

PSYCHOLOGICAL IMPACT OF CHANGING ENVIRONMENT

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Abstract

Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar cycle. But since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas. Various causes are global warming, greenhouse effect, and pollution. Climate related disasters such as floods, hurricanes, and bush-fires are often associated with stress-related psychiatric disorders. Individuals who have been exposed to life threatening situations are at a considerable risk of developing posttraumatic stress disorder (PTSD). The symptoms of PTSD include flashbacks of the event, increased arousal and avoidance of cues to the memory of the event. In many cases, the symptoms of PTSD may have a delayed onset, months to years after the experiencing of threatening disaster situation. Development of PTSD is associated with impairment in the quality of life and significant subjective distress.

Individuals who have been through the experience of climate related natural disaster are not only at a higher risk of developing PTSD, but also at a greater risk of developing acute stress reaction and adjustment disorder. These disorders are anxiety spectrum disorders which can subside over a period of time with rehabilitations and/or treatment greenhouse gas, pollution, psychological.

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Introduction

Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar cycle. But since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas.

Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures.

Examples of greenhouse gas emissions that are causing climate change include carbon dioxide and methane. These come from using gasoline for driving a car or coal for heating a building, for example. Clearing land and forests can also release carbon dioxide. Landfills for garbage are a major source of methane emissions. Energy, industry, transport, buildings, agriculture and land use are among the main emitters.

Causes of Environmental Changes

1) Global Warming

Global warming occurs when carbon dioxide (CO₂) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth's surface. Normally this radiation would escape into space, but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. These heat-trapping pollutants—specifically carbon dioxide, methane, nitrous oxide, water vapor, and synthetic fluorinated gases—are known as greenhouse gases, and their impact is called the greenhouse effect.

Though natural cycles and fluctuations have caused the earth's climate to change several times over the last 800,000 years, our current era of global warming is directly attributable to human activity—specifically to our burning of fossil fuels such as coal, oil, gasoline, and natural gas, which results in the greenhouse effect. In the United States, the largest source of greenhouse gases is transportation (29 percent), followed closely by electricity production (28 percent) and industrial activity (22 percent).

Curbing dangerous climate change requires very deep cuts in emissions, as well as the use of alternatives to fossil fuels worldwide. The good news is that countries around the globe have formally committed—as part of the 2015 Paris Climate Agreement—to lower their emissions by setting new standards and crafting new policies to meet or even exceed those standards. The not-so-good news is that we're not working fast enough. To avoid the worst impacts of climate change, scientists tell us that we need to reduce global carbon emissions by as much as 40 percent by 2030. For that to happen, the global community must take immediate, concrete steps: to decarbonize electricity generation by equitably transitioning from fossil fuel-based production to renewable energy sources like wind and solar; to electrify our cars and trucks; and to maximize energy efficiency in our buildings, appliances, and industries.

Scientists agree that the earth's rising temperatures are fueling longer and hotter heat waves, more frequent droughts, heavier rainfall, and more powerful hurricanes.

In 2015, for example, scientists concluded that a lengthy drought in California—the state's worst water shortage in 1,200 years—had been intensified by 15 to 20 percent by global warming. They also said the odds of similar droughts happening in the future had roughly doubled over the past century. And in 2016, the National Academies of Science, Engineering, and Medicine announced that we can now confidently attribute some extreme weather events, like heat waves, droughts, and heavy precipitation, directly to climate change.

The earth's ocean temperatures are getting warmer, too—which means that tropical storms can pick up more energy. In other words, global warming has the ability to turn a category 3 storm into a more dangerous category 4 storm. In fact, scientists have found that the frequency of North Atlantic hurricanes has increased since the early 1980s, as has the number of storms that reach categories 4 and 5. The 2020 Atlantic hurricane season included a record-breaking 30 tropical storms, 6 major hurricanes, and 13 hurricanes altogether. With increased intensity come increased damage and death. The United States saw an unprecedented 22 weather and climate disasters that caused at least a billion dollars' worth of damage in 2020, but 2017 was the costliest on record

and among the deadliest as well: Taken together, that year's tropical storms (including Hurricanes Harvey, Irma, and Maria) caused nearly \$300 billion in damage and led to more than 3,300 fatalities.

