Analysis and comment

Contraction and convergence

Healthy response to climate change

Robin Stott

Environmentally friendly policies may feel like a low priority among the many pressures in a busy professional life, but promoting carbon rationing could be your most important contribution to patients' health

Climate change related to global warming is the world's most urgent public health problem. Our planet is already seriously damaged, with worse to come (box 1).¹ Health professionals have an enviable record of contributing solutions to previous threats and must do the same for climate change. The most feasible policy for tackling global warming is contraction and convergence, developed by Aubrey Meyer of the Global Commons Institute.⁶ So how can health professionals contribute?

Contraction and convergence

Contraction and convergence is a carbon cap and trade policy designed to stabilise and then reduce carbon dioxide emissions, which are responsible for 70% of greenhouse gases. Industrial methane emissions, responsible for much of the rest, will reduce alongside carbon dioxide. Frugal fossil fuel users will be able to sell entitlements to profligate users through international trading of this capped amount of carbon dioxide.

The first step in implementing this policy is to set a global carbon budget and allocate an entitlement of this carbon to each region, country, or person. The initial carbon allocation is then reduced (the carbon budget is contracted) at an agreed pace and time until the amount of allocated carbon equals the globe's carrying capacity, about 12 billion tonnes of carbon dioxide a year. Given the present global population, this amounts to 2 tonnes/person/year, five times less than the present UK average emission.

The effect of contraction is to stabilise and then reduce atmospheric carbon dioxide levels. The stabilisation level is negotiable, but the consensus is that an atmospheric level of carbon dioxide of 450 ppm, which will result in a temperature increase of around 2°C, is a tipping point. Carbon budgets should be set with this in mind.

Benefits of contraction

The move to a low carbon society will encourage each of us to get the benefits of low carbon living. It will also enable the much more rapid uptake of measures to

conserve energy, promotion of renewable fuels, building of carbon sequestering coal power stations, and a better informed debate on the need to build new nuclear power stations. However, no foreseeable technological change can compensate for all the energy we presently generate from fossil fuel. In a low carbon future, we will inevitably use more of our own human effort, prompting those of us living in rich industrialised societies to get much more exercise in our everyday lives. Exercising will help reverse the obesogenic trends of industrialised societies. The psychological health benefits of exercise are substantial, and increasing the entire population's exercise levels is key to preventing atheroma, the leading cause of death in industrialised countries.

What about convergence?

All countries must participate in setting and then reducing the carbon budget. The allocation must therefore take into account the needs of countries that have yet to industrialise. By reducing the amount of available carbon based fuels, contraction inevitably restricts the capacity of these countries to reap the benefits of fossil fuel driven industrialisation. Convergence, the move to an equal entitlement of the carbon

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Carbon monoxide plumes show pollution from eastern Asia extending eastward over the Pacific Ocean. Satellite data were collected early in 2003; no data were collected in grey areas because of cloud cover or gaps between viewing swaths

Box 1: Atmospheric carbon dioxide levels and global warming

- Atmospheric carbon dioxide levels have risen steeply from 280 ppm since the start of the industrial revolution and in step with increasing use of fossil fuels^{2 3}
- Global temperature has risen in parallel with carbon dioxide, and the world is around 1°C warmer than 100 years ago
- Industrialised countries bear greatest responsibility for the present level of 380 ppm, as well as the annual increase of 2 ppm/year
- The US, with one twentieth of the world's population, uses 20 million of the 80 million barrels of oil used each day, Japan 5 million, Germany 3 million, and the UK 1.7 million⁴
- China and India are set to greatly increase their use of fossil fuels over the next few years
- The predicted temperature increase for the 21st century is 0.15-0.6°C per decade
- Around 60% of the ecosystems essential to sustain life are already damaged⁵

budget to every global citizen and then promoting market trading of entitlements, recognises and deals with this problem.

Although every individual will have an equal entitlement of carbon, the amount individuals emit varies considerably. In the main, the rich are profligate emitters, the poor frugal emitters. For instance, people living in most African countries emit less than one tonne of carbon dioxide a year whereas those of us in the United Kingdom emit about 10 tonnes and those in the United States 20 tonnes.⁷ Under contraction and convergence, initial individual entitlement is likely to be around 7 tonnes of carbon dioxide a year, reducing to the sustainable level of 2 tonnes/person over the agreed period. The state will wish to take a proportion of this individual entitlement to cover the carbon cost of specified activities, such as the provision of public services, but the poor will still have unused carbon entitlements to sell to the rich. They will be able to trade carbon dioxide for its market value with a resultant transfer of money from rich to poor, with the poor getting money through market transactions not aid.

