

This planet ain't big enough for the 6,500,000,000

Behind the climate crisis lies a global issue that no one wants to tackle: do we need radical plans to reduce the world's population? Chris Rapley sparks the debate

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What do the following have in common: the carbon dioxide content of the atmosphere, Earth's average temperature and the size of the human population? Answer: each was, for a long period of Earth's history, held in a state of equilibrium. Whether it's the burning of fossil fuels versus the rate at which plants absorb carbon, or the heat absorbed from sunshine versus the heat reflected back into space, or global birth rates versus death rates - each is governed by the difference between an inflow and an outflow, and even small imbalances can have large effects. At present, all of these three are out of balance as a result of human actions. And each of these imbalances is creating a major problem.

Second question: how do these three differ? Answer: human carbon emissions and climate change are big issues at the top of the news agenda. And rightly so, since they pose a substantial threat. But population growth is almost entirely ignored. Which is odd, since it is at the root of the environmental crisis, and it represents a danger to health and socioeconomic development.

The statistics are quite remarkable. For most of the two million years of human history, the population was less than a quarter of a million. The advent of agriculture led to a sustained increase, but it took thousands of years, until 1800, before the planet was host to a billion humans. Since then growth has accelerated - we hit 2 billion in 1930, 3 billion in 1960, 4 billion in 1975, 5 billion in 1987 and 6 billion in 1999. Today's grand total is estimated to be 6.5 billion, with a growth rate of 80 million each year.

To what can we attribute such a dramatic rise? Impressive increases in the food supply have played a part, but the underlying driver has been the shift from an "organic" society, in which energy was drawn from the wind, water, beasts of burden (including humans) and wood, to a fossil fuel-based world in which most of our energy is obtained by burning coal, oil and gas. This transition has fuelled the changes in quality of life associated with modern technology, especially the major advances in hygiene and medicine. Although unevenly distributed, these bounties have seen life expectancy double and a corresponding reduction in mortality rates.

But success in reducing mortality has not been matched by a lowering of the birth rate - and this has resulted in the dramatic increase in the human stock. As noted by Malthus, who at the end of the 18th century was the first to foresee the problems of population growth, such growth can accelerate rapidly since every individual has the capacity to produce many offspring, each of whom can in turn produce many more, and the process will only cease when something happens to bring birth rate and death rate once more into balance.

In fact, the overall growth rate of the world's population hit a peak of about 2 per cent per year in the late Sixties and has since fallen to 1.3 per cent. Although the timing and magnitude of the changes have been different in different parts of the world, the pattern has followed the so-called "demographic transition". Initially both mortality and birth

rates are high, with the population stable. As living standards rise and health conditions improve, the mortality rate decreases. The resulting difference between the numbers of births and deaths causes the population to increase. Eventually, the birth rate decreases until a new balance is achieved and the population again stabilises, but at a new and higher level.

Demographers offer two possible explanations for the decline in birth rate, suggesting that it is an inherent tendency of societies to find an equilibrium between births and deaths, with the lag simply being the time taken for the change in mortality rate to be recognised. Alternatively, it is attributed to the same general driving forces that caused the decline in mortality, such as improvements in medical practice and technology, in this case birth control.

So where do we stand today? Worldwide, the birth rate is about six per second, and the death rate stands at three per second. UN figures foresee numbers levelling out at a point when we have between 8 and 10 billion humans by 2050 - that's roughly a 50 per cent increase on today's figure.

This is not comforting news. Even at current levels, the World Health Organisation reports that more than three billion people are malnourished. And although food availability continues to grow, per capita grain availability has been declining since the Eighties. Technology may continue to push back the limits, but 50 per cent of plants and animals are already harvested for our use, creating a huge impact on our partner species and the world's ecosystems. And it is the airborne waste from our energy production that is driving climate change.

Yet, even at a geo-political level, population control is rarely discussed. Today, however, marks the publication of a new report on population by the United Nations Environment Programme. Perhaps this could be the spur we need.

If debate is started, some will say that we need to stop the world's population booming, and to do so most urgently where the birth rates are highest - the developing world. Others may argue that it is in the developed world, where the impact of individuals is highest, that we should concentrate efforts. A third view is to ignore population and to focus on human consumption.

Programmes that seek actively to reduce birth rates find that three conditions must be met. First, birth control must be within the scope of conscious choice. Second, there must be real advantages to having a smaller family - if no provision is made for peoples' old age, the incentive is to have more children. Third, the means of control must be available - but also to be socially acceptable, and combined with education and emancipation of girls and women.

The human multitude has become a force at the planetary scale. Collectively, our exploitation of the world's resources has already reached a level that, according to the World Wildlife Fund, could only be sustained on a planet 25 per cent larger than our own.

Confronted with this state of affairs, there is much discussion about how to respond to human impacts on the planet and especially on how to reduce human carbon emissions. Various technical fixes and changes in behaviour are proposed, the former generally having price tags of order trillions of dollars. Spread over several decades, these are

arguably affordable, and to be preferred to the environmental damage and economic collapse which may otherwise occur.

But by avoiding a fraction of the projected population increase, the emissions savings could be significant and would be at a cost, based on UN experience of reproductive health programmes, that would be as little as one-thousandth of the technological fixes. The reality is that while the footprint of each individual cannot be reduced to zero, the absence of an individual does do so.

Although I'm now the director of the British Antarctic Survey, I was previously executive director of the International Geosphere-Biosphere programme, looking at the chemistry and biology of how Earth works as a system. About 18 months ago, I wrote an article for the BBC Green Room website in which I raised the issues: "So if we believe that the size of the human footprint is a serious problem (and there is much evidence for this) then a rational view would be that along with a raft of measures to reduce the footprint per person, the issue of population management must be addressed.

"In practice, of course, it is a bombshell of a topic, with profound and emotive issues of ethics, morality, equity and practicability. So controversial is the subject, that it has become the Cinderella of the great sustainability debate - rarely visible in public, or even in private. In interdisciplinary meetings addressing how the planet functions as an integrated whole, demographers and population specialists are usually notable by their absence. Rare, indeed, are the opportunities for religious leaders, philosophers, moralists, policy-makers, politicians and the global public to debate the trajectory of the world's human population in the context of its stress on the Earth system, and to decide what might be done."

The response from around the world was strong and positive - along the lines of "at last, this issue has been raised". But after that initial burst of enthusiasm, I find that little has changed. This is a pity, since as time passes, so our ability to leave the world in a better state is reduced. Today's report from the UN provides an opportunity to raise the debate once again. For the sake of future generations, I hope that others will this time take up the challenge.