

SOME CONCERNS ABOUT CLIMATE CHANGE

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Received May 22, 2017

Accepted June 10, 2017

ABSTRACT

Climate change has led to rise in extreme events thereby adversely affecting all the economic indicators of developing countries lying in low latitude regions i.e. livelihood, agriculture and health of human beings. Extreme events like floods can lead to communicable diseases, malnutrition and mental disorders, loss of property, damaging agricultural fields and loss of livelihood for many. It may also lead to salmonella, cholera etc. and breeding of mosquitoes which leads to dengue, malaria and diarrhoea. Human faeces, sewage and animal waste may enter water bodies affecting water supply which may lead to diarrhoea, dysentery, typhoid and other water borne diseases and deformities. Climate change has led to rise in temperature and fall in rainfall in low latitude regions thereby making them more prone to famines and droughts. This has led to alteration of agricultural yields thereby rise in malnutrition and pushing economy to subsistence fishing. It has been found that mortality rates have been on rise due to heat stress. People with cardiovascular problems and respiratory problems are worst sufferers. There has also been a fall in mortality in temperate regions especially during winters. Events like El Niño and La Niña have negative bearing on rainfall thereby affecting the agricultural productivity and making developing countries all the more drought prone. It has led to cholera outbreak in Bangladesh and malaria has been prevalent in East Africa. Due to rise in global temperature by 2oC and heat stress there has been melting of ice in Greenland thereby leading to rise in sea level, reversal of ocean currents and high storm intensity.

KEYWORDS: greenhouse gases, emissions, global warming, calamities, airborne

INTRODUCTION

Climate change has posed a big threat to mankind and other living beings through its impact on ecosystem, biodiversity and human health. It is a scientific and public policy issue. The CO₂ emissions and the greenhouse gas emissions lead to warmer surface temperature. The consequences of rise in temperature include rise in sea level, reversal of ocean currents, heightened storm intensity. These changes impact ecosystem, wildlife and humans. There has been an increasing evidence of rising temperature of earth as a result of the emissions of green house gases like carbon dioxide, methane, nitrous oxide and various other gases caused by human activities. A doubling of the green house gases to the pre industrial level is likely to increase the global mean temperature by 2-5 degrees Celsius which we are expected to reach by 2050 at the flow of emissions at the current rate. And the temperature rise from the last ice age till today is 5 degrees Celsius. The last 25 years have witnessed a rise in global warming at 0.18 degree Celsius. The high rate of emission of green house gases and chlorofluorocarbons has led to formation black hole above the Antarctica region thereby leading to direct exposure of sun and causing various skin and health problems. Stabilisation requires matching the level of green house gasses to the level of earth's natural capacity to remove them from the atmosphere. Climate change has posed a major threat to livelihood for people across the world, for instance it threatens elements like basic healthcare, access to water, use of land and ecosystems. As warming intensifies it predicted damages would be disproportionately larger leading to abrupt changes such as melting of Green Iceland sheet or change in the pattern of monsoons. This is expected to lead to socio economic conflict, widespread migration and global insecurity. Due to climate change it has been observed that there has been rise in natural calamities especially earthquakes (witnessed by Japan recently), cyclone (witnessed in Uttarakhand), Tsunami (witnessed by Andaman and Nicobar Islands, Orissa and various other states) etc thereby leading to rising deaths.

Due to changing climate across the globe, there has been adverse effect on health. The impacts can be seen directly and indirectly. The direct effect is through the emission of smoke through industrial or any other human activity (like smoking, incessant use of vehicles, dumping wastes in river Ganges etc) particularly through discharge of waste and smoke in the river and atmosphere leading to rise in cases of air borne (like asthma, bronchitis etc) and water borne health problems (like typhoid, cholera etc). It is this water borne problem which is indirectly entering our food chain through agricultural activity. It is through this contamination in air and water the production of wheat rice and other grains is yielding poor nutritional

variety which there by affects our health. There has been a change in productivity due to climate change which brings change in price and quantity. It has been experienced in agriculture where production is a function of climate, forestry, energy, water utilities etc.