The impacts of global warming are being felt everywhere. Extreme heat waves have caused tens of thousands of deaths around the world in recent years. And in an alarming sign of events to come, Antarctica has lost nearly four *trillion* metric tons of ice since the 1990s. The rate of loss could speed up if we keep burning fossil fuels at our current pace, some experts say, causing sea levels to rise several meters in the next 50 to 150 years and wreaking havoc on coastal communities worldwide.

2) Greenhouse Gases

The main driver of climate change is the greenhouse effect. Some gases in the Earth's atmosphere act a bit like the glass in a greenhouse, trapping the sun's heat and stopping it from leaking back into space and causing global warming.

Many of these greenhouse gases occur naturally, but human activities are increasing the concentrations of some of them in the atmosphere, in particular:

- carbon dioxide (CO₂)
- methane
- nitrous oxide
- fluorinated gases

CO₂ produced by human activities is the largest contributor to global warming. By 2020, its concentration in the atmosphere had risen to 48% above its pre-industrial level (before 1750).

Other greenhouse gases are emitted by human activities in smaller quantities. Methane is a more powerful greenhouse gas than CO₂, but has a shorter atmospheric lifetime. Nitrous oxide, like CO₂, is a long-lived greenhouse gas that accumulates in the atmosphere over decades to centuries. Non-greenhouse gas pollutants, including aerosols like soot, have different warming and cooling effects and are also associated with other issues such as poor air quality.

Natural causes, such as changes in solar radiation or volcanic activity are estimated to have contributed less than plus or minus 0.1°C to total warming between 1890 and 2010.

- Burning coal, oil and gas produces carbon dioxide and nitrous oxide.
- Cutting down forests (deforestation). Trees help to regulate the climate by absorbing CO₂ from the atmosphere. When they are cut down, that beneficial effect is lost and the carbon stored in the trees is released into the atmosphere, adding to the greenhouse effect.
- Increasing livestock farming. Cows and sheep produce large amounts of methane when they digest their food.
- Fertilisers containing nitrogen produce nitrous oxide emissions.
- Fluorinated gases are emitted from equipment and products that use these gases. Such emissions have a very strong warming effect, up to 23 000 times greater than CO₂.

Psychological Impact Of Climate Change

The **psychological impacts of climate change** on the Earth's inhabitants include emotional states such as eco-anxiety, ecological grief and eco-anger. While unpleasant, such emotions are often not harmful, and can be rational responses to the degradation of the natural world, motivating adaptive action.^[1] Other effects of climate change on mental health, such as post-traumatic stress disorder (PTSD), can be more dangerous. In the 21st century, academics, medical professionals and various other actors are seeking to understand these impacts, to assist in their relief, make more accurate predictions, and to assist efforts to mitigate and adapt to global warming.

There are three broad channels by which climate change affects people's mental state: directly, indirectly or via awareness. The direct channel includes stress related conditions being caused by exposure to extreme

weather events. The indirect pathway can be via disruption to economic and social activities, such as when an area of farmland is less able to produce food. And the third channel can be of mere awareness of the climate change threat, even by individuals who are not otherwise affected by it. There are many exceptions, but generally it is people in developing countries who are more exposed to the direct impact and economic disruption caused by climate changes. Whereas recently identified climate related psychological conditions like eco-anxiety, which can result just from awareness of the threat, tend to affect people across the planet.^[1]

The psychological effects of climate change are investigated within the field of climate psychology. Various non-clinical treatments, group work options, internet based support forums, and self-help books are available for people suffering from less severe psychological conditions. Some of the psychological impacts require no form of treatment at all, and can even be positive: for example, worry about climate change can be positively related to information-seeking and to a sense of being able to influence such problems.^[1] The psychological effects of climate also receive attention from governments and others involved in creating public policy, by various campaigning groups and NGOs, and by private sector firms.

Pathway

The USNS *Comfort* on its way to deliver relief after Hurricane Katrina. Rapid assistance and restoration of security for those affected by extreme weather reduces the risk of long term psychological impact.

There are three causal pathways by which climate change causes psychological effects: directly, indirectly or via awareness (or “psychosocial”). In some cases, people may be affected via more than one pathway at once.

