



IMPACT OF ENVIRONMENTAL CHANGE ON HUMAN HEALTH:AN OVERVIEW

¹Shende V.A. and ²Patil K.G.,

¹K. Z. S. Science College, Bramhani-Kalmeshwar, Nagpur (M.S.) India

²Department of Zoology, Institute of Science, R. T. Marg Nagpur (M.S.) India
 Email: drkgpatil@gmail.com

Abstract: People are mainly suffering from ill-health are caused by environmental hazards. Environmental diseases are often found in the near home surrounding. Poor people have less possibilities to protect themselves from bad quality of water, bad sanitation or indoor-air pollution. Health problems include environmental hazards posed by biological agents, exacerbated by poor sanitation, lack of safe water, smoky kitchens, and crowded dwellings in garbage-strewn neighborhoods. Environmental changes directly or indirectly show effects on human health. The direct impact on human health due to occurrence of UV rays, heat waves, floods, droughts and fires; and changes in temperature and precipitation. Indirect impacts on human health are due to ecological disruptions, rising sea level, changing temperatures and precipitation patterns which leads to crop failures, shifting patterns of disease vectors, water-borne disease, vector-borne disease. The complexities of interactions between environment and host are the vector borne diseases. Biodiversity is under significant threat from the effects of human-induced climate. Its loss is threatening the fulfillment of basic needs and aspiration of humanity as a whole. If we carry on losing biodiversity, future generations face hunger, thirst, disease and disaster.

Keywords: Climate change, Vector-borne, Water-borne, Infectious Diseases, Foodborne diseases, Malnutrition, Heat stress

Introduction:

Global climate change shows significant environmental health hazards faced by humankind. People are mainly suffering from ill-health are caused by environmental hazards. Environmental diseases are often found in the near home surrounding and poor people have less possibilities to protect themselves from bad quality of water, bad sanitation or indoor-air pollution. Twentieth century has an extraordinary global revolution in human health. This health revolution is underpinned by, and results in, epidemiologic and demographic transitions. The epidemiologic transition is a shifting away from high levels of infectious diseases and a high death toll among children, towards a higher proportion of chronic illnesses, such as cardiovascular diseases and cancers. Although chronic (non-communicable) diseases increase in proportion, they do not increase in absolute numbers. Note that the overall mortality is reduced in the demographic transition. Uneven development, unequal distribution of wealth and the incomplete coverage of health services, leads to 'epidemiologic polarisation,' where the gap in health status

among social classes and geographical regions widens (Bobadilla et al., 1993).

Populations grow increasingly older and wealthier, non-communicable and old-age diseases should become the major challenges. Even though mortality has decreased substantially all over the world, infectious diseases still give a large burden of ill-health in developing countries, where HIV/AIDS prevalence is high. The remaining challenge of infectious disease and illness related to malnutrition and poverty is often referred to as 'the unfinished agenda'.

Most of the environmental health problems are linked to poverty. They typically include environmental hazards posed by biological agents, exacerbated by poor sanitation, lack of safe water, smoky kitchens, and crowded dwellings in garbage-strewn neighborhoods. With increased economic development, many of these problems are resolved. Other environmental hazards are associated with economic development in itself, rather than the lack of it. These include many chemical pollutants that are hazardous to both human and ecosystem health that pose the largest

challenges in many industrialized and industrializing countries (Kjellén M. 2001).

Urbanization, and population growth, is portrayed as a threat to environmental sustainability. Poverty is the main determinant of food insecurity and malnutrition, and acts with poor environmental quality to create and maintain poor human health. Malnutrition is the result of a combination of inadequate food intake and infection. Children are particularly at risk. There is a vicious circle consisting of children not eating well enough, leading to their immune system being lowered, resulting in greater incidence, severity and duration of disease, implying nutrient loss and suppressed appetite, leading to children not eating well enough (UNICEF, 1998).

