

Socio-economic and health impacts of Climate Variability with reference to Droughts and Floods in South Asia

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Introduction

Increase in frequency of extreme climatic events which can be classified into two types:

- Extremes based on simple climatic measures eg: very high or low temps
- More complex, even driven extremes eg: droughts, floods, cyclones
- Climate extremes can have devastating effects on human societies.
- Human history is coloured with famines, population displacements, disease outbreaks etc. post droughts and floods
- Worst effect is on poor countries.
- Higher temperatures, more variable precipitation, more extreme weather events and sea level rise, will intensify in South Asia, as will it all over the world.



- These changes are already having major impacts on the economic performance of South Asian countries and on the lives and livelihoods of millions of poor people.

Future impacts of climate change for the South Asian region as detailed by the [Intergovernmental Panel on Climate Change fourth Assessment report](#) are

- Glacier melting in the Himalayas is projected to increase flooding and will affect water resources within the next two to three decades.
- Climate change will compound the pressures on natural resources and the environment due to rapid urbanization, industrialization, and economic development.
- Crop yields could decrease up to 30% in South Asia by the mid-21st century.
- Mortality due to diarrhea primarily associated with floods and droughts will rise in South Asia.
- Sea-level rise will exacerbate inundation, storm surge, erosion and other coastal hazards.



What does that mean for the region's inhabitants?

The consequences of such environmental changes include:

- decreased water availability and water quality in many arid and semiarid regions
- an increased risk of floods and droughts in many regions
- reduction in water regulation in mountain habitats
- decreases in reliability of hydropower and biomass production
- increased incidence of waterborne diseases such as malaria, dengue, and cholera
- increased damages and deaths caused by extreme weather events
- decreased agricultural productivity
- adverse impacts on fisheries
- adverse effects on many ecological systems



- Strong linkages are established between poverty, high social vulnerability to low capacity to cope with water related hazards and disasters (UNESCO 2006)
- Areas with lowest socio-economic conditions show higher mortality rates
- This underlines the need to examine the impact of ENSO type events in order to devise for adaptive management strategies



Socio-economic impacts of Droughts

Social impact of droughts is many fold:

- Starvation, mortality, health issues
- Migration which results in break down of family structure
- Political impact

Economic impact:

- impact on economic growth and development
- Agriculture and livestock



Socio- economic impact of Floods

- Loss of Lives and property
- Impact on livelihoods
- Impact on economic growth and development
- Psychological morbidity
- Political impacts
- Health impacts



ENSO events and health

Figure 2.3. Areas which are vulnerable to drought. Countries where drought disasters are more frequent during the second year of El Niño (year +1).

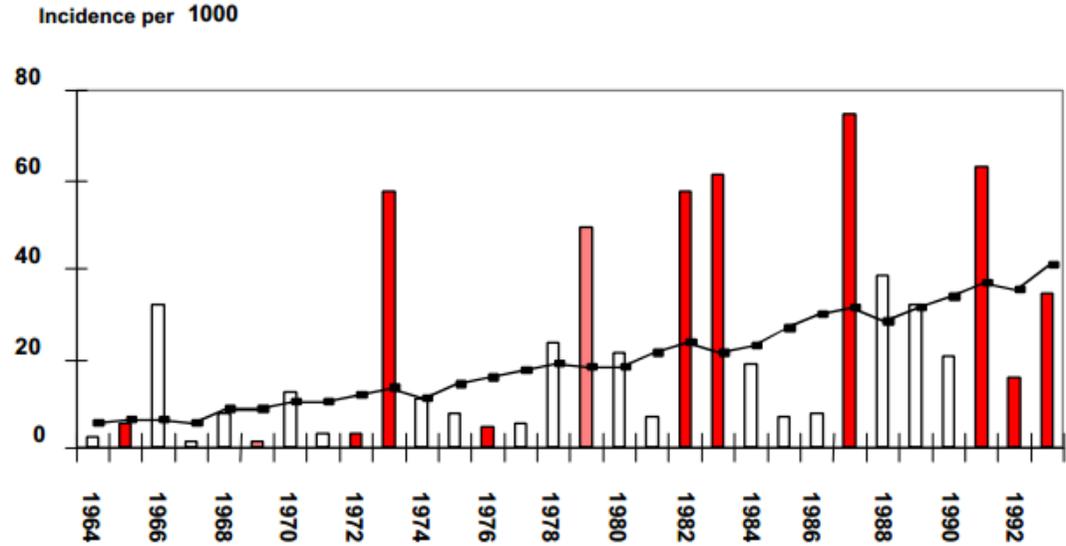
Source: Dilley and Heyman, 1995.



