

Global Changes and its Impact on Human Health



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Abstract

In the past, the earth's climate has altered following natural causes but at the present the changes have accelerated as a result of human behavior. Human activities like industrialization and population growth directly affect the earth's climate. Collectively these changes endanger health and future prospects for many other living creatures. Global warming and stratospheric ozone depletion have attracted the most attention, but other changes go beyond these two processes. Climate change contributes to the global burden of diseases, and this contribution is expected to grow in future. A lot of attention has been given to the impact of climate change on our environment, ecosystems and on various plant and animal species. We as human can make small but significant contributions towards preventing and reducing effects of climate change simply by making a few changes in our daily lives.

Introduction

Throughout its 4 billion years existence, the earth's atmospheric composition and climate have changed many times (John, 1997). The earth's climate is always changing. Climate refers to the average of all those events such as rain, wind and sunshine over a period of time, like a year or several years (WHO, 2008). The human population does contamination and destructive activities within the earth. Natural processes

such as forest and fires, volcanic eruption or wind erosion have long contaminated the air. Human activities such as burning fossils, surface mining of coal and incineration of solid waste or manufacturing process are recognized as sources of pollution. Air and water pollution act interchangeably, they present a world problem (Miller, 1994).

The major global changes are as follows:

1. Climate change
 2. Stratospheric ozone attenuation
 3. Resource depletion
 4. Desertification of fertile land
 5. Environmental pollution
 6. Demographic changes
 7. Emergence and re-emergence of dangerous pathogens
 8. Species extinction and reduced biodiversity
 9. Other relevant changes
- (John, 1997)

1. *Climate Change*

It is estimated that global temperature will rise by about 0.5°C in first half of 21st century and

may rise 2°C by 2100 AD. Climate changes have direct, indirect and predominantly adverse effect on human health. Direct effects increase the heat and cold related illness and death, increase waterborne diseases, increase vector borne diseases, malnutrition, intensity of other extreme weather events: deaths and injuries, psychosocial disorders or stress, and damage to public health infrastructure.

Warm spells heatwaves and stagnant air masses, disturbed rainfall patterns either heavy precipitation events or droughts or even intense weather events are indirect effects of climate change. This change increases incidence of vector-borne diseases; increases the incidence of waterborne and food borne infective agents, increases the incidence of diarrheal and other infectious diseases like malaria, dengue, Japanese encephalitis and other vector borne diseases. Climate change also alters the food productivity, increase incidence of bad weather events and associated pests and diseases bring malnutrition, hunger and consequent impairment of child growth and development.

There is incidence of sea level rises. So there is risk of coastal storms, loss of livelihoods and disappearance of land. This triggers massive migration and causes potential social conflicts, affecting mental health and increases the risks of infectious diseases. Similarly, levels and biological impacts of air pollutions including pollens and spores increase globally. This increases the acute and chronic respiratory disorders and deaths. Social, economic and demographic dislocation due to effects on economy, infrastructure and resource supply

increase risk of mental health and nutritional impairment, infectious diseases, and civil strife.

2. *Stratospheric Ozone Attenuation*

Stratospheric ozone layer protects the biosphere from exposure to lethal levels of ultraviolet rays. Natural as well as human induced processes can contribute to stratospheric ozone attenuation. Ozone depletion is about 3-4% of total stratospheric ozone, per year per year. In 1974, Rowland and Molina, atmospheric physicists, predicted that chlorofluorocarbons would permeate the upper atmosphere where they would breakdown under the influence of solar radiation to produce chlorine monoxide. Each molecule of chlorine monoxide is capable of destroying over 10,000 ozone molecules. Other atmospheric contaminants that destroy stratospheric ozone include other halocarbons and perhaps oxides of nitrogen e.g. in exhaust emissions of high flying jet aircraft, volcanic eruptions may release chlorine compounds into the atmosphere. Thus the stratospheric ozone depletion brings many health hazards to human such as skin cancer, cataracts, and immune suppression. Besides that it has indirect impacts via impaired production of agricultural and aquatic systems.

3. *Resource Depletion*

Due to population growth, people are suffering from great stress on finite and scarce resources. Two resources essential for survival are fresh water for drinking and irrigation and food. Desertification of grazing lands and marginal cultivated agricultural land would further threaten food security. There is shortage of ocean and coastal fish stocks mainly due to overfishing. Change in marine ecosystems are

disappearance of coastal wet land, disruption of river flows by massive dams, changes in ocean temperature, pollution with chemicals, oil spills in ocean and flow of currents can affect marine ecology. Proliferation of zooplankton that feed on algae, is increasing in the sea. Due to global trade patterns, oceanic current fluctuation and warmer costal seas, and symbiosis of cholera vibrio with algae and zooplankton was a massive epidemic of cholera with over 300,000 cases in Peru, Equator and the Pacific coast of Colombia in late 1980s and early 1990s. Shortage of energy in industrializing nations is another form of resource depletion that adds further damaging factors. In these industrializing nations, rising energy needs and use inefficient combustion of low-grade coal, add burden of greenhouse gases and cause health harming atmospheric pollutions. Energy production and combustion have diverse impacts on health ranging from chronic respiratory damage to risk of nuclear reactor disaster.

