International Journal of Innovations & Research Analysis (IJIRA)
ISSN : 2583-0295, Impact Factor: 5.449, Volume 02, No. 03(II), July- September, 2022, pp 174-179

IMPACT OF CLIMATE CHANGE ON HUMAN HEALTH

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ABSTRACT

Climate is the average weather in a place over a long period. A shift in those average conditions is known as climate change. Climate is a crucial part of the natural environment in which human beings live, any climate change will affect the natural ecosystem, human health and social economy. The impact of global climate change on human beings will be multi-layered, multi-scale and comprehensive. The rapid climate change we are now seeing is caused by various factors which are caused naturally or are due to anthropogenic activities like using gas, oil, and coal for factories, transportation and at home. Burning of fossil fuels releases greenhouse gases - mostly carbon dioxide (CO2). Greenhouse gases trap heat from the Sun and cause the planet's temperature to rise. The world is now about 1.1`C warmer than it was in the 19th Century - and the amount of CO2 in the atmosphere has risen by 50%. Climatological research shows that Earth's climate will change due to the accumulation of greenhouse gases in the atmosphere. The rise in temperature at an unusual rate of (0·5ºC) since the mid1970s is substantially attributable to this anthropogenic increase in greenhouse gases. In view of greenhouse gas longevity and the climate system's inertia, climate change will continue for at least several decades even if we take radical international pre-emptive actions very soon. This paper throws the limelight on how climate change has different impacts on human health. It mainly explores the progress that researchers have made on the direct and indirect impacts of climate change. It considers that the impacts of climate change on human health mainly include the following aspects: extreme weather events; heat wave effects, insect-borne infectious diseases, hunger and malnutrition. The impact of climate change on health must be assessed against a constantly changing background, population health status, influenced by a diversity of factors, varies over time. Infectious diseases rise and fall in response to the rhythms and disjunctions of nature and response to local demographics, cultural and technological changes. Food supplies are affected by natural disasters, the abundance of pests and predators, civil war and patterns of commerce. Chronic non-infectious diseases like Heart disease, diabetes and cancer, reflect much about the material of development and their associated lifestyles. Each of these elements of population health must be considered when assessing the human impacts of climate change. Climate change will have many effects on health over the coming decades some direct impacts of Climate change will affect the potential incidence, seasonal transmission, and geographic range of various vector-borne diseases. These diseases would include yellow fever, malaria, various types of viral encephalitis, dengue fever, schistosomiasis (water-snails), Lyme disease (ticks), leishmaniasis (sand-flies: South America and Mediterranean coast), and onchocerciasis (West African river blindness, spread by black flies). In the end, the paper presents a few suggestions for ways to tackle the prevention of various diseases caused due to climate change.

Keywords: *Climate, Health, Global Warming, Diseases, Environment.*

Introduction

Climate change is a long-term shift in global or regional climate patterns. Climate change refers specifically to the rise in global temperatures from the mid-20th century to the present. Climate and weather have always influenced human health. Climate variability and climate change particularly changes in weather extremes, affect our environment which delivers us with clean food, air, water, shelter, and security. Along with natural and human-made health stressors, Climate change

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threatens the health and well-being of humans in numerous ways. Rapid increase this century in world energy production (through the combustion of fossil fuels and biomass) and in world food production (through animal husbandry, irrigated agriculture and forest clearance) have caused heat-trapping "greenhouse gases" (GHGs) to accumulate in the troposphere. This will change the world's climate at a greater rate than has ever been experienced by human societies. Some climatologists also believe that the unusual weather patterns of the past two decades may signal the beginning of the longer-term process of change in average temperature, precipitation and patterns of extreme weather events. such "climate change" could have a wide range of impacts on human health, most of which would probably be adverse. This may result in the intensification of Some existing health threats and the emergence of new health threats. Not everyone is equally at risk. Important considerations include age, economic resources, and location. Climate change includes both shifts in precipitation as well as increases and decreases in temperature, changing risks of certain types of severe weather events, and changes to other features of the climate system public health can be affected by disruptions of physical, biological, and ecological systems, including disturbances originating here and elsewhere. The effects of these disruptions on human health are injuries and premature deaths related to extreme weather events, increased respiratory and cardiovascular disease, changes in the prevalence and geographical distribution of food- and water-borne illnesses, threats to mental health and other infectious diseases.