Environmental change poses threats not only to human health but also to the many endangered species. The environmental threats to the Pantanal's biodiversity can be grouped under seven interacting categories: 1) conversion of natural vegetation into pasture and agricultural crops, 2) destruction or degradation of habitat mainly due to wild fire, 3) overexploitation of species mainly by unsustainable fishing, 4) water pollution, 5) river flow modification with implantation of small hydroelectric plants, 6) unsustainable tourism, and 7) introduction of invasive exotic species. More recently, two other factors have proven devastating to populations and ecosystems, adding to the list: pathogen pollution, and global environmental change linked to climate (Alho 2011 and Shende et al., 2015).

In the home environment, the level of exposure to existing pollutants is high. The major threat is made up of pathogens, but there are also problems of discomfort, inordinate work burden for women, and exposure to chemical substances from cooking fires and insecticides. occupational health deals with chemical and biological pollutants as well as accidents in the work environment. Mostly affected are children and the elders, who are more susceptible to infections.

Material and Methods:

As the material and method, authors were contacted to the hospital (emergency section), medical department presentations and mortality (public and private system), senior doctors, medical survey representatives and social NGOs that are directly related to the public health in different urban and rural region. A methodology is allowed to access a diverse range of sources like printed materials, internet, books, journals and articles etc. In the present study authors are illustrate the effect of climate change on some health-related issues of human beings, rather than to catalogue all the issues.

Results and Discussion:

Global climate changes are likely to affect human health by adversely affecting morbidity and mortality rates. Global warming is a growing concern in both medical and climatological communities. Rich countries produce most of the world's greenhouse gases, but it is the health of people in poor countries that suffers the most. The World Health Organization estimates loss of 150,000 lives every year due to changes in climate warming and precipitation. The WHO warns that the risk of death and disease from climate change will double in the next 20 years. Diseases such as malaria, yellow fever, dengue and cholera are all sensitive to climate change due to effect on the viability and the geographical distribution of the mosquitoes and micro-organisms, which prefer a wetter, warmer world. Deaths from heart diseases and respiratory illness during heat waves and malnutrition from crop failures add to the toll.

India being a highly populous country undergoing industrialization, with large scale rural to urban migration resulting in chaotic and unplanned urbanization, depletion of forest cover along and high energy consumption is more vulnerable to impacts of climate change. Until mid-century climate change will act mainly by exacerbating health problems that already exist. However, new conditions may emerge under climate change, and existing diseases(e.g., food-borne infections) may

extend their range into areas that are presently unaffected. In addition to their implications for climate change, essentially all the important climate altering pollutants (CAPs) other than carbon dioxide (CO₂) have near-term health implications. In 2010, more than 7% of the global burden of disease was due to inhalation of these air pollutants. IPCC report suggests that that reducing emissions of short-lived climate pollutants such as methane and black carbon would not only slow warming, but could avoid 2-2.5 million deaths per year, globally (NAPCCHH, 2016).

The emission of carbon dioxide is significantly increase and leads to Greenhouse effect and climate change. Climate change and environment are the issues of global scope and importance that have recently become subjects of great public concern. Both issues are fascinating in that their perceived threat lies in their potential to disrupt ecological functioning and stability. They pose direct and indirect threat to human health and biodiversity. Climate change show different forms of impacts on biodiversity and environment in terms of temperature, rainfall, water resources, cyclones, snow, frost and fire. The most effective way to control climate change is to adopt a sustainable development pathway. It is achieved by environmentally sustainable technologies and promotion of energy efficiency, renewable energy, forest conservation, reforestation and water conservation etc (Janbandhu et al., 2014).

Environmental changes directly or indirectly show effects on human health. The direct impact on human health due to occurrence of heat waves, floods, droughts and fires; and changes in temperature and precipitation. Rise in ultraviolet levels and maximum summertime day temperatures are related to the prevalence of non-melanoma skin cancers and cataracts in the eye. Flooding windstorms and drought affect health adversely through infectious diseases, drowning, injuries, hypothermia, hyperthermia and respiratory illness. It affects people's mental health problems like anxiety, depression and psychological distress. If there has been an increase in

daily maximum temperatures, then it follows, in our view that the number of heat-related deaths is likely to have also increased. Numerous studies of temperature-related morbidity, based on hospital admissions or emergency presentations, have reported increases in events due to cardiovascular, respiratory, and kidney diseases (Hansen et al., 2008) and the impact has been related to the duration and intensity of heat (Nitschke et al., 2011).

