

