Budgetary consequences of entitlements

Evidence from Mozambique suggests that this money will help trigger the latent entrepreneurial skills of the recipients.⁸ Given the likely market value of a tonne of carbon dioxide, it will more than provide the \$110 dollars/person/year that the UN millennium project believes necessary to reach the millennium development goals in Africa.⁹

The financial implications of trading in carbon entitlements mean it will be in everyone's interest to minimise the amount of carbon we emit. Just as all of us strive to live within our financial means, we will strive to live within our carbon means, with the evident financial benefit this brings. The less carbon we emit, the better off financially we are, a major inducement to the global development of low carbon emitting societies.

Benefits of convergence

Convergence will thus facilitate the engagement of the majority world, effect a transfer of resources from the rich to the poor, and stimulate sustainable development that restores and conserves the ecosystem. By synergistically improving the environmental, economic, and social circumstances of our global populations, and so influencing all three pillars of sustainability, contraction and convergence will trigger a global "virtuous cycle" of activity. This global virtuous cycle will facilitate the uptake of many other virtuous cycles.

The health benefits are also considerable. The policy will mitigate the adverse health effects of global warming, narrow the gap between rich and poor, and help deliver the millennium development goals. The psychological lift from the understanding that we are active in resolving our global predicaments will be considerable, and increasing exercise as an essential ingredient of our everyday lives will give many health benefits. Can this policy be made to work?

Implementation

The political courage and will to implement contraction and convergence is gaining ground, and many organisations, institutions, and countries have signed up to the concept.¹⁰ There are senior policy advocates at governmental level in the UK, European Union, India, Africa, and even within the US.⁶ Additional support comes from the German Advisory Council on Global Change,¹¹ the Church of England, the mayor of London, and a cross party UK parliamentary committee. Contraction and convergence is implicitly supported in the Department for International Development's response to the Stern review on the economics of climate change.¹² Business engagement is reflected

Box 2: How health professionals can influence virtuous cycles of activity**Regional or national level**

Regional directors of public health promoting contraction and convergence in conjunction with regional development agencies and business

Community level

Purchasing goods to create local production and consumption cycles—eg, health facilities buying locally grown organic food^{14 15}

Ensuring new health facilities are constructed in a way that improves the economic, environmental, and social circumstances of the localities^{16 17}

Developing and implementing travel plans, including those for visitors and staff (www.activetravel.org.uk)

Encouraging the use of the Good Corporate Citizen self assessment model (www.corporatecitizen.nhs.uk)

Personal level

Monitor carbon emissions (www.carboncounter.org) and use every opportunity to explain why we are doing this

Ride a bicycle

Insulate our homes using local materials and local workers

Promote local meetings and electronic communication in preference to conferences that require air travel

in a statement of support for the concept signed by 25 roundtable business leaders at this year's world economic forum.

This high level support must now be deepened and formalised so that politicians worldwide commit themselves to contraction and convergence. The details of implementation can then be worked out, guided by insights gained from the several carbon trading initiatives already in place in Europe and the north eastern states of the United States. Researchers at the Manchester branch of the Tyndall centre for climate change have developed the idea of domestic tradable quotas. Their research shows the scheme is fair, technically feasible, and affordable, and is acceptable to the public. It is about to be piloted.¹³ Health professionals can use our extensive networks and lobbying expertise to support these political and practical initiatives (box 2).

Fuel security

Although the thrust for contraction comes from the need to control global warming, concern over availability of fossil fuel and fuel security is another stimulus. The demand for fossil fuel will soon exceed the supply, and new fossil fuel sources are not readily or cheaply available.^{18 19} Oil analysts, not noted for their concern about global warming, also articulate the need to reduce use of fossil fuel.

Contraction and convergence as short hand for public health

A public health initiative guided and regulated by the contraction and convergence framework will activate a global virtuous cycle directed at tackling climate change and reducing the gap between rich and poor. Health professionals must develop a powerful passionate and coordinated voice to call for the adoption of contraction and convergence and to implement the many other virtuous cycles of activity which will be facilitated by the framework. Let us show by example the benefits of learning to speak carbon.²⁰

I am indebted to Aubrey Meyer, who developed the idea of contraction and convergence, and to colleagues in Medact, with whom for many years I have discussed the impacts of social, environmental, and economic injustice on health and whose insights have sharpened my understanding of potential solutions to these problems.

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Summary points

Climate change is a major health threat and requires concerted action to mitigate it

Contraction and convergence offers a way forward which is globally just and produces many health benefits

Trading in carbon will transfer money from the rich to poor, enabling the millennium health goals to be met

By encouraging more physical activity, it will also improve the health of people in industrialised countries

Health professionals must set an example and advocate for contraction and convergence both locally and nationally

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Commentary: Personal carbon allowances

Mayer Hillman

In the past few years, the scientific community has achieved a near-consensus that our energy profligate lifestyles are contributing to a process that threatens future life on earth. As Robin Stott describes,¹ the Global Commons Institute has put forward the only realistic framework to prevent this. Based on principles

of precaution and equity, the policy of contraction and convergence is already commanding impressive national and international support.²

Given that scientists have calculated that the capacity of the planet to absorb greenhouse gases without serious destabilisation of the climate is finite, could

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