

# Malaria and Climate Change

## A Sustainable Development Network briefing paper

In recent years there has been a great deal of scientific and public debate on climate change and global warming<sup>1</sup>. It is a widely-held view that global warming and climate change will deleteriously affect infectious diseases such as malaria.

### Claims about climate change and disease

- "Higher temperatures, heavier rainfall and changes in climate variability would encourage insect carriers of some infectious diseases to multiply and move further afield."<sup>2</sup>
- "Changes in climate may alter the distribution of important vector species and may increase the spread of disease to new areas... Highland populations...that fall outside areas of stable endemic malaria transmission may be particularly vulnerable to increases in malaria due to climate warming... Not only will climate change exacerbate various current health problems, it may also bring new and unexpected ones."<sup>3</sup>

### Climate, Mosquitoes, and Malaria

A contentious debate remains over the cause and impact of climate change. Whether or not climate change is occurring, whether or not human intervention is the cause, and whatever the impact, it is important to address the fundamental causes of diseases such as malaria, yellow and dengue fevers, and real solutions to eliminate those causes.

- The relationship however between climate and mosquito populations is highly complex. There are over 3,500 species of mosquito and all breed, feed and behave differently:
  - Increased temperatures and higher rainfall and humidity can affect the incidence and spread of vector borne diseases such as malaria by creating more breeding pools for vectors and allowing them to develop faster.
  - In some areas, higher rainfall will wash out breeding pools, thereby decreasing mosquito populations.
  - A 1935 malaria epidemic in Sri Lanka, which killed an estimated 100 000 people, came after two exceptionally dry years.<sup>4</sup>
- Mosquitoes are highly adaptable and use highly effective survival strategies to protect against both extreme heat and cold, even changing their feeding routines and delaying breeding while adverse conditions exist. They have been known to survive winters with temperatures as low as -10°C. *Anopheles gambiae* survives temperatures of more than 55°C in the Sudan.
- Malaria is associated with hot, tropical countries, yet until the early 1950s, the disease was widespread throughout Europe and North America.
  - Infection and death rates remained constant during the 16<sup>th</sup> through mid-19<sup>th</sup> centuries.
  - Changes in agriculture (separating humans from livestock), lifestyle (protecting against mosquito entry), and availability of treatment, meant that the strain of *plasmodium falciparum* died out in these areas. Use of the pesticide DDT helped to eliminate malaria from Europe after World War II.
- Research into the relationship between climate change and malaria in East Africa shows that 'claimed associations between local malaria resurgences and regional changes in climate are overly simplistic'. Moreover, 'Economic, social and political factors...explain

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<sup>1</sup> McMichael, A.J. (1993) Planetary Overload: Global environmental change and the health of the human species Cambridge University Press.

<sup>2</sup> Intergovernmental Panel on Climate Change, <http://www.unep.org/Documents/Default.asp?DocumentID=192&ArticleID=2776>

<sup>3</sup> <http://www.who.int/inf-fs/en/fact266.html>

<sup>4</sup> Paul Reiter (2001) 'Climate Change and Mosquito-Borne Disease' *Environmental Health Perspectives* 109:1.February.

recent resurgences in malaria and other mosquito-borne diseases with no need to invoke climate change.<sup>5</sup>

▪ The histories of malaria, yellow fever and dengue fever "reveal that climate has rarely been the principal determinant of their prevalence or range; human activities and their impact on local ecology have generally been much more significant. It is therefore inappropriate to use climate-based models to predict future prevalence."<sup>6</sup>

## **Sustainable strategies for disease, and development**

Discussions of the climatic causes of malaria and other vector borne diseases diverts attention away from the more substantial causes and potential solutions. Man's activities have a far greater impact on the spread of malaria than climate, and certainly far more than the small part that man's emissions may be playing in changing the climate.

Certain policies can improve health and wellbeing whether or not climate change is occurring:

**Make clean water and sanitation a priority.** Decentralising water control and giving people responsibility and rights over water results in more efficient and effective use of the resource. This in turn can increase the delivery of clean safe water to poor communities, and will result in fewer transmissions of diseases.

**Increase human intervention in malaria control.** While humans cannot change the weather, they can change the environment to minimise health risks. Key to success against these diseases is to restrict the breeding of vectors; improving human living conditions to reduce contact with vectors; removal of breeding grounds, insecticide spraying, including DDT; prevention of contact (bednets); preventive treatment with drugs (prophylaxis) and treatment of the parasitical infection. However, over-reliance on any one method will prompt adaptation by the mosquito.

**Increase wealth and prosperity** to enable people to afford drug prevention and timely treatment. In the long run, human prosperity is the most effective way to defeat infectious diseases – as the world's wealthy countries have shown. However, economic growth will be harmed by efforts to reduce greenhouse gas emissions and through proposed reliance on expensive and inefficient 'renewable' energy.

**Reduce government bureaucracy in health policy.** India has the capability to control malaria, but its health system is burdened with inefficiencies, over-centralisation of control, counter-incentives, fatigue and complacency (not least among the public). Likewise, developing countries should be allowed to develop their own policies, using the tools and methods of their choice.

The Sustainable Development Network (SDN) is a global network of organizations whose mission is to encourage policies which allow individuals to pursue their goals without bureaucratic intervention. The SDN focuses on the institutional framework within which people act, to ensure that policies encourage individuals to make the best use of resources and to protect the environment, while improving both their own wellbeing and the wellbeing of others.

**Contact:** Richard Tren, Africa Fighting Malaria, [www.fightingmalaria.org](http://www.fightingmalaria.org)  
+2782 921 1081  
Lorraine Mooney, European Science and Environment Forum, [www.scienceforum.net](http://www.scienceforum.net)  
[lorrainemooneyuk@aol.com](mailto:lorrainemooneyuk@aol.com)  
+44 1223 264643

<sup>5</sup> Hay, S. et al. (2002) 'Climate change and the resurgence of malaria in the East African highlands' *Nature*, **415**, 21 February 2002.

<sup>6</sup> Paul Reiter. *Ibid.*