Figure 2.1. Total number of persons affected by natural disasters and El Niño years

El Niño years are indicated by grey bars.

Source: Bouma *et al.*, 1997a.



Climate change may be hazardous to your health

But what's good for climate is good for health



FIGURE 5.1 ENSO and disease. ENSO events cause physical effects such as droughts and floods (blue circle). Where these overlap and interact with suitable ecological and socioeconomic conditions (within dotted lines) they may cause disease outbreaks (dark shaded area).

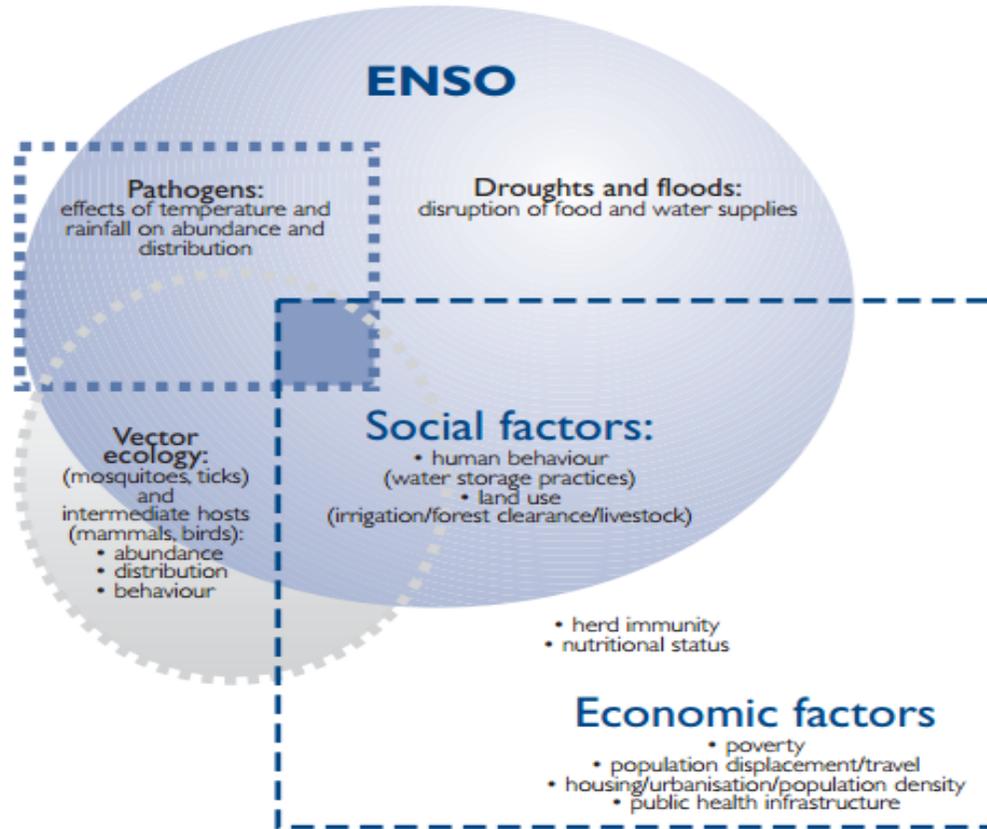


TABLE 5.1 Mechanisms by which above-average rainfall can affect health.

Event	Type	Description	Potential health impact
Heavy precipitation event	meteorological	"extreme event"	increased mosquito abundance or decreased (if breeding sites are washed away)
Flood	hydrological	river/stream over tops its banks	changes in mosquito abundance contamination of surface water
Flood	social	property or crops damaged	changes in mosquito abundance contamination of water with faecal matter and rat urine (leptospirosis).
Flood	catastrophic flood /"disaster"	Flood leading to >10 killed, and/or 200 affected, and/or government call for external assistance.	changes in mosquito abundance contamination of water with faecal matter and rat urine and increased risk of respiratory and diarrhoeal disease deaths (drowning) injuries health effects associated with population displacement loss of food supply psychosocial impacts

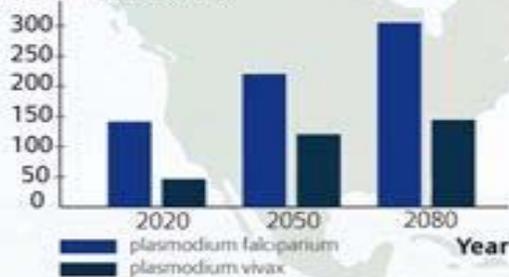
Source: reproduced from reference (2).

TABLE 5.2 Mechanisms by which below-average rainfall can affect health.

Event	Type	Description	Potential health impact
Drought	meteorological	evaporation exceeds water absorption, soil moisture decreases. Several indices have been developed based on meteorological variables, e.g. Palmer Drought Severity Index.	changes in vector abundance if vector breeds in dried up river beds, for example.
Drought	agricultural	drier than normal conditions leading to decreased crop production	depends on socioeconomic factors, i.e. other sources of food available and the means to acquire them.
Drought	social	reduction in food supply or income, reduction in water supply and quality	food shortage, illness, malnutrition (increases risk of infection) increased risk of disease associated with lack of water for hygiene

The UN World Health Organization reports that around 150,000 people die each year from factors related to climate change. Health experts suggest that this number could dramatically increase with further global warming. Potential health impacts of climate change are:

Additional threat by malaria (2020, 2050, 2080) (in million people)



In comparison to 1990, the worldwide number of people threaten by Malaria will increase up to 300 mio (by parasite plasmodium falciparium) and 150 mio (plasmodium vivax).

Source: <http://hamburger-bildungsserver.de>

"The worst-case scenario would be if we continue to ignore this broad-scale environmental health risk. If we just continue to do business as usual and ignore the long-term environmental risks, they will turn around and bite us in the future. Kyoto Protocol is just a first step, but absolutely not enough."



Jonathan Patz, public health expert and Professor at the University of Wisconsin-Madison

Vector-borne Diseases

- Climate change could widen the geographic distribution of mosquitoes, flies and worms that malaria, Dengue Fever, and West Nile Virus.
- Malaria afflicts up to 500 million people worldwide. Changes in weather patterns and prolonged hot seasons could increase this number by millions.



Drought

- Reduced access to water will have health impacts, particularly in the developing world.
- Droughts affect migration, agricultural production, environmental degradation, loss of biodiversity, and civil conflict.



Heat Waves

- Heat waves can kill thousands of people, even in developed countries.
- Heat waves cause dehydration and heat stroke and increase mortality, particularly among elderly people.



Asthma and Respiratory Diseases

- The prevalence of asthma in the United States has quadrupled since 1980.
- Climate-related factors – concentrations of atmospheric CO₂, wildfires, pollution, heat waves, desertification, and distribution of pollen and molds – are at least partially responsible for increases in asthma and other respiratory diseases, like asthma.



- A growing number of studies have shown that the El Niño cycle is associated with changes in the risk of diseases transmitted by mosquitoes, such as malaria and dengue and other arboviruses.
- An interaction of appropriate social, economic and ecological/biological factors during drought and flood events could result in disease outbreaks
- A vulnerability map that takes into account these factors during climate variability events, could be a useful tool to develop mitigation and adaptation strategies to reduce the impacts of such events