There are three broad channels by which climate change affects people’s mental state: directly, indirectly or via awareness. The direct channel includes stress-related conditions being caused by exposure to extreme weather events, such as cyclones and wildfires, causing conditions such as PTS and anxiety disorder. However, psychological impacts can also occur through less intense forms of climate change such as through temperatures rising leading to increased anger and aggression. The indirect pathway occurs via disruption to economic and social activities, such as when an area of farmland becomes infertile due to desertification or a decrease in tourism due to damage to the landscape. This can lead to increased stress, depression and other psychological conditions such as anxiety. And the third channel can be of mere awareness of the climate change threat, even by individuals who are not otherwise affected by it. This can be, for instance, feeling intimidated by the threats to food and water security, posed by climate change which can lead to war. There are many exceptions, but generally, it is people in developing countries who are more exposed to economic disruption caused by climate change. Whereas recently identified climate-related psychological conditions like eco-anxiety, which can result just from awareness of the threat, tend to affect people across the planet.

Direct Impact

Exposure to extreme weather events, such as wildfires, hurricanes and floods, can cause various emotional disorders. Most commonly this is short term stress, from which people can often soon make a rapid recovery. But sometimes chronic conditions set in, especially among those who have been exposed to multiple events, such as post traumatic stress, somatoform disorder or long term anxiety. A swift response by authorities to restore a sense of order and security can substantially reduce the risk of any long term psychological impact for most people. Though individuals who already suffered from mental ill health, especially psychosis, can need intensive care, which can be challenging to deliver if local mental health services were disrupted by the extreme weather.

The less extreme direct manifestations of climate change can also have direct psychological effects. The single most well studied linkage between weather and human behavior is that between temperature and aggression, which has been investigated in lab settings, by historical study, and extensive field work. Various reviews conclude that high temperatures cause people to become bad tempered, leading to increased physical violence, especially in areas where there are mixed ethnic groups. There have been exceptions, such as in

modern cities where air conditioning is widely available. Also, there has been academic dispute regarding the degree to which the excess violence is caused by climate change, as opposed to natural temperature variability. The psychological effects of unusually low temperatures, which climate change can cause in some parts of the world, is much less well studied. Though available evidence suggests that unlike unusual heat, it does not lead to increased aggression.

Indirect Pathway

In several parts of the world, climate change significantly impacts people's financial income, for example by reducing agricultural output, or by making an area unattractive for tourism. This can cause significant stress, which in turn can lead to depression, suicidal ideation, and other negative psychological conditions. Consequences can be especially severe if financial stress is coupled with significant disruption to social life, such as relocation to camps. For example, in the aftermath of Hurricane Katrina, the suicide rate for the general population rose by about 300%, but for those who were displaced and had to move into trailer parks, it rose by over 1400%. Effective government interventions, similar to those used to relieve the stress from a financial crisis, can alleviate the negative conditions caused by such disruption, however this is sometimes not easy, especially in some of the less prosperous countries in the global south.

Indirect effects on mental health can occur via impacts on physical health. Physical health and mental health have a reciprocal relationship, so any climate change related effect that affects physical health can potentially indirectly affect mental health too.^[13] Environmental disruption, such as the loss of bio-diversity, or even the loss of inanimate environmental features like sea-ice, cultural landscapes, or historic heritage can also cause negative psychological responses, such as ecological grief or solastalgia.

Awareness

Simply knowing about the risks posed by climate change, even from those not otherwise affected by it, can cause long lasting psychological conditions, such as anxiety and other forms of distress. This can especially affect children, and has been compared to nuclear anxiety which occurred during the Cold War. Conditions such as eco-anxiety are very rarely severe enough to require clinical treatment. While unpleasant and thus classified as negative, such conditions have been described as valid rational responses to the reality of climate change.

Psychological consequence due to climate related disasters

Climate related disasters such as floods, hurricanes, and bush-fires are often associated with stress-related psychiatric disorders. Individuals who have been exposed to life threatening situations are at a considerable risk of developing posttraumatic stress disorder (PTSD). The symptoms of PTSD include flashbacks of the event, increased arousal and avoidance of cues to the memory of the event. In many cases, the symptoms of PTSD may have a delayed onset, months to years after the experiencing of threatening disaster situation. Development of PTSD is associated with impairment in the quality of life and significant subjective distress.