High air temperature has contributed to rise in deaths to people suffering from cardiovascular and respiratory diseases especially among the elderly people. High temperature raises the ozone and other pollutants in the air thereby exaggerating the problem. Pollen and other aeroallergen are also higher in the heat thereby triggering asthmatic problems.

Changing climate has even affected rainfall pattern thereby affecting the supply of fresh water. This has led to drought and famines. Floods have also increased in intensity thereby reducing the fresh water supply thereby creating ground for insects borne diseases like Malaria, Dengue etc.

Rising temperature and changing pattern of rainfall has led to fall in production of staple foods, thereby leading to malnutrition and under nutrition.

I. HOW HUMAN ACTIVITY AFFECTS GLOBAL TEMPERATURES AND HOW CLIMATE AFFECTS HUMAN HEALTH

There is consensus within scientific community that the rising greenhouse gases in the atmosphere due to actions of human beings will cause warming on Earth's surface. (AJ McMichael , 2006)

IPCC forecasts a rise in world average temperature 1·4–5·8°C by 2100. The rise will be much more at higher latitudes and around the land areas. Global average annual rainfall will rise; precipitation and flooding will rise. Climate Variability is expected to increase in a tropical areas.

Climate will change is result of rise in greenhouse gases. The rapid rise in temperature since the 1970s is majorly due to factors which led to rise in greenhouse gases.

In today's world climate models have more detailed representations of the ocean, land-surface, sea-ice, sulphate and non-sulphate aerosols, the carbon cycle, vegetation dynamics, and atmospheric chemistry, and at finer spatial resolution.

Climate model predicted future greenhouse gas and aerosol emissions, indicate that Earth would be warmer, thereby leading to increase in sea level and extreme weather events.

There is widespread debate about mankind's future trajectories of greenhouse gas emission.

There are various controversies engulfed around it like the relative effects of climate versus socio economic, and topographic conditions on vector-borne infectious disease transmission).

Forecasted effect of climate change on health is unfavourable, but some areas it would be beneficial. Relatively Mild winters would lead to decline in mortality in winters in some temperate countries, and lead to warming of already hot regions would reduce the breeding of mosquitoes.(Haines, 2006)

The climate and health equation are studied in respect to heat-waves, the physical hazards of floods, storms, and fires, and various infectious diseases (especially those that are vector- borne). The effects of climate changes in regional food yields, catch of fisheries, loss of livelihoods, and population displacement are difficult to assess will have an indirect bearing on health.

Extreme weather events

Extreme weather events like periods of extremely high temperatures, torrential rains and flooding, droughts, and storms are a result of climate change. Over time, the people living in particular regions adapt to the local prevailing climate adjusting their behaviour, physiology, cultural and technological responses. However, due to climate change, extreme events would push populations beyond the threshold limit of adaptation.

Thermal stress

Mortality rates are on the rise once temperature deviates from the comfort zone. It is a U-shaped relation. The trough shows comfort zone; the steeper side or right arm of each line shows the mortality increase as temperatures increases and the falling side or left arm showing mortality rising with falling temperatures. People residing in warm cities are more affected by cold temperatures, and people living in cold cities are more affected by rise in temperatures.

In high- latitude countries of north, people witness high seasonal death rates and illness events in winter than in any other season. Cold temperature is a major factor which has led to rise in mortality exceeding deaths from seasonal infections like influenza in elderly people and respiratory problems in infants apart from seasonal haematological changes.

There is a positive relationship between heat-waves and mortality. This has adversely affected people in their old age and women. Other researches have shown that mentally ill people, children, and others working in temperature stressful occupations or those already suffering from some illness are more

susceptible to diseases.

People suffering from cardiovascular disease are worst affected by heat waves putting them greater risk of deaths(heart attack and stroke) or chronic respiratory diseases. People living in urban environments are at higher risk than those living in rural areas. Urban heat island effect and thermally inefficient housing (whereby high thermal mass with concrete jungle and low ventilation, absorb and retain heat) has amplified rise in temperatures (especially overnight).

There us need to undertake adaptation measures.

Floods

Floods affect physical infrastructure and human lives. There have been rising cases of disaster due to droughts or famines, extreme temperature, floods, forest/scrub fires, cyclones, and windstorms. The disasters like flooding have taken away lives of many.

