

Climate Change, Food Scarcity and Disease

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Editorial

The present era is third industrial revolution and the world is going towards development, but the cost of this development is the environmental degradation. One of the most dangerous climate changes is due to global warming. Global warming means increase in the average temperature of the Earth. 'Intergovernmental Panel on Climate Change' (IPCC) stated that the increase in global average temperature is very likely due to anthropogenic greenhouse gas concentration. This has adversely affected the negative impacts on crop production, which gives a significant economic loss to us. Loss of food and water is one of the immediate threats by global warming. Crop productivity decreases globally for even small changes in average temperature of 1-3°C. Local adverse effects also hit the aquaculture and fisheries industries directly or indirectly. Climate variability and their effect on environment severely compromises food production and yields decreases in some regions upto 50% by 2025. A widespread effect of climate change on the health status of millions of people to-

- Increased deaths, disease and injury due to heat waves, floods, storms, fires and droughts
- Increased burden of diarrheal disease
- Increased frequency of cardio-respiratory diseases due to increase of ozone concentration
- Altered spatial distribution of some infectious vector-borne disease due to malnutrition.

All living species can be involved in parasitism, either as parasites or as hosts. Human community does not free of this effect, as evidenced by data produced by different health organizations like WHO and CDC etc. Indeed malaria, yellow fever, AIDS, lyme disease, cholera, trypanosomiasis, bilharziasis and fasciolosis are all human diseases caused by a symbiotic organism. Moreover, we cannot ignore the emergence or re-emergence of many of these diseases around the world. Climate change greatly effect on public health, as per researches in different parts of the world. Global warming certainly increases the epidemic of malaria, dengue fever, encephalitis, hanta-virus and vector-borne diseases. It is evident that even the rise of an average 1°C temperature, about 300000 people may die every year in the world due to climate related disease-malaria, and the rise of 2°C, about 60 million people in Africa alone would be exposed to malarial disease. The role of climate is a driving force for malaria epidemics. In recent years, vector-borne diseases have emerged as a serious public health problem in Asian countries, including India. Among these diseases dengue fever and Japanese encephalitis causing considerable morbidity and mortality.

As reported by World Health Organization-three of the key components which determine the occurrence of vector-borne diseases are-i) abundance of vectors and intermediate and reservoir hosts; ii) the prevalence of disease-causing parasites and pathogens suitably adapted to the vectors, the human or animal host, and the local environmental conditions, especially temperature and humidity; and

iii) the resilience and behavior of the human population, which must be in dynamic equilibrium with the vector-borne parasites and pathogens. Climate changes are able to affect the predominance, high degree and geographical distribution of helminthes, which is directly or indirectly influencing free-living larval stages and their hosts (Invertebrate and vertebrate) also. The impact of climate change appears to be more pronounced in trematodes, and it is mainly shown by increased cercarial production and emergence associated with global warming. Schistosomiasis is one of the most widespread of all human parasitic diseases, ranking second only to malaria in terms of its socioeconomic and public health importance in tropical and subtropical countries. In 1996 WHO reported that schistosomiasis was endemic in 74 tropical countries and about 200 million people were estimated to be infected and 600 million people were considered at risk of infection. Fasciolosis (caused by liver fluke *Fasciola hepatica* and *F. gigantica*) is a parasitic disease that affects globally in 61 countries. No continent is free from this disease, about 17 million people are infected with *Fasciola* sps and a further 180 million are at risk of infection as per WHO records. Fasciolosis is the third most important parasitic disease after malaria and schistosomiasis and is prevalent in the world in terms of overall morbidity, socio-economic and public health importance. Theoretically, one single miracidium may produce 4000 infective larvae (metacercariae) free swimming in water. There are a large number of snails as well as miracidium in water body, so that there is a good chance of multiplication of *Fasciola* through snail host *Lymnaeidae* and *Planorbidae*. *Fasciola* browses on liver tissue for a period of 5-6 weeks. It produce 25000 eggs/day/fluke upto 500000 eggs/day/fluke can be deposited on to pasture by a single organism. A land mark contribution established by Malacology Laboratory, Department of Zoology, DDU Gorakhpur University, Gorakhpur, UP, India. It is one of the major centers, where work on different aspect of snail control is being carried out under the guidance of Prof D. K. Singh since more than 3 decades. The research team of this laboratory reported nucleotide sequencing of *Fasciola gigantica* and their larva *Cercaria* for the first time. A GenBank accession number KT149356 and KT149357 were allotted (online) for cercaria larva and *F. gigantica*, respectively.

Source-www.ncbi.nlm.nih.gov/KT149357.1and/KT149357.2. It is trematode parasite which is causing Fasciolosis in cattle population as well as human being. Alveolar Echinococcosis is currently the only cestode disease that climate change has been found to influence. Nematodiasis, including heterakiasis, different trichostrongyliases and protostrongyliases, ancylostomiasis and dirofiliariases are the helminth diseases most intensively discussed by the scientist with regard to climate change. Vector-borne diseases such as malaria, dengue, JE, chikungunya, kalaazar are great health problems in south Asian country. Japanese encephalitis (JE) is the cause of viral encephalitis in Asia. The disease is transmitted by *Culex* mosquitoes. JE causes severe epidemics which are highly seasonal, occurring during the monsoon season when temperatures rise 30°C or

above and will increase with increase in temperature and rainfall. H1N1 a swine flu known as pandemic influenza of the year 2009. This is new strain of influenza virus. It is the combination between the influenza viruses of man, animal and birds. This influenza may be spread in the direct contact of one meter of an infected person. WHO declared it as pandemic on 11 June, 2009. Dengue as an important public health concern globally, about 100 million persons affected annually from the tropical and subtropical countries. Dengue epidemics in urban areas are due to transmission by *Aedes aegypti* and can involve 80% of the population. Recently, World Health Organization (WHO) of 6 January 2016, have noted a total of 28,638 suspected cases and 11,315 deaths from Ebola. Ebola virus disease is caused by four of five viruses classified in the genus Ebola virus. Among all four disease causing viruses, Zaire virus (Ebola virus), is the

most dangerous and is the species responsible for the continuing epidemic in West Africa. Another threat is that by the year 2050, higher temperature because of the global warming will increase dehydration and an additional 1.6 million to 2.2 million kidney stone cases may be resulted.

Conclusively, it can be stated that by the influence of climate change, nearly half of the world's population may be infected by vector-borne diseases, resulting in high morbidity and mortality. However, there is still a lack of awareness from this emerging/or re-emerging problems. An urgent priority is to carry out surveillance studies to determine the risk of infection. Programmes for prevention and control should be planned and applied.