

An Interconnected Relation Between Environment and Human Health

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Abstract: The connection between environmental factors and human health is intricate and complicated. The environment has a significant impact on both physical and emotional wellbeing, determining human health outcomes. Health risks and illness prevalence are directly impacted by environmental elements such as air and water quality, accessibility to green areas, exposure to contaminants, and climatic conditions. On the other hand, both individual and human activities (including economic activities) can contribute to environmental deterioration and have a negative impact on health. Furthermore, human actions might worsen the environment, which has an impact on health outcomes. Ecosystem disturbance, soil erosion, water contamination, and loss of biodiversity can result from deforestation, land degradation, pollution, and unsustainable agricultural practices. Significant dangers to human health can result from these environmental changes, which can also have an impact on water supply, food production, and the spread of vector-borne diseases. For the sake of preserving human health, it is crucial to make efforts to maintain and enhance environmental quality, such as lowering pollution, conserving natural resources, supporting sustainable agriculture, and implementing clean energy sources. Promoting health in varied contexts also requires improving access to sanitary facilities, healthcare services, and clean drinking water. Creating successful solutions to promote and safeguard both human and planetary well-being requires an understanding of the interconnectedness between health and the environment.

Keywords: Environment, Health, Climate Change, Environmental Degradation.

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I. INTRODUCTION

The intricate relationship between the environment and human health is a topic of growing importance in today's world. The environment, encompassing the natural surroundings and the built environment, has a profound impact on the well-being of individuals and communities. It directly influences physical, mental, and social aspects of health. Understanding and addressing the interactions between the environment and health is crucial for promoting sustainable development and ensuring the well-being of present and future generations.

Numerous environmental factors significantly affect human health outcomes. Air pollution, for example, poses substantial risks, contributing to respiratory and cardiovascular diseases (Anenberg et al., 2018). Climate change amplifies the frequency and intensity of extreme weather events, leading to injuries, displacement and mental health issues (Clayton et al., 2017). Additionally, environmental degradation, such as deforestation and water pollution, jeopardizes access to clean water, food security, and nutrition, further compromising

human health. On the other hand, a healthy environment with clean air, clean water, and intact ecosystems provides the foundation for better health outcomes, reducing the burden of diseases and promoting overall well-being (Foley et al., 2011; WHO, 2016).

The linkages between the environment and health are complex and multi-dimensional. They involve various disciplines, including environmental science, public health, epidemiology, and social sciences. Collaborative efforts are required to understand the impacts of environmental factors on health, develop effective interventions, and promote sustainable practices that protect both human health and the environment.

II. IMPORTANCE OF HEALTH

The WHO constitution states: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Health plays a crucial role in the economic well-being of individuals, communities, and

nations. Here are some key points highlighting the importance of health in an economic sense.

➤ *Economic Productivity:*

Good health is essential for productive workforce participation and economic productivity. Healthier individuals are more likely to be actively engaged in the labor force, leading to increased productivity and economic growth (Bloom et al., 2011). A study by Black et al. (2018) estimated that the global economic burden of lost productivity due to illness and premature death reached trillions of dollars annually.

➤ *Healthcare Expenditure:*

Health expenditures are a significant component of national budgets. Investments in healthcare systems, preventive measures, and disease management contribute to economic growth and stability (Smith et al., 2018). A study by Dieleman et al. (2019) found that global health spending increased substantially between 1995 and 2016, reflecting the importance of healthcare investment in supporting economic development.

➤ *Poverty Reduction:*

Improved health outcomes play a vital role in reducing poverty. Illness and disability can lead to increased healthcare costs, reduced productivity, and limited income-earning opportunities, exacerbating poverty. The World Bank has emphasized the importance of investing in health as a key strategy for poverty reduction and achieving sustainable development goals (World Bank, 2020).

➤ *Human Capital Development:*

Health is a critical component of human capital, which refers to the knowledge, skills, and health of individuals. Healthy individuals are more likely to obtain education, acquire skills, and contribute to economic development (Jamison et al., 2018). The Global Burden of Disease study estimated that disability-adjusted life years (DALYs) lost due to health problems can have significant implications for human capital development and economic growth.

These above-mentioned bulletins highlight the economic implications of health and the interplay between health and economic development. Further research and studies in health economics can provide more detailed insights into the economic benefits of promoting and improving health.

III. RELATION BETWEEN HEALTH AND ENVIRONMENT

Environment refers to the surroundings or conditions in which a person, animal, or plant lives or operates. The term "environment" refers to the external surroundings, conditions, and factors that exist outside of an individual or organism and can potentially influence their well-being and functioning. It encompasses both the natural world (such as ecosystems, climate, and resources) and the built environment (including human-made structures, infrastructure, and social systems).