Floods is a result of interplay between rainfall, surface run-off, evaporation, wind, sea level, and local topography.

People residing near rivers or seashore lines have adjusted their lifestyles by constructing levees, dikes etc. Adaptation measures like water management practices, urbanisation, intensified land use, and forestry can be of great help. In most of the rich temperate countries people have developed a social quotient by living near coastal areas which poses them with great danger of flooding.

Increased intensity of floods has worsened with climate change. Flooding has led to rise in communicable diseases, or exposure to toxic pollutants whereas malnutrition and mental health disorders have been some other repercussions. Excessive rainfall leads to entry of human sewage and animal wastes into waterways making drinking water unfit for drinking and leading to water-borne diseases.

(Campbell-Lendrum, Pruss-Ustun, & Corvalan, 2003)

There is a relation between short-term climatic variation and occurrence of infectious disease—especially vector- borne disease according to various studies. In the Asia-Pacific region, El Niño and La Niña events have led to outbreak of dengue fever.

"High temperature affects vector and pathogen. The effect of rainfall is more complex. In tropical and subtropical regions which are heavily populated and poverty ridden, heavy rainfall and flooding leads to health issues like diarrhoea and other water borne diseases but heavy rainfall can decrease mosquito populations by flushing larvae in pooled water.

Increasing incidents of (non-specific) food poisoning in countries like UK and of water borne diseases like diarrheal in Peru and Fiji have accompanied short-term increases in temperature.(Alistair, 2008)

II. ARE ANY HEALTH EFFECTS OF CLIMATE CHANGE DETECTABLE?

There has been a rise in global temperatures over the past three decades, which have already adversely affected some health outcomes. However, it is difficult to ascertain the effect on health outcomes due to longer-term climate change and demarcate it from shorter-term natural variation.

Due to changes in temperature, rainfall, soil moisture, and pest and disease activity There has been a change in food yields in some regions, which is an outcome of climate change. In populations facing food insecurity climate change has aggravated the problem of malnutrition. Subsistence hunting and fishing have also been adversely affected by climate changes. In fact, El nino and la nina have changed the reserves of fisheries thereby adversely affecting the areas which were dependent on fisheries.

Sea level has risen recently thereby leading to relocation of population to other areas.

Extreme events

In Alaska, Canada, central and eastern Europe, Siberia, and central Australia there has been increased duration of heat-waves due to global warming.

Although rainfall varies globally but the frequency of high rainfall has risen in some areas. But it is difficult to deny that floods have become a common phenomenon after climate change.

Infectious diseases

There have been changes in the amplitude of the El Niño cycle since 1970s which have led to outbreak of cholera in Bangladesh. The cholera vibrio naturally harbours near coastal and estuarine marine algae and copepods, and its multiplication is affected by sea-surface temperature. Climate change has given rise to harmful algal blooms.

There has been increasing incidence of malaria in the eastern African highlands associated with global warming. Incidence of malaria is affected by various factors like height, topography, disturbance in environment, variability in climate in the short run, El Nino and climate trends in long run.

The extent of climate change since 1961–90 upto year 2000 has caused around 160 000 deaths worldwide and the loss of 5 500 000 disability-adjusted life-years for diseases ranging from malaria, malnutrition, diarrhoeal disease, heat waves, and floods.

Estimates of future health effects

Climate change will have many effects on health over the coming decades (figure 1).There will be uncertainties in modelling as how the climate system will be affected by future higher levels of greenhouse gases, and uncertainties about how world will cope up with it. Therefore it makes it difficult for us to predict accurately its impact on health.

Extreme events

The early modelling of the effect of extreme events did not pay heed to the possibility of altered climate variability.

There will be rising incidences of heat waves in major cities of Europe and northern USA by 2090. Populations in high-income countries are expected to reach their elderly stage in the near future, and with rising urbanisation there will be a greater proportion of population which will be at risk of heat extreme. But on a positive note, there will be fall in mortality from cold weather due to decline in northern latitudes. The precise estimation of how many deaths will occur in future from floods and storms is difficult to ascertain.

