

Health is often neglected in the assessment of vulnerability and adaptation to climate change. However, methods have been developed for assessing the impacts of climate variability and change on a range of health outcomes.<sup>44</sup>

Systematic health assessments are needed to inform the management of everything from water, to food, housing and trade. Several developed and developing countries have already conducted national assessments to determine their vulnerability to the impacts of climate change and evaluate the capacity of their health infrastructures to adapt. In the summer of 2003, an estimated 11,435 people above the seasonal average died in France when a record-breaking heatwave struck in the first two weeks of August. Responding, Health Minister Jean-François Mattei, announced \$748 million in extra funding for hospital emergency services, a measure that would either be impossible or stretch to breaking point government budgets in much of Africa.<sup>45</sup>

The range of potential problems sensitive to climate change is enormous:

- Heat stress (the direct effect of the thermal environment on health).
- Air pollution (outdoor air quality).
- Weather disasters (such as floods, windstorms).
- Vector-borne diseases (such as malaria, dengue, schistosomiasis and tick-borne diseases).
- Water-borne and food-borne diseases (such as diarrhoeal diseases).
- Stratospheric ozone depletion (not a direct element of climate change, but a matter of concern).
- Food security.
- Demographic changes that shift the balance of vulnerable populations demanding different health services.

In spite of its relative neglect as an issue, since the first IPCC report in 1990, there has been a steady improvement in the understanding of the impacts of climate change on health. The World Health Organisation (WHO) estimated that globally, for the year 2000, there were 150,000 deaths and the loss of 5.5 million 'disability-adjusted life years', (a standard WHO measure to compare disease burdens) caused by climate change.

In its report, *Climate change and human health*, the WHO shows that changes in the patterns for the spread of infectious diseases are a likely major consequence of climate change.<sup>46</sup> The report indicates likely increases in mosquito populations which spread viral diseases such as dengue and yellow fever, and points to the positive correlation between the annual number of dengue epidemics in the South Pacific with the warm wet conditions of La Niña,<sup>47</sup> and the seasonal variation in many diarrhoeal diseases suggesting sensitivity to climate.

The most recent IPCC report, *Climate change 2001: impacts, adaptation, and vulnerability*, is unequivocal: climate change will have the biggest impact on the communities least able to respond to it. "The impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, thereby exacerbate inequities in health status and access to adequate food, clean water and other resources."<sup>48</sup> These communities are also the least responsible for damage to the climate. Poor communities in Africa are likely to be the most vulnerable.

Africa's high vulnerability to the impacts of climate change is compounded by widespread poverty. Ongoing drought and floods, and a dependence on natural resources for rural livelihoods, in turn, exacerbate the increased vulnerability. Also, Sub-Saharan Africa already supports a heavy disease burden including HIV/AIDS and malaria, cholera, dengue fever, yellow fever, encephalitis and haemorrhagic fever.<sup>49</sup>

## Malaria – a special case

*"Mosquitoes are spreading into highland areas that were historically free from malaria. There is also an increase in water-borne diseases."*

**Tadesse Dadi, Ethiopia**

Beyond its role in the continent's already serious disease burden, malaria represents a particular and additional threat in Africa. There are between 300 and 500 million cases of malaria annually in the world each year with a very high proportion of those occurring in Africa – largely among the poor. Malaria causes between 1.5 and 2.7 million deaths, of which more than 90 per cent are children under 5 years of age. In addition, malaria slows economic growth in Africa by up to 1.3 per cent each year.<sup>50</sup>

Climate change is almost certain to make an already bad situation worse, and may be already contributing to the problem. There is increasing evidence that



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climate change plays a significant role. In one highland area of Rwanda, for example, malaria incidence increased by 337 per cent in 1987, and 80 per cent of the increase could be explained by changes in rainfall and temperature. It is expected that small further changes in temperature and precipitation could trigger malaria epidemics at the current limits of the disease both in altitude and latitude.

Global warming will increase the incidence of floods, warming and drought all of which are factors in disease transmission. In South Africa, it is estimated that the area suitable for malaria will double and that 7.2 million people will be at risk – an increase of 5.2 million.<sup>51</sup>

In addition, flooding – which is likely to increase as the climate changes – could facilitate breeding of mosquitoes, and as a result spread malaria to otherwise dry areas. The Sahel region, which has suffered from drought in the past 30 years, has experienced a reduction in malaria transmission as a result. If flooding does occur, there is a renewed risk of a malaria epidemic.<sup>52</sup>

Recent studies also show that it is not just an increase in average temperatures and rainfall that trigger epidemics in areas previously free of malaria, but greater climatic

variability can introduce the disease to areas previously free of malaria. Populations within these areas lack immunity and increase the impact of the illness.<sup>53</sup>

Climate change will have a dramatic impact not just on the health of vulnerable communities in Africa, but also on the ability of those communities to respond to the changing conditions. Any response to this crisis must include support for adaptation to the climate change that cannot be avoided, as well as investment in livelihoods and technologies that will both improve quality of life and mitigate further damage to the climate.

Rarely considered, though, is the knock-on effect of these impacts on poor and vulnerable communities. What will be the impact of an increased disease burden on an already-stressed healthcare infrastructure? What will be the impact of that increasing disease burden on educational provision when both economic capacity and the pool of prospective teachers (and potential students) are diminished? What will be the impact on the ability of people to work the land, or even rebuild communities after climate driven disasters? Climate change will not only affect people's health in all the ways described, but in doing so it will also hamper people's ability to adapt to a changing, uncertain climate.