➤ *The Relationship Between Health and the environment is Complex and Multifaceted. The Environment, Including Natural, Built, and Social Surroundings, can have Both Positive and Negative Impacts on Human Health.*

• *Air Pollution and Respiratory Health:*

Exposure to air pollution, such as particulate matter (PM_{2.5}), ozone (O₃), and nitrogen dioxide (NO₂), has been linked to respiratory diseases, cardiovascular problems, and increased mortality rates (Cohen et al., 2017).

The Global Burden of Disease study estimated that outdoor and household air pollution contributed to over 6 million premature deaths globally in 2017 (Cohen et al., 2017). Dockery et al. (1993) conducted a study in the United States and found that reducing air pollution led to improved respiratory health outcomes and decreased mortality rates.

• *Water Quality and Infectious Diseases:*

Contaminated water sources can lead to waterborne diseases, such as diarrheal diseases, cholera, and hepatitis. The World Health Organization (WHO) estimated that inadequate water and sanitation cause around 842,000 deaths annually (WHO, 2014). Prüss-Ustün et al. (2014) conducted a systematic review and estimated that unsafe water, sanitation, and hygiene contribute to approximately 4% of the global burden of disease, measured in disability-adjusted life years (DALYs).

• *Climate Change and Health:*

Climate change affects various aspects of health, including increased heat-related illnesses, exacerbation of respiratory and cardiovascular conditions, spread of vector-borne diseases, and food insecurity (Watts et al., 2018; Haines et al., 2021).

The Lancet Countdown on Health and Climate Change, a collaboration of international researchers, has extensively documented the impacts of climate change on health (Watts et al., 2021). Their reports provide comprehensive insights into the health risks associated with climate change.

➤ *How Environment positively affects Health?*

• *Green Spaces and Mental Health:*

Access to green spaces, such as parks, gardens, and natural environments, has been associated with improved mental health outcomes. Spending time in nature has been linked to reduced stress, improved mood, increased psychological well-being, and enhanced cognitive function (Gascon et al., 2015).

A study by Mitchell and Popham (2008) in the United Kingdom found that individuals living in greener areas had lower levels of mental distress and improved mental well-being.

- *Physical Activity and Active Living Environments:*

Environments that are designed to support physical activity, such as walkable neighborhoods, bike lanes, and accessible recreational facilities, can promote regular exercise and active lifestyles. Sallis et al. (2012) conducted a systematic review and found that neighborhood environments with features like sidewalks, parks, and trails were associated with increased physical activity levels among residents.

- *Biophilic Design and Healing Environments:*

Incorporating elements of nature in healthcare settings, known as biophilic design, has shown positive effects on patient outcomes and well-being. Studies have found that exposure to natural light, green views, and indoor plants in hospitals can reduce stress, improve patient satisfaction, and enhance recovery rates (Ulrich et al., 2008). Ulrich (1999) conducted a landmark study that demonstrated the positive impact of views of nature on surgical patients' recovery. Patients with views of trees had shorter hospital stays, required less pain medication, and had fewer postoperative complications.

- *Access to Clean Water and Sanitation:*

Adequate access to clean water and improved sanitation facilities is essential for promoting good health and preventing waterborne diseases. The provision of safe drinking water and sanitation contributes significantly to reducing morbidity and mortality rates, particularly in low- and middle-income countries (WHO/UNICEF, 2019).

The World Health Organization (WHO) and UNICEF have extensively documented the importance of water and sanitation for health and development (WHO/UNICEF Joint Monitoring Programme, 2019).

➤ *What are the causes of Environmental Degradation?*

Environmental degradation refers to the deterioration or destruction of the natural environment, including ecosystems, habitats, and natural resources, due to human activities. It occurs when the environment's capacity to support life and ecological functions is significantly compromised. Environmental degradation can take various forms, such as:

- *Deforestation and Land Conversion:*

Deforestation for agriculture, logging, and urban expansion leads to habitat loss, soil erosion, and loss of biodiversity (Foley et al., 2005). Lambin et al. (2003) conducted a global analysis and found that agricultural expansion was the primary driver of deforestation.

- *Pollution and Contamination:*

Industrial activities, improper waste management, and agricultural practices contribute to pollution of air, water, and soil (Watts et al., 2018). The Lancet Commission on Pollution and Health highlighted industrial pollution, chemical releases, and contaminated water sources as major sources of environmental degradation.