These climate changes have to be controlled by a few preventive measures which can minimise human effects on the environment.

Method

The entire paper is formulated and typed narratively. This is an empirical method of the study conducted with a qualitative approach. Mainly secondary sources have been used for data collection based on the analysis of various documents. Governmental records, books and non-governmental organizations, journal articles, and media reports are a few main sources of data. Other than this some in-depth observation is also another source of primary data.

Discussion

The most harmful result of climate change is Ozone layer depletion "Ozone layer depletion is the gradual thinning of the earth's ozone layer in the upper atmosphere caused due to the release of chemical compounds containing gaseous bromine or chlorine from industries or other human activities."

Due to high exposure to ultraviolet light chlorine and bromine are released by some compounds, contributing to ozone layer depletion. Such compounds are known as Ozone Depleting Substances (ODS).

Ozone layer depletion is a serious concern and is related to several factors. The main causes responsible for the depletion of the ozone layer are chlorofluorocarbons, Unregulated Rocket Launches, Nitrogenous Compounds, and Natural Causes. Humans will be directly exposed to the harmful ultraviolet radiation of the sun due to the depletion of the ozone layer.

This direct exposure can result in serious health issues among humans, such as cancer, skin diseases, sunburns, quick ageing, cataract, and a weak immune system.

Effect of Climate Change on Human Health

The influences of climate and weather on human health are important and varied. (figure1.1 shows few impacts of climate change)

- It ranges from the clear threats of temperature extremes and severe storms to connections that may seem less obvious. For example, weather and climate affect the survival, distribution, and behaviour of mosquitoes, ticks, and rodents that carry diseases like West Nile virus or Lyme disease.
- Climate and weather can also affect water and food quality in particular areas, with implications for human health. In addition.
- The effects of global climate change on mental health and well-being are integral parts of the overall climate-related human health impact.
- Specific exposure pathways and how they can lead to human disease are considered a useful approach to understanding how health is affected by climate change. The exposure pathways concept is adapted from its use in chemical risk assessment, and in this context, it describes the main ways through which climate change affects health. Exposure pathways differ in different

locations and over time, and exposures related to climate change can affect different people and their communities to varying degrees. While often assessed individually, exposure to multiple climate change threats can occur at the same time, which results in cascading or compounding impacts on health. Threats to Climate change may also accumulate with time, which will lead to longer-term changes in resilience and health. Whether or not a person is exposed to a health threat or suffers illness or other adverse health outcomes from that exposure depends on a complex set of vulnerability factors.

We define the three elements of vulnerability as follows:

- Exposure is contact between a person and one or more biological, psychosocial, chemical, or physical stressors, including stressors affected by climate change. Contact may occur repeatedly over time or in a single instance, and may occur in one location or over a wider geographic area.
- Sensitivity is the degree to which people or communities are affected, either adversely or beneficially, by climate variability or change.
- Adaptive capacity is the ability of communities, institutions, or people to adjust to potential hazards, take advantage of opportunities, or respond to consequences.

Few more impacts of climate change are:

- Thermal stress Populations typically display an optimum temperature at which the (daily or weekly) death rate is lowest. Mortality rates rise at temperatures outside this comfort zone. The temperature-mortality relation varies greatly by latitude and climatic zone. People in hotter cities are more affected by colder temperatures, and people in colder cities are more affected by warmer temperatures. Regions, where housing provides poor protection against cold, have higher excess winter mortality than expected for that location. Most epidemiological studies of extreme temperatures have been done in North America and Europe. These studies have shown a positive association between heatwaves and mortality, with elderly people (who have diminished physiological capacity for thermoregulation) especially women, being the most affected. Other research indicates that mentally ill people, children, and others in thermally stressful occupations or with pre-existing illnesses are also vulnerable.
- Floods: Floods are low-probability, high-impact events that overwhelm physical infrastructure, human resilience, and social organisation. Floods have recently tended to intensify, and this trend could increase with climate change. The ENSO cycle determines inter-annual variability in temperature and rainfall, and the likelihood of flooding, storms, and droughts in many regions. Some health consequences arise during or soon after the flooding (such as injuries, communicable diseases or exposure to toxic pollutants), whereas others (malnutrition and mental health disorders) occur later. Excessive rainfall facilitates the entry of animal wastes and human sewage into waterways and drinking water supplies, potentiating water-borne diseases.
- Infectious Diseases: Transmission of infectious disease is determined by many factors, including extrinsic social, economic, climatic, and ecological conditions, and intrinsic human immunity. Many of the associations between infectious diseases and El Niño events have a plausible climatic explanation. High temperatures, in particular, affect vectors and pathogens. The effect of rainfall is more complex. For example, in subtropical and tropical regions poverty, crowding, heavy rainfall and flooding may trigger outbreaks of diarrhoea, whereas very high rainfall can reduce mosquito populations by flushing larvae from their habitat in pooled water.
- Other health effects Beyond the specific and quantifiable risks to health are indirect and knock-on health effects due to the social, economic, and political disruptions of climate change. Some direct and indirect health effects are shown in (figure 1.2)