Infectious diseases

The incidence of various vector-borne diseases will be affected by climate change. These diseases would include malaria, dengue fever, and yellow fever (all mosquito-borne), various types of viral encephalitis, schistosomiasis (water-snails), leishmaniasis (sand-flies: South America and Mediterranean coast), Lyme disease (ticks), and onchocerciasis (West African river blindness, spread by black flies).

Undue emphasis has been given to malaria and dengue by researchers while modelling the effect of climate change on vector borne diseases.

Warmer temperatures shortened the time for mosquitoes to become infectious thereby making them more prone to transmission. Various researches have projected major increases in the population at risk of dengue.

Disease transmission not only depends on factors other than climate, presence of vector and pathogen is prerequisite but is also affected by socioeconomic conditions and availability of public health facilities. There is a need to take up adaptation measures such as case surveillance and treatment in fringe areas, management of deforestation and surface water, and effective mosquito control programmes would help, whereas universally-funded bed-net campaigns would reduce infection rates.

Other health effect

Beyond the direct effects there exists some indirect effects like regional agricultural yields and sanitation and water supplies.

III. EFFECTS THROUGH AGRICULTURE

Humans are exposed to agricultural chemicals and pathogens in the environment through various ways, like consumption of crops treated with pesticides or contamination from the soils; livestock that have accumulated contaminants via the food chain. Other ways also include exposure through inhalation of particulate matter or from direct contact with agricultural soils. (Alistair, 2008)

The environmental pathways from the farm to the wider population will be from consumption of contaminated drinking water and food.

Climatic change

Climate change may affect the growth of the agricultural pests and diseases due to its seasonality (Food and Agricultural Organization 2008). This may lead to overuse of fertilisers and pesticides.

It may lead to increase in frequency of heavy precipitation activity i.e.; more rains and floods which leads to the transportation of historical contaminants from one location to other locations. This will also lead to rise in irrigation demands as there will be warmer and drier summers, water of poorer quality will be applied to the crops, leading to contamination of the crops.

Transport to water bodies

Contaminants are transported from agricultural land to water bodies depends on the soil properties and water flow intensity.

Flood events lead to increase in the contamination of water bodies by pesticides. Flood immersion is likely to increase the dispersion of agricultural chemicals after immersion in floodwater.

Changes in rainfall affect river flows, affecting seasonal pattern of flow (Falloon and Betts 2006). Climate change will lead to increased use of pesticides and biocides as farming practices will intensify. This will adversely affect the occupation. Extreme weather events will lead to increased contaminants from soil and faecal matter thereby raising their bioavailability.

Climate change will not only affect pathogens but also chemical contaminants in agricultural systems. Chemicals and pathogens availability would be affected due to increases in temperature and irregularity in rainfall pattern .

Climate change has indirectly increased underfed people by 5to 10% globally. The Migrants and refugees affected by conflicts would further spread infectious diseases, malnutrition, mental health problems, and injury and violent death.

In Faroe Islands, the ocean warming has led to the methylation of (pollutant) mercury which is subsequently taken up by fish.

Ocean warming causes geographic changes in fisheries. Climate change also brings about changes in the timing and duration of pollen and spore seasons and the geographic areas of these aeroallergens, affecting allergic disorders such as hay fever and asthma.

We have breached Earth's capacity to absorb waste product which causes anthropogenic greenhouse gases. The resultant risks to health are anticipated to multiply over time as climate change—along with other large- scale environmental and social changes—continues.

Climate change will bring in adaptation measures being taken up by many communities who will buffer themselves. Buffering capacity varies greatly between regions and communities depending on their geography, technological resources, governance, and wealth.

Knowledge of vulnerability allows an informed approach to development and evaluation of adaptive strategies to lessen those health risks.

There is a need for 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. Other strategies include protection from coastal storms, improved sentinel case surveillance for infectious diseases, crops resistant to drought and disease, and working upon of renewable energy sources.

CONCLUSION

We have seen that climate change not only affects us directly but it has indirect effects also thereby compounding our problems. Although extensive research has been done on this area but it requires a consistent effort to undertake adaptation measures before we reach dooms day. There is need for greater participation of government to not only create public awareness but also incorporate technologies that help minimise emissions and thereby improve climate. There is a need to revamp socio economic structure, technologies our culture which is more amicable to climate.

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