- *Climate Change and Greenhouse Gas Emissions:*

The burning of fossil fuels for energy generation and transportation releases greenhouse gases, leading to climate change and global warming (IPCC, 2014). The Intergovernmental Panel on Climate Change (IPCC) provides comprehensive assessments of the scientific basis and impacts of climate change (IPCC, 2014).

- *Overexploitation of Natural Resources:*

Unsustainable extraction of resources such as minerals, water, and fisheries without proper management leads to depletion and irreversible damage to ecosystems (Leach et al., 2012). The Millennium Ecosystem Assessment highlighted overexploitation as a major driver of environmental degradation and loss of ecosystem services (MEA, 2005).

- *Population Growth and Urbanization:*

Rapid population growth and urbanization increase the demand for resources, energy, and infrastructure, putting pressure on natural systems (Seto et al., 2012). The United Nations' World Urbanization Prospects report provides insights into global urbanization trends and its impact on the environment (UN DESA, 2018).

➤ *How Environmental Degradation affects Health?*

Environmental degradation can have significant negative impacts on human health.

- *Air Pollution and Respiratory Health:*

Exposure to air pollution, including particulate matter (PM_{2.5}), ozone (O₃), and nitrogen dioxide (NO₂), is linked to various respiratory diseases, including asthma, chronic obstructive pulmonary disease (COPD), and lung cancer (Cohen et al., 2017).

The Global Burden of Disease study estimated that outdoor and household air pollution contributed to over 6 million premature deaths globally in 2017 (Cohen et al., 2017).

- *Water Contamination and Waterborne Diseases:*

Contaminated water sources can lead to waterborne diseases such as diarrhea, cholera, and hepatitis. Lack of access to clean water and sanitation contributes to significant morbidity and mortality globally (Prüss-Ustün et al., 2014; WHO, 2019).

The World Health Organization (WHO) estimated that inadequate water and sanitation cause approximately 842,000 deaths annually (WHO, 2014).

- *Chemical Exposure and Health Risks:*

Exposure to hazardous chemicals in the environment, such as heavy metals, pesticides, and industrial pollutants, can lead to various adverse health effects, including developmental disorders, cancer, and endocrine disruption (Grandjean & Landrigan, 2014; Gore et al., 2015).

A study by Grandjean & Landrigan, (2014) identified environmental chemicals as a significant contributor to the global burden of disease, estimating that they were responsible for 1.2 million deaths in 2017.

- *Climate Change and Health Impacts:*

Climate change exacerbates existing health problems and creates new health risks, including heat-related illnesses, increased incidence of vector-borne diseases, malnutrition, and mental health impacts (Watts et al., 2018; Haines et al., 2021).

The Lancet Countdown on Health and Climate Change has extensively documented the health risks associated with climate change and environmental degradation (Watts et al., 2021).

These references provide a starting point for understanding the impacts of environmental degradation on human health. Further research and scientific studies in environmental health can offer more specific insights into the relationship between environmental degradation and health outcomes.

Table 1: Top Greenhouse Gases (GHG) Emitting Countries of 2018.

Country	2018 Emission (million tonnes of GHG)	As percent of Global	Per Capita (tonnes of GHG)
China	13,739.79	27.8%	9.71
USA	6,297.62	12.7%	19.27
India	3,619.80	7.3%	2.67
Russia	2,313.74	4.7%	16.07
Japan	1,270.21	2.6%	9.99
Brazil	1,259.51	2.5%	5.97

Source: UNEP

China is a major emitter of greenhouse gases. It contributes 27.79 percent of global emissions. It released 13,739.79 million tonnes in 2018. Since 1990, its GHG emissions have increased by 250%, making it one of the highest. The United States of America is a major emitter of greenhouse gases. It represents 12.74% of worldwide outflows. It released 6,297.62 million tonnes in 2018. It ranks among the nations with the highest GHG emissions per capita, at 19.27 tonnes.

India is a major emitter of greenhouse gases. It represents 7.32% of worldwide emanations. It released 3,619.80 million tonnes in 2018. Fed of Russia is a major source of greenhouse gases. It represents 4.68% of worldwide emanations. In 2018, it produced 2,313.74 million tons. It ranks among the nations with the highest GHG emissions per capita, at 16.07 tonnes. Japan is a major emitter of greenhouse gases. It contributes 2.57 percent of global emissions. It produced 1,270.21 million tonnes of CO₂ in 2018. Brazil is one of the top GHG producers. It contributes 2.55 percent to global emissions. It released 1,259.51 million tonnes in 2018.

IV. CLIMATE CHANGE AND PUBLIC HEALTH

Climate change refers to long-term shifts in temperature patterns, precipitation levels, wind patterns, and other aspects of the Earth's climate system. It is primarily driven by human activities, particularly the emission of greenhouse gases (such as carbon dioxide and methane) into the atmosphere from burning fossil fuels, deforestation, and industrial processes.