Notably, increasing attention is paid by governments now to adaptation options. Researchers should also engage themselves, with the formulation, economic costing and evaluation of adaptive strategies. Beyond structural, technological, procedural, and behavioural adaptations by at-risk communities are larger scale technical possibilities— such as applying satellite data and computer modelling to natural disaster forecasting, and geographic information system modelling of the effect of changes in rainfall and vegetation on specific infectious diseases. A few Other generalised strategies are protection from coastal storm surges, improved sentinel case surveillance for infectious diseases, most importantly the fostering of renewable energy sources and the development of crops resistant to drought and disease.

Measures for Prevention of Climate Change

- **Renewable Energies**

The first way to prevent climate change is to move away from fossil fuels to Renewable energies like solar, wind, biomass and geothermal. These energies are available in abundance around us, given by the sun, water, and wind. the heat from the Earth and waste – is restored by nature and it emits little to no greenhouse gases or pollutants into the air.

- **Energy & Water Efficiency**

Though clean energy production is important, reduction in consumption of water and energy by using more efficient devices (e.g. innovative shower systems and LED light bulbs) is less costly and equally important. Conserving water saves energy. Energy is required to filter, heat and pump water to your home, so reducing your water use also reduces your carbon footprint.

- **Sustainable Transportation**

Currently, the CO2 emissions in the transport sector are about 30% in the case of developed countries and about 23% in the case of total man-made CO2 emissions worldwide. There is a widespread agreement to reduce CO2 emissions from transport by a minimum of 50% at the latest by 2050. Promoting public transportation, carpooling, and also electric and hydrogen mobility can help in the reduction of CO2 emissions and thus fight global warming.

- **Sustainable Infrastructure**

Infrastructure is responsible for 79 per cent of all greenhouse gas emissions, as well as 88 per cent of all adaptation costs and therefore the sector is centrally important to achieving the Paris Agreement and the Sustainable Development Goals. To reduce the CO_2 emissions from buildings - caused by heating, air conditioning, hot water or lighting - it is necessary both to renovate the existing construction and build new low-energy buildings.

- **Sustainable Agriculture & Forest Management**

Efficient and better use of natural resources should be encouraged, massive deforestation should be stopped as well as making agriculture greener and more efficient should also be a priority. Forests absorb greenhouse gases, regulate water flows and protect coastal communities from extreme events and sea level rise. Forests and trees are the core of addressing climate change

- **Responsible Consumption & Recycling**

Adaptation of responsible consumption habits is very important, be it regarding food (particularly meat), cosmetics, clothing or cleaning products. We can safely say that recycling is an unalterable necessity for dealing with waste.

Government Measures

Problems we are currently facing due to climate change can only be tackled by working together following are a few measures taken by countries.

- In a landmark agreement in Paris in 2015, countries pledged to take measures to keep global warming to 1.5C.
- Egypt hosted a summit for world leaders, called COP27, in November, where countries developed more ambitious plans for cutting emissions including reducing fossil fuel use.
- Many countries have pledged together to get to "net zero" by 2050. This means reducing greenhouse gas emissions as much as possible and balancing out remaining emissions by absorbing an equivalent amount from the atmosphere.

Experts agree that this is still achievable, but requires governments, businesses and individuals to make substantial changes now.