4. *Desertification of Fertile Land*

Marginal agricultural land is converting into desert due to inappropriately use of fertile land. Thin soil in the mountain slopes was cleared and cultivated, leading to rapid erosion. Trees and shrubs have been stripped from many mountain slopes to provide fuelwood. Due to rapid deforestation, the hydrologic cycle is disrupted. Significantly, rainfall is reduced and soil moisture levels are declined. By this, the food production in the world as a whole is declining. It is very difficult to make fertile land after desertification. It takes few 100 to few 100,000 years.

5. *Environmental Pollution*

Environmental pollution can be localized, regional or even global; all forms adversely affect human health and integrity of the environment. Global environmental changes include major environmental disasters and catastrophes: Chernobyl nuclear accident of former Soviet Union, massive oil spills in maritime accidents and insidious permeation of the entire biosphere by stable toxic chemicals that enter and are transmitted from one species to another through marine and terrestrial food chains. The main environmental pollutions are air, water and land pollutions.

Air pollutants may be biologic, physical or chemical. Biologic air pollutants are mycobacterium tuberculi, viruses – measles, smallpox virus. Physical air pollutants are dirty; dust etc. Chemicals that make air unsafe to breathe are carbon dioxide, carbon monoxide, sulfur dioxide, ammonia, phosgene, oxides of nitrogen etc. The main sources of air pollutions are solid particulates and sulfur emissions from combusted coal, oxides of carbon and nitrogen, aldehydes and ozone from combusted petroleum fuels. Sulfur and nitrogen oxide combine with water vapor to produce sulfuric and nitric acid, which fall as acid rain. Increased combustion of fossils fuels have led to an increase in the atmospheric concentration of carbon dioxide. Reduction of forested areas has contributed to the buildup of higher concentration of carbon dioxide.

Polluted waters are turbid, unpleasant, bad smelling and unfit for use. The sources of water pollutions are sewage and other waste,

industrial effluents, agricultural discharges and industrial wastes from chemical industries; fossils fuel plants. On the way to the sea, rivers receive huge amounts of sewage, garbage, agricultural discharge, biocides; including heavy metals are also added to sea. Discharge of oils and petroleum products and dumping of radionuclide waste into sea also cause marine pollution. Petroleum product pollution causes damage to marine fauna and flora including algae, fish, birds, invertebrates. By this hydrocarbons and benzpyrene accumulate in food chain and consumption of fish by man may cause cancer. Fertile land may be degraded by acid / radioactive waste from surface mining of metals and uranium, pesticides residues, synthetic chemicals, heavy metal salt and other soluble materials, exploitation of soil to produce large crops at minimum cost, intensive live-stock-raising techniques have resulted increased use of antibiotics, increasingly the loads of water produced from society.

Physical, chemical or radioactive toxicants after releasing into environment contaminate our food, water and air. Consumption and direct exposure to these toxicants result into serious health hazards. Radiations from electromagnetic radiations, ultraviolet rays, x-rays, gamma rays, infra-red rays, radio waves and visible light rays from sun and outer space, results following effects: somatic effects- cataract, leukemia, malignant tumors, premature aging and death, and genetic effects are natural and man-made radiations and bringing about genetic effects.

6. Demographic Changes

Most of the world (except European nations and former Soviet Nations) has had sustained population growth. Mostly of Africa, Latin America and Asia, growth rates have been up to 5% per year and population will be doubled in about 17 years. Due to opportunities for work and a good life, the number of migrated people in developed countries from developing countries, have been very large. The proportion of the world's population living in cities will exceed. In developing nations, movement of people from rural to urban regions is attributable to industrialization, mechanization of agriculture, attraction of rural substance farmer and landless peasants to prospects for more lucrative work in cities, in many countries, fight from oppression by powerful landowners, banditry and arm conflict.

7. Emergence and Re-emergence of Infections

Another way in which the world has changed is the emergence and reemergence of lethal infectious pathogens. HIV and AIDS has rapidly become a worldwide pandemic. In African nations the ranks of urban white collar workers have been decimated; men from rural areas who sought work in cities are infected by prostitutes, with whom they consort, living widows to die in their turns and a generation of orphans to be reared by grandparents. T.B. and syphilis find fertile soil in immune-compromised hosts and due to resistant strains of pathogens. A deadly combination of rising and shifting population in periurban slums with no public health services, deterioration nutritional status

that reduces resistance to infection, high levels of ultraviolet rays flux that impair cell-mediated immunity, antibiotic resistant pathogens and pesticides-resistant disease vectors. Due to wide use of antibiotics in agriculture, animal husbandry and in human, diseases causing microorganisms become resistance to antibiotics. So there is vulnerability to epidemic of infectious diseases in worldwide.

8. *Species extinction and reduce biodiversity*

As a result of human activity, unique animals and plant species are becoming extinct at an accelerating rate. Entire harvests could be wiped out by an epidemic plant disease to which that strain is vulnerable; the same danger may apply to genetically engineered crops. If a genetically diverse crop is struck by plant disease, some strains are likely to survive. Widespread use of pesticide on weeds and insects, which kills large numbers of useful arthropod species and leads to the death or reproductive failure of many species of birds.

9. *Other Relevant Changes*

Important economic, social, industrial and political factors accompany and contribute to difficulty of finding solutions world widely. Global economies have changed from national and regional ones to transnational corporations despite for a profitable balance sheet, move capital and production from places where obsolete plan and equipment, labor and environmental laws and political systems may impede them, to countries without these restraining influences to maximizing short-term profits. In most of developed countries, there have been no new investments, no maintenance,

no salary increases and serious staff reductions in public health services; there is risk for outbreak of preventable epidemic diseases. Television sound bites and irresponsible fragmentary news reporting deprive many people of information that is essential to make intelligent decisions about environmental sustainability. Almost all political leaders have lack of courage to make tough decisions such as make policies for higher taxes on fossil fuels. No political leaders seem capable of planning with a time horizon of 50-100 years; they only plan less than 5 years focusing on next election only. (John, 1997)

Ways of minimizing the changes

We can make small but significant contribution for reducing the effects of climate change by making a few changes in our activities of daily living. There are main two ways to deal with the health problems of climate change: mitigation and adaptation. Mitigation is the reduction of the causes of climate change and its consequences on human health. Any actions taken to permanently eliminate or reduce the long – term risk to human life, property, and function from the hazards of climate change. Without good and early mitigation, the difficulty and costs of adaptation will grow rapidly. Adaptation is the improvement of the capacity to cope with the health risks by being better prepared. In other word, an adaptation is the adjustment in behavior that responds to actual or expected climatic effects. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, public and private adaptation, and autonomous and planned

adaptation. Successful adaptation builds on local knowledge, local capacity and willingness to act. (WHO, 2008)

The following activities can be done to preserve the world:

Both adaptation and mitigation are needed as effective response measures to climate change. We need to avoid the unmanageable and manage the unavoidable.

1. Use less AC and water coolers
2. Use low – energy light bulbs and switch them off when leaving the room. Replace the bulbs by using most with compact fluorescent (CFL) lamps.
3. Buy energy efficient appliance: make informed choices.
4. Use less energy and conserve more of it. Save water by not letting it run while brushing your teeth, repair leaky plumbing fixtures, prevent overflowing of tanks.
5. Solar power is renewable and plentiful. So use solar power by fitting solar panels
6. Minimize the use of toxic chemicals, use non-toxic, biodegradable water or plant-based paints, cleaners and pest repellents.
7. Turn off computers, televisions, videos, stereos and other appliance when not in use.
8. Improve insulation systems in homes by designing our houses better.
9. Walk or cycle more – use the car less.
10. Use public transportation
11. Debate, discuss, distribute leaflets, brochure and posters on climate change and environmental health issues.
12. Write letters about health impacts of climate change in local newspapers.
13. Share ride to school with friends and neighbors. It is also fun!
14. Implement the “Three R principle”: Reduce, Recycle, Re-use! Save paper by printing on both sides of the paper. Value wastes. Reused and recycle where possible. Use organic waste for composting.
15. Quit using plastic bags. Carry own bags when going shopping.
16. Home water purification treatments can prevent water borne diseases.
17. Sleeping in mosquito nets can protect from being bitten by mosquitoes carrying diseases such as malaria and dengue. Fixing wire netting on windows, using mosquito repellent creams and wearing long-sleeved clothes and trousers are also useful in avoiding mosquitoes.
18. Plant trees, □□□□ □□ □□□□ □□□□ □□ □□□□ □□□□.
19. Write letters to your President, Prime minister, Parliamentarian or local leaders about the impact of climate change on human health and encourage them to make strong laws and policies for preserving the environment. (WHO, 2008)

These above mentioned things are actions individual can do himself. But to bring

about wider change in our society, we have to involve our neighbors. Public health policies should be made for dealing with the current burden of diseases and for taking measures to reduce and prevent these diseases in the future. Government should actively work with local communities to protect themselves from diseases. Other measures that reduce the negative impacts of climate change include the use of crop varieties with greater drought tolerance; adoptions of irrigation methods that use less water or use it more efficiently.

References:

Last J.M. (1997) Public Health and Human Ecology. University of Ottawa: Canada.

Miller, G. M. (1994). Living in the Environment, Principles, Connections, and Solutions 5th ed, Belmont, International Thomson Publishing.

World Health Organization: (2008) How is Climate Change affecting Our HEALTH? Geneva author.

WHO (2008). How is climate change Geneva: the author.

www.jpcc.ch/climatecharge WHO UNEP.

UNEP climate charge factsheet - July 2010

UNEP climate charge presentation-June 2009

www.unep.org/pdf/UNEP_profile/climatecharge.pdf



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