- ❖ *Climate Change has Significant Implications for Public Health.*

- *Extreme Weather Events:*

Climate change increases the frequency and intensity of extreme weather events, such as heatwaves, hurricanes, floods, and droughts. These events can directly impact public health by causing injuries, displacement, and loss of life.

- *Heat-related Illnesses and Mortality:*

Rising temperatures and heatwaves increase the risk of heat-related illnesses, such as heatstroke, dehydration, and cardiovascular conditions, which can lead to increased hospitalizations and mortality (Hajat et al., 2014; Gasparrini et al., 2015). A study by Watts et al. (2018) estimated that heat exposure contributed to over 150,000 excess deaths per year globally between 2000 and 2017.

- *Infectious Diseases and Vector-borne Diseases:*

Climate change can alter the geographic distribution, seasonality, and intensity of infectious diseases, including vector-borne diseases like malaria, dengue fever, and Lyme disease (Patz et al., 2005; Semenza et al., 2012). The Intergovernmental Panel on Climate Change (IPCC) reports provide assessments on the impacts of climate change on human health, including infectious diseases (IPCC, 2014).

- *Air Pollution and Respiratory Health:*

Climate change influences air quality, exacerbating air pollution and increasing the risk of respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD), and allergies (Anenberg et al., 2018; Watts et al., 2018). The Lancet Countdown on Health and Climate Change has extensively

documented the health impacts of air pollution and climate change (Watts et al., 2021).

➤ *Food Security and Nutrition:*

Climate change affects agricultural productivity, crop yields, and food availability, leading to potential food shortages, malnutrition, and increased risks of undernutrition and foodborne illnesses (Wheeler & von Braun, 2013; Myers et al., 2017).

The Global Report on Food Crises provides insights into the impacts of climate change and other factors on global food security (FAO et al., 2020).

➤ *Mental Health and Well-being:*

Climate change-related events such as natural disasters, extreme weather events, and displacement can have adverse effects on mental health, causing stress, anxiety, post-traumatic stress disorder (PTSD), and depression (Berry et al., 2018; Clayton et al., 2017). The Lancet Countdown on Health and Climate Change has highlighted the mental health impacts of climate change (Watts et al., 2021).

Between 2030 and 2050, climate change is expected to cause approximately 250 000 additional deaths per year, from malnutrition, malaria, diarrhoea and heat stress. The direct damage costs to health (i.e. excluding costs in health-determining sectors such as agriculture and water and sanitation), is estimated to be between USD 2-4 billion/year by 2030. Areas with weak health infrastructure – mostly in developing countries – will be the least able to cope without assistance to prepare and respond. Reducing emissions of greenhouse gases through better transport, food and energy-use choices can result in improved health, particularly through reduced air pollution.

The Intergovernmental Board on Environmental Change (IPCC) has inferred that to turn away devastating wellbeing influences and forestall a large number of environmental change-related passings, the world should restrict temperature climb to 1.5°C. Climate change and a certain degree of global temperature rise have already been caused by previous emissions. However, even a 1.5°C global warming is not considered safe; People's lives and health will suffer greatly with each additional tenth of a degree of global warming.

Despite the fact that no one is immune to these dangers, the people whose health is being harmed the most by the climate crisis are those who have contributed least to its causes and are least able to protect themselves and their families from it—people living in countries and communities with low incomes and disadvantages.

The current health disparities between and within populations are only going to get worse as a result of the climate crisis, which has the potential to further widen and undo the fifty years of progress in poverty reduction, global health, and

development. It seriously endangers the acknowledgment of widespread wellbeing inclusion (UHC) in different ways - including by intensifying the current weight of sickness and by fueling existing obstructions to getting to wellbeing administrations, frequently at the times when they are generally required. Health care costs more than 930 million people, or about 12 percent of the world's population, at least 10 percent of their household budget. Health shocks and stresses currently push approximately 100 million people into poverty annually, with the effects of climate change accelerating this trend. The poorest people are largely uninsured.

V. FOOD SECURITY AS A BYPRODUCT OF ENVIRONMENT

Food security is a fundamental component of human well-being, ensuring that people have the resources and means to meet their dietary needs and lead healthy and productive lives. Food security is closely linked to the state of the environment and natural resources. Food security refers to the availability, accessibility, and affordability of sufficient, safe, and nutritious food for all individuals.

Food security and environmental degradation are closely interrelated. Unsustainable agricultural practices, deforestation and pollution contribute to environmental degradation which in turn threatens food production, availability and access, compromising long term food security for population around the world.