Major changes need to come from governments and businesses, but scientists say some small changes in our lives can limit our impact on the climate:

- take fewer flights
- live car-free or use an electric car
- reduce consumption of meat and dairy products
- reduce your energy use
- buy energy-efficient products, such as washing machines, when they need replacing
- improve your home insulation
- switch from a gas heating system to an electric heat pump

Conclusion

To sum up, climate change will have many impacts on natural ecosystems, the national economy and human health. Some of these impacts may be catastrophic and irreversible. Because the influence of climate change is very broad, we should gradually expand the scope of research in future studies and establish partnerships among countries. Other than the measures mentioned above industry and professional groups, local communities government agencies, and intergovernmental and non-governmental organizations, should try their bests to carry out joint research. Namely, all relevant departments need to collaborate to find enough effective and innovative solutions to stabilize the climate and protect health. Due to the increasing global warming issue, we should step up public preventive awareness for the sake of protecting human health as well as speed up the public exchange platform for building global climate change and health risks.

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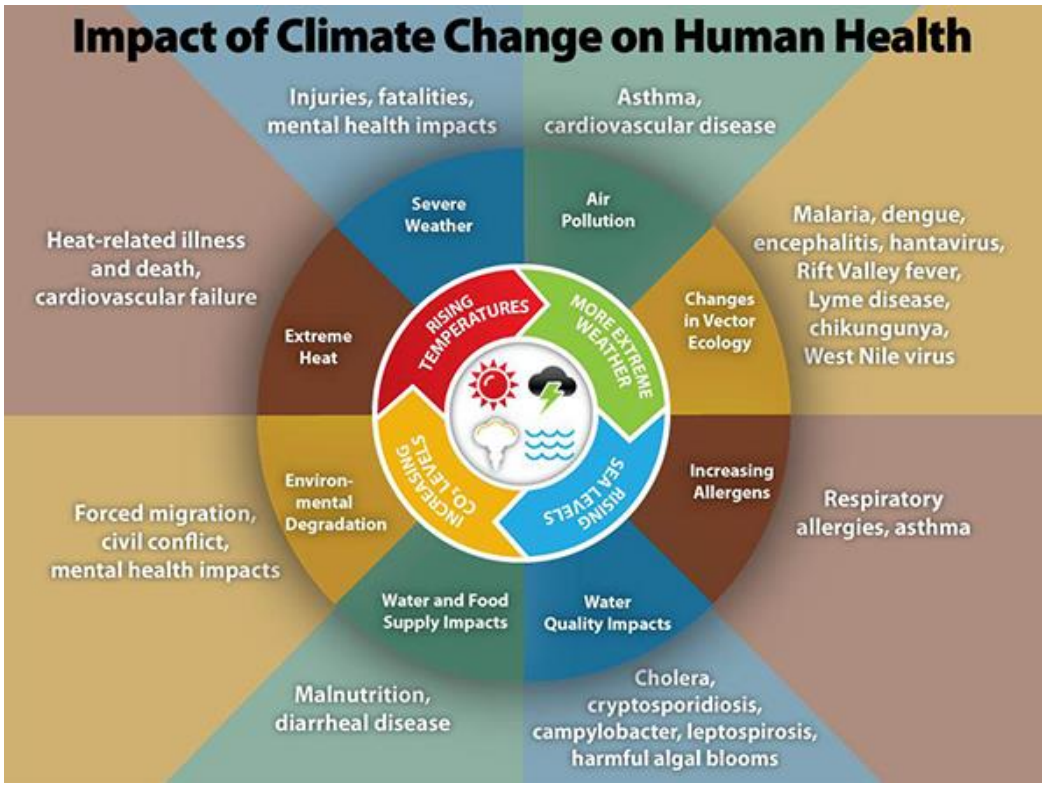

