved in agriculture, and this situation causes drought anxiety in individuals living in urban areas, which may cause psychological disorders. Albayrak stated that the climate imbalances experienced in countries such as Turkey affect seasonal expectations and this leads to a feeling of climate-related psychological imbalance in individuals. He stated that individuals who consult doctors due to drought anxiety follow meteorological data, do research on drought, and feel hopeless for both themselves and their children due to the decrease in precipitation, and as a result experience anxiety disorders. Albayrak stated that people are worried about whether there will be a water problem in the future, but over time, they cannot cope with these concerns and experience psychological problems. He also explained that if climate changes are at extreme levels, they cause the human biological clock to be affected, these changes often change physical conditions and psychological expectations, and these situations can lead to disruptions in the body system. He emphasized that especially in periods when weather changes are frequent or harsh, individuals become sick more and these health problems can indirectly cause psychological disorders (IHA, 2018).

## CONCLUSION

This article comprehensively addresses the profound effects of the climate crisis on economic and psychological health, revealing the broad repercussions of climate change on individuals and societies. The findings of the research show that climate change has important consequences not only in environmental but also in economic and psychological dimensions. In terms of

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economic impacts, it has been stated that climate change causes significant disruptions in the agriculture, energy and health sectors. These disruptions increase problems such as unemployment, income inequality and regional economic differences. Economic uncertainties are becoming more evident, especially for individuals living in low-income and developing regions, and seriously threaten the living standards and general well-being of these groups. The effects on psychological health include the effects of economic uncertainties and crises on the mental health of individuals. An increase in psychological problems such as anxiety, depression and burnout has been observed. In addition, natural disasters and environmental disruptions trigger mental health problems such as stress and trauma and test the psychological resilience of individuals. These cases highlight the importance of social support systems and psychological intervention strategies. Climate change is a process that deeply affects many sectors and the lives of individuals, from industry to tourism, from food management to human health. Therefore, it is of great importance to examine the effects of climate change on human well-being, considering the effects of climate change on various sectors and the importance of these sectors in human life. Climate change can cause various health problems by restricting access to natural resources and insufficient nutritional and medical resources necessary for health.

The effects of climate change on human health can be evaluated under two main headings: physical and mental. Situations such as forced migration, loss of family members, unemployment, lack of access to basic food items and increased severity of chronic diseases can negatively affect both the physical and mental health of individuals. These situations can cause a variety of psychological health problems, such as anxiety, stress, depression, anger dysregulation, and violence. The spread of such health problems may have negative effects on public health and public security, leading to widespread national and international security problems. Concrete and urgent measures must be taken at the international level to reduce these health and safety vulnerabilities. Countries should adopt a participatory approach by collaborating with international organizations and increase health infrastructure investments. It does not seem possible to be fully successful unless efforts to solve mental health problems are integrated into sustainable development strategies. Individuals have adapted to nature-induced changes in the past; Although some changes are more difficult than others, individuals have managed to make their lives sustainable by using scientific methods. Today, adaptation to climate change is possible thanks to the social capital accumulated over the years and the advanced technological infrastructure. This infrastructure can reduce the effects of climate change on human health and increase social welfare by synthesizing existing information. Thanks to this synthesis, climate change risks, possible consequences of these risks, and responses to these stresses can be addressed more efficiently and quickly.

As is clear from the above explanations, mental health, like physical health, can be affected by a changing climate and is often shaped by growing social and ecological factors. Although it is not the main subject of the article, it is important to bring up the problem of climate change and access to safe and natural food as a topic that can guide future articles and thesis studies. This situation can lead to cognitive development problems, especially for babies and children in their developmental age, as it becomes difficult to access the necessary nutrients. Additionally, an indirect impact of this problem can be seen on parents. When parents cannot provide their children with the necessary nutrients, they run the risk of resorting to acts of crime and violence in order to find a solution. Climate change is not only limited to psychological or physical health problems, it can also indirectly cause other problems in the background. As a result of cognitive development restrictions, increases in child poverty and anxiety and stress disorders in parents or other members of society may lead to increases in urban crime in the medium and long term. Therefore, this relationship should be examined in more detail by the academic community. Additional research on climate change and mental health is needed. The following can be stated as policy and intervention suggestions: The findings reveal the necessity of developing various policy recommendations and solution strategies to manage the climate crisis and its economic and psychological effects. Strengthening social support systems, increasing access to psychological health services, and implementing sustainable economic policies play a critical role in reducing these effects. Additionally, promoting social awareness and solidarity against climate change can increase individuals' capacity to cope with this crisis.

As a result, the relationship between the climate crisis and economic uncertainties significantly affects the psychological health of individuals. Understanding and managing these interactions is of great importance not only for individual but also for social well-being. The findings of the article can be a guide for policy makers, academics and practitioners in developing a holistic approach to problems in this field. Developing effective and holistic solutions to the broad impacts of climate change is essential for a sustainable future.

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