❖ *Few ways How Food Security is Hampered as a Result Misconduct of the Environment:*

➤ *Climate Change and Agricultural Productivity:*

Climate change affects temperature patterns, rainfall, and extreme weather events, which can have significant impacts on crop yields, agricultural productivity, and food production (Lobell et al., 2011; Rosenzweig et al., 2014).

The Intergovernmental Panel on Climate Change (IPCC) reports provide comprehensive assessments on the impacts of climate change on agriculture and food security (IPCC, 2014).

➤ *Soil Degradation and Land Productivity:*

Soil erosion, degradation, and depletion of nutrients reduce land productivity and agricultural yields, leading to decreased food production capacity (Lal, 2015). The Food and Agriculture Organization of the United Nations (FAO) publishes reports on the status of global soil resources and their impacts on food security (FAO, 2015).

➤ *Water Scarcity and Irrigation:*

Growing water scarcity and competition for water resources affect agricultural irrigation, which is crucial for crop production. Insufficient water availability can limit agricultural productivity and threaten food security (FAO, 2020). The World Water Development Report by the United Nations

provides insights into global water resources and their implications for various sectors, including agriculture (UNESCO, 2021).

➤ *Biodiversity and Genetic Resources:*

Loss of biodiversity, including plant and animal genetic resources, can have negative implications for food security by reducing agricultural resilience, crop diversity, and the availability of genetic traits for crop improvement (FAO, 2019).

The FAO's State of the World's Biodiversity for Food and Agriculture report highlights the role of biodiversity in food security and sustainable agriculture (FAO, 2019).

➤ *Land Use Change and Deforestation:*

Conversion of agricultural land for other purposes, such as urbanization and deforestation, reduces available land for food production, affecting food security and contributing to environmental degradation (Foley et al., 2011).

Global Forest Resources Assessments by the FAO provide information on global forest cover and deforestation trends (FAO, 2020).

These references provide a starting point for understanding the relationship between the environment and food security. Further research and scientific studies in the field of environmental science and agriculture can offer more specific insights into the impacts and potential solutions for ensuring food security in the face of environmental challenges.

VI. ENVIRONMENTAL PROTECTION:

In order to improve human health, environmental conservation is essential. Individuals and communities can get a variety of health advantages by protecting and enhancing the quality of natural resources and lowering exposure to environmental dangers.

➤ *Clean Air:*

Respiratory health may be greatly enhanced by putting into action measures to minimize air pollution, such as limiting industrial emissions and supporting cleaner energy sources. The World Health Organization (WHO) estimates that air pollution is responsible for 7 million annual fatalities and has a major influence on respiratory conditions such as asthma, chronic obstructive pulmonary disease (COPD), and lung cancer.

➤ *Safe Drinking Water:*

Protecting water sources from contamination and ensuring access to clean and safe drinking water is crucial for preventing waterborne diseases. According to UNICEF and WHO, around 2.2 billion people worldwide lack access to safely managed drinking water services, resulting in various health issues, including diarrheal diseases, which cause approximately 485,000 deaths annually (UNICEF & WHO, 2021).

➤ *Reduced Exposure to Toxins:*

Environmental protection measures, such as controlling the use and disposal of hazardous chemicals, can minimize exposure to toxic substances. This can have positive impacts on neurological development, reproductive health, and the prevention of chronic diseases. For instance, reducing exposure to lead, a harmful neurotoxin, has been linked to improved cognitive development in children (Lanphear et al., 2018).

➤ *Preserving Biodiversity:*

Protecting natural habitats and biodiversity supports the stability of the ecosystem and may improve human health. As the COVID-19 pandemic demonstrated, the loss of biodiversity raises the danger of zoonotic infections (diseases spread from animals to humans). Future disease outbreaks are less likely if we preserve biodiversity.

VII. CONCLUSION

In conclusion, the relationship between the environment and human health is undeniable. Environmental factors significantly influence the well-being of individuals and communities, either positively or negatively. It is crucial to recognize the interconnectedness of these two domains and prioritize their integration in policies and practices.

Efforts to address environmental challenges and promote sustainable practices can yield substantial benefits for public health. This includes reducing air and water pollution, mitigating climate change, protecting biodiversity, and ensuring access to clean resources. Moreover, recognizing the importance of environmental justice and equity is essential, as marginalized communities often bear a disproportionate burden of environmental health risks.

By adopting a holistic and interdisciplinary approach, policymakers, researchers, healthcare professionals, and communities can work together to safeguard human health while preserving and restoring the environment. Investing in sustainable development, environmental conservation, and public health initiatives can lead to a healthier, more resilient future for all.

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