Individuals who have been through the experience of climate related natural disaster are not only at a higher risk of developing PTSD, but also at a greater risk of developing acute stress reaction and adjustment disorder. These disorders are anxiety spectrum disorders which can subside over a period of time with rehabilitations and/or treatment. Other stress exacerbated disorder includes development of acute and transient psychosis and relapse of bipolar disorder. Faced with the loss of home, environment, social structures and loved ones, an individual may develop a bereavement (grief reaction) or depression. The depression is likely to be more pronounced in those who live in small rural communities, than those living in big cities. As the impact of climate change seems to be increasing over the time period, it is likely that a greater proportion of the population would be impacted by the mental health consequences of climate change related disasters.[

Global climate change is likely to exacerbate droughts in the years to come. Changes in precipitation patterns are likely to lead to increased floods in some areas while prolonged droughts are expected in other areas. A relationship has been found between the occurrence of drought and farmer suicides. Such a trend has

not only been found in developed country like Australia, but also in developing the country like India. Association has been found between crop failures due to unexpected droughts and suicide attempts in the farmers. Failure of crop can lead to economic hardships. When dependent on low precipitation situations, the farmer might not be able to sustain the expenses of the family and may become a victim of the debt trap to meet the expenses. Second, it may also lead to rise in expenses of food and other goods in the region. Inability to make basic purchases can lead to malnutrition and risk of other infections, especially in developing countries where structural social services are not efficiently organized. Third, droughts are also often associated with prolonged exposure to warm, dry season. As above, it seems likely that exposure to heat can lead to increased rates of suicide attempts. Fourth, prolonged droughts can lead an individual to migrate to another region and/or pursue another vocation. This leads to acculturation stress which may further lead to suicide attempts in the farmer population. Since much of the world population depends on the farmers for their food supply, health care of the farmers is an important issue and efforts are required to provide help to them when needed. Moreover, since the majority of the farmers live in rural areas while healthcare facilities are concentrated in urban areas, efforts are required for easy access to services to this population.

Conclusion

Since climate change is likely to impact human mental health in many ways, it is imperative that some steps are taken to either reduce the global warming with time or develop measures to deal with the challenges posed through adaptation. Mitigation of greenhouse gases involves less reliance on fossil fuels, developing and using alternate efficient power sources, reducing encroachment on green cover and other similar measures. There is a developing global perspective about the need to reduce the carbon footprint per person over the next few decades, and to cover the inequities between the rich and the poor countries. Countering the challenge of climate change requires inter-sectoral and international collaboration to implement policies for reducing the emission of greenhouse gases.

Developing countries like India have also developed and articulated their policies toward challenging the impact of climate change. The National Action Plan on Climate Change (NAPCC) documents the Indian government's plan to deal with the issue of climate change. The eight missions focused on by NAPCC involves National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, Green India Mission, National Mission for Sustainable Agriculture, and National Mission on Strategic Knowledge for Climate Change. Each of the missions aims at mitigating the process or reducing the impact of climate change. The effect of implementation of these policies needs to be seen.

Meanwhile, provision of adequate treatment facilities for managing mental health problems should be undertaken. This is especially required for natural disaster-related problems, when the vulnerability to stress is acute. It is likely that the existing infrastructure of treatment might be compromised during the disaster situation. Such a time requires the inputs and help from professionals from other regions.

Promoting positive mental health is another way to mitigate the psychological distress due to climate change. Human resilience and coping can reduce the effect of mental health stress due to climate change. Utilization of strategies like yoga can be indigenous and acceptable ways to deal with stress.

Another method to reduce suicide fatalities due to secondary consequences of climate change may include debt-abolition or economic support for farmers. Creating co-operatives and protection of farmers from loan sharks might reduce the suicide rates due to crop-failures. Furthermore, provision of subsidies and guaranteed income during the drought seasons might lead to less economic and psychological stress on farmers in question.

What can and needs to be done in response to climate change can have many viewpoints. It might be probably useful to amalgamate the best from different solutions to provide a coherent, implementable and effective response to the concerns raised by climate change. And the solutions would be best refined with the systematic evidence accumulated over the course of time.

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