Figure 1

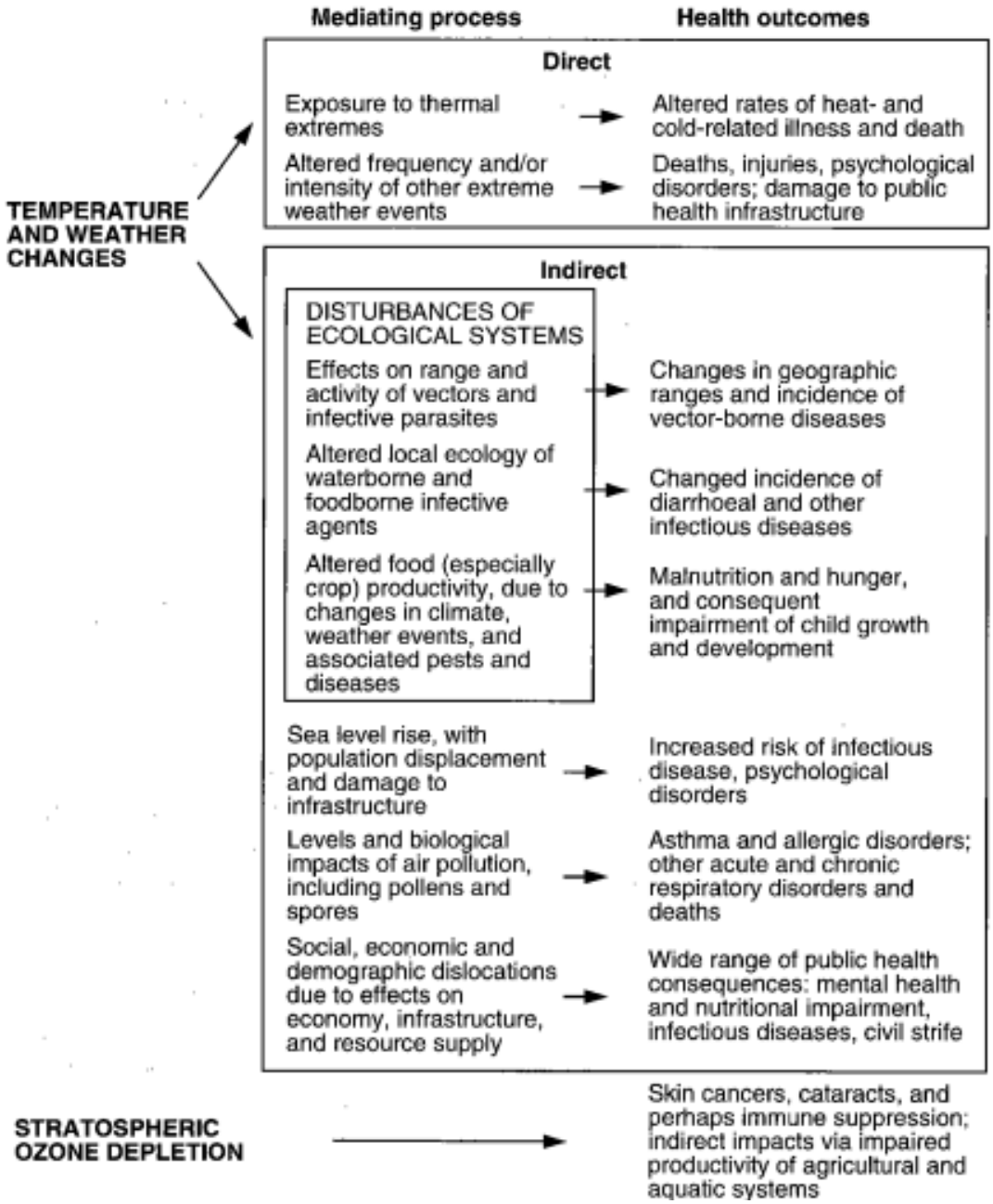
Mediating process
Health outcomes
Direct
Exposure to thermal extremes
Altered rates of heat- and cold-related illness and death
Altered frequency and/or intensity of other extreme weather events
Deaths, injuries, psychological disorders; damage to public health infrastructure
TEMPERATURE AND WEATHER CHANGES
Indirect
DISTURBANCES OF ECOLOGICAL SYSTEMS
Effects on range and activity of vectors and infective parasites
Changes in geographic ranges and incidence of vector-borne diseases
Altered local ecology of waterborne and foodborne infective agents
Changed incidence of diarrhoeal and other infectious diseases
Altered food (especially crop) productivity, due to changes in climate, weather events, and associated pests and diseases
Malnutrition and hunger, and consequent impairment of child growth and development
Sea level rise, with population displacement and damage to infrastructure
Increased risk of infectious disease, psychological disorders
Levels and biological impacts of air pollution, including pollens and spores
Asthma and allergic disorders; other acute and chronic respiratory disorders and deaths
Social, economic and demographic dislocations due to effects on economy, infrastructure, and resource supply
Wide range of public health consequences: mental health and nutritional impairment, infectious diseases, civil strife
STRATOSPHERIC OZONE DEPLETION
Skin cancers, cataracts, and perhaps immune suppression; indirect impacts via impaired productivity of agricultural and aquatic systems

Figure 2

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