

( 120 )

## Mapping health vulnerability of climate change in South Asia

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### Abstract

Humans have proven themselves to be a very adaptable species in both historical and recent times. We have responded to natural climate variability and natural disasters through measures with two options: mitigate or adapt. In practice, both of these approaches will be required in our strategy to deal with adverse effects of climate change on health. The objective of the paper is to analyze the direct and indirect effects of climate change on human health through a complex set of interdependent interactions in South Asian Countries like India, Sri Lanka, Pakistan, Bangladesh, Nepal and Bhutan and to provide techniques of management and adaptation of health related effects. The paper high lights changes in the pattern and distribution of disease spreading insects, virus, bacteria and increasing rate of deaths during last one decade due to greater frequency and severity of heat waves and other extreme weather events with the help of secondary data and provides projections on estimated deaths up to 2050 due to heat wave in south Asian region. It focuses on direct effects like increase in rates of diarrheal, cholera and other bacterial diseases due to rise in heat and pollution of drinking and recreational water. Warmer and wetter conditions will enable malaria mosquito's to spread their range and survival leading to more vector-borne diseases like malaria, dengue and schistosmiasis fever and deaths. Rise in surface ozone concentrations will reduce air quality and it will lead to respiratory diseases like asthma, cardiovascular diseases and breathing problems. Variable rainfall and warming will result crop failure, food insecurity and malnutrition. The indirect effects of changes in weather pattern are ecological disturbances, changes in food production, rise in biological organisms and infectious diseases. The rise in temperature and increasing frequency of heat waves will increase the incidences of illness and death in all South Asian Countries. The paper also presents specific impacts of weather change on health of old, physically challenged, women and mentally retarded people.

In India and Sri Lanka, the seasonal pattern of malarial transmission will change and area bordering the non-endemic wet zone is likely to become more vulnerable to malaria. The sub tropical and warm temperate regions of Nepal will be more vulnerable to Kalaazar and malaria. In Pakistan, long warm spells are likely to become more frequent due to increase in carbon dioxide. The mountain regions of South Asia will be more affected by temperature rise and climate sensitive problems. The health impacts associated with population displacement and migration due to coastline flooding & food scarcity are also analyzed. The paper also provides health determinants and health outcomes with an interaction matrix for South Asian region.

**Key words:** Bacterial disease, climate change, health, malaria, vulnerability