Indirect impacts on human health are due to ecological disruptions, rising sea level, changing temperatures and precipitation patterns which leads to crop failures, shifting patterns of disease vectors, water-borne disease, vector-borne disease.

ozone and airborne particles are associated with premature mortality and a wide range of other adverse health effects of both clinical and public health significance (Pope and Dockery, 2006). Heat stress and air pollution adversely affects morbidity and mortality particularly from non-communicable diseases including respiratory, cardiovascular, circulatory diseases. Eighteen heat-waves were reported in India between 1980 and 1998, with a heat-wave in 1988 affecting ten states and causing 1,300 deaths (De and Mukhopadhyay, 1998). Drought occurrence diminishes dietary diversity and reduces overall food consumption, and may therefore lead to micronutrient deficiencies. For India a proactive approach is critical as close to half (48 percent) of children aged less than five are chronically malnourished and more than half of women (55 percent) and almost one-quarter of men (24 percent) are anemic. (NFHS-3) The health of the vulnerable population is further threatened by the changing climate. For instance, in Gujarat, during a drought in the year 2000, diets were found to be deficient in energy and several vitamins. In this population, serious effects of drought on anthropometric indices may have been prevented by public-health measures (Hari Kumar et al., 2005).

Foodborne diseases from salmonellosis, campylobacteriosis may rise or shift in peak infection rates as a response to rising global air and water temperatures. Extreme

weather events and heat decline crop yields leading to increase hunger and malnutrition due to increase of food prices. Waterborne diseases such as typhoid, hepatitis, dysentery, and others caused from micro-organisms such as *Vibrio vulnificus* and *Vibrio cholera*, *E.Coli*, *Campylobacter*, *Salmonella*, *Cryptosporidium*, *Giardia*, *Yersinia*, *Legionella* are some climate-dependant infectious diseases that are likely to change in occurrence with disease exposure in India (Panic and Ford, 2013).

The complexities of interactions between environment and host are the vector borne diseases. Hard ticks (such as the vectors of Lyme disease) feed more frequently and for shorter periods than soft ticks. Hard ticks therefore tend to be much more efficient vectors of human diseases. The daily activities of slum population and domesticated animals are responsible for fecal contamination of shoreline of lake. This is expected to accentuate environment-related health risks, including those from water-washed diseases (diarrhea, cholera, typhoid etc.), vector borne diseases (malaria and dengue fever) etc (Patil et al., 2015).

Malaria-carrying mosquito populations can increase tremendously within a very short time. Equally the *Plasmodium* parasite species proliferates rapidly in both mosquito and human hosts. In contrast, tsetse flies have a low reproductive rate and their populations take much longer to increase under favorable conditions. Hence, infectious diseases transmitted by the tsetse fly (human sleeping sickness) respond less rapidly to variations in climate than do many mosquito-borne infections. Vectors' ability to transmit disease is also affected by feeding frequency. In India, a farmer from the village of Shivani (district of Chandrapur) 140 km from Nagpur in the central State of Maharashtra, has been identified as the first confirmed recorded case of human trypanosomiasis (Patil and Shende 2015).

Vector-borne diseases such as malaria, dengue, chikungunya, Japanese encephalitis, kala-azar, and filariasis are likely to be affected by change in climate and weather (Singh and Dhiman, 2012). Shifts in the geographical range

and duration of the transmission window for *Plasmodium falciparum* and *Plasmodium vivax* malaria is predicted for India (Bhattacharya et al., 2006). The spreading of chikungunya, malaria, and dengue has also due to unplanned urbanization in India.

Biodiversity contributes to make human life both possible and worth living. Human beings are the major source for degradation of biodiversity. Biodiversity is under significant threat from the effects of human-induced climate. Its loss is threatening the fulfillment of basic needs and aspiration of humanity as a whole. If we carry on losing biodiversity, future generations face hunger, thirst, disease and disaster. It directly and indirectly contributes many constituents of human, including security, basic material for a good life, health, good social relations, and freedom of choice and action (Shende and Patil, 2013).

References:

- 1) **Alho, C. JR. (2011)** Concluding remarks: overall impacts on biodiversity and future perspectives for conservation in the Pantanal biome. *Braz. J. Biol.*, vol. 71, no. 1 (suppl.), p. 337-341.
- 2) **Bhattacharya S., Sharma C., Dhiman R.C. and Mitra A.P. (2006)** Climate change and malaria in India. *Curr.Sci.* 90(3): 369-375.
- 3) **Bobadilla J.L., Frenk J, Lozano R, Frejka T and Stern C. (1993)** The epidemiologic transition and health priorities. In: Jamison D.T., Mosley W.H., Measham A.R. and Bobadilla J.L., (eds.). *Disease Control Priorities in Developing Countries*. Oxford, Oxford University Press for the World Bank.
- 4) **De, U.S. and Mukhopadhyay, R.K. (1998)** Severe heatwave over Indian subcontinent in 1998 in a perspective of global Climate, *Current Science*, 75, 12, 1308-1311.
- 5) **Hansen, J., Sato M., Kharecha P., Beerling D., Berner R., Masson-Delmotte V., Pagani M., Raymo M., Royer D.L., and Zachos J.C., 2008:** Target atmospheric CO₂: Where should humanity aim? *Open Atmos. Sci. J.*, 2, 217-231,
- 6) **Hari Kumar R., Venkaiah K., Arlappa N., Kumar S., Brahmam G. and Vijayaraghavan K. (2005).** Diet and Nutritional status of the population in the

severely drought affected areas of Gujrat. Journal of human ecology 18, 4:319-326.

7) **Janbandhu K.S., Shende V.A. and Patil K.G. (2014)** Impacts of CO₂ and Global Climate Change on Biodiversity. Eco Revolution- International Journal of Technology, Science and Humanity, 1:103-106.

8) National action plan for climate change & Human health (NAPCCHH) (2016) Ministry of health & family welfare Government of India.

9) **Nitschke M, Tucker G.R., Hansen A.L., Williams S., Zhang Y. and Bi P. (2011)** Impact of two recent extreme heat episodes on morbidity and mortality in Adelaide, South Australia: a case-series analysis. Environmental Health,10:42, 1-9.

10) **Panic M., Ford J.D. (2013)** A review of national-level adaptation planning with regards to the risks posed by climate change on infectious diseases in 14 OECD nations. Int J Environ Res Public Health 10: 7083–7109.

11) **Patil K. G. and Shende V. A, (2015)** Human infectious diseases and climate change. International Journal of Researches in Biosciences, Agriculture and Technology. Special issue-6: 120-122.

12) **Patil K.G. Shende V.A., and Janbandhu K.S. (2015)** Human Impact on Urban Lake Futala-Telangkhedi: A Case Study. International Journal of Researches In Biosciences, Agriculture and Technology, 2(3): 60-62.

13) **Pope C.A. and Dockery D.W. (2011)** Health Effects of Fine Particulate Air Pollution: Lines that Connect, J. Air & Waste Manage. Assoc. 56:709–742.

14) **Shende V.A. and Patil K.G. (2013)** Human Being and Biodiversity Degradation, Int. J. of Life Sciences, 1(1): 1-8.

15) **Shende V.A., Janbandhu K.S. and Patil K.G. (2015)** Impact of Human Beings on Environment. International Journal of Researches in Biosciences, Agriculture and Technology, 3: 23-28.

16) **Singh P.K., Dhiman R.C. (2012)** Climate change and human health: Indian context. Journal of Vector Borne Diseases. 49(2):55-60.

17) **UNICEF (1998)** The State of The World's Children 1998. Oxford, Oxford University Press for UNICEF.

18) **Kjellén M. (2001)** Health and Environment, Health Division Document 2001:2 Commissioned by Sida, Department for Democracy and Social Development. Printed in Stockholm, Sweden
