From the Medical Director's Desk

The real costs of climate change

After a hiatus, concerns about global warming returned in the late 1980s, and have been a theme in this column since 1991. In the same year William Nordhaus, a leading US economist, published an influential analysis on the cost effectiveness of abating climate change. Nordhaus estimated that a doubling of CO_2 to 560 parts per million (ppm) would reduce US gross national product by a trifling 0.25% and that at the most, World National Product (WNP) would be reduced by 2%, with most of this cost borne by poor countries. (Two percent of the current WNP of US$40 trillion is about US$800 billion). Though Nordhaus cautioned that his findings should not be used as an argument for a *laissez faire* approach to the greenhouse effect, a generation of conservative economists and policy makers have in fact used his conclusions to justify inaction and complacency.

Optimism and naïveté also were evident at the 2004 Copenhagen Consensus in which eight prominent economists were asked to prioritize how US$50 billion, spent over five years, could best be used to address a prearranged list of challenges, including HIV/AIDS, under-nutrition, poor health services and climate change. As economist Jeffrey Sachs, a critic of this conference has pointed out, US$10 billion per annum is a minuscule amount compared to the scale of these challenges. For example, the US military spends almost US$450 billion per annum, while the total amount globally spent on aid is about US$70 billion. If rich countries increased their aid spending to 0.7% of their GNP (as many have claimed to aspire to), this would increase by US$140 billion.

Complacency

Of the challenges listed, dealing with climate change was ranked lowest by the Copenhagen meeting. This conclusion was widely publicized. This complacency about climate change is based on three key, uncertain assumptions:

The first is that when Nordhaus published his study there was consensus that a doubling of CO_2 would cause a warming of between 1 and 3^0C. Now, the most probable range has risen to 1.5-4.5^0C, and the upper boundary looks likely to increase further. Climate change has far more effects than temperature increase. There is also debate about the frequency and severity of extreme weather events, the speed and degree of sea level rise and the impact of climate change upon the world agricultural system. It is not hard to imagine sequences of climatic effects that trigger adverse economic and social consequences of sufficient power to undermine, or even reverse development, leading to falls in the WNP much greater than 2%.

Up in smoke

Some of these concerns are listed in 'Up in Smoke,' a recent document sponsored by a group of eighteen development NGOs (http://www.ewg.org/reports/upinsmoke/pr.html/) (see also forthcoming *Lancet* commentary by McMichael and Butler).

A second assumption implicit in the mainstream economic literature is also dubious. Nordhaus's original cost-benefit calculations assumed a concentration of CO_2 at double its pre-industrial level. In March 2004 CO_2 was recorded at 379 ppm, 34% above the background level. Of concern, the increase over the previous year was a record, at almost 3 ppm, just beating the previous record set in 1998. But that earlier record had been attributed to the strong El Niño event of that year. The more recent increase, in the absence of an El Niño, raised eyebrows because it hinted that an ecological feedback between climate change and atmospheric CO_2 levels may be developing. (A feedback is a consequence of an event that in turn changes the cause – in this example, for the worse). Dr. Peter Cox, at the Hadley Centre in the UK speculated that the record increase in atmospheric CO_2 might be related to the 2003 European heat wave. This is thought to have contributed to the death of an abnormally large amount of vegetation, caused additional forest fires, and most invidiously, reduced soil storage of CO_2.

Speculation of ecological feedbacks worsening climate change is not new. In 2000 a team led by Cox suggested that CO_2 levels could rise as high as 980 ppm by the year 2100, because of feedbacks from climate change damaging the terrestrial 'carbon sink' especially the tropical forests, including the Amazon.

So, at the worst case, in the year 2104 the world could have a CO_2 concentration of more than 600 ppm, an average temperature at least 4^0C higher than in 1960 and be awash with more floods, droughts, crop failures, hunger and violent conflict. In such a world the WNP would be reduced by far more than 2%; indeed civilisation as we know it would be threatened.

This leads to the third key assumption in the complacent approach to climate change: that a solution can be found just as the problem becomes catastrophic. A medical analogy is that the best way to treat a long predicted viral epidemic would be to build hospitals and to search for a cure when the disease strikes, rather than to invest in developing a vaccine.

In short, climate change remains an important issue, including for development. In the last few months both Japan and the US state of Florida have been struck by repeated storms, and there has also been severe flooding in Bangladesh and Northeast India. Haiti, a country with only 2% forest cover, was particularly vulnerable to and affected by the recent series of Caribbean hurricanes. No one can yet say that these storms are definitely related to climate change, but there is increasing scientific consensus, and – outside the US and Australia – growing political consensus that climate change could become an overwhelming problem for the next generation.

Reducing military spending

This does not mean that issues like the strengthening of health and education systems in developing countries, tackling HIV/AIDS, TB, malaria, maternal mortality, meeting the Millennium Development Goals and so on should be sacrificed in order to tackle climate change. Instead, it would be far better to divert military spending (not only by the US but also by developing countries such as India) towards health and development. This challenge was completely ignored by the Copenhagen Consensus: it was not on their menu.

While technological breakthroughs continue, the capacity of the world to tolerate its human burden has been repeatedly underestimated. Some politicians, corporations and consumers are starting to realize the fundamental dependence of civilisation upon the Earth's human and environmental resources – and that these resources are linked. The scientific literature is bursting with articles about the ways, means and urgency to achieve the sustainability transition. The present could be worse than it is; let us work for a future that is better than it could be.

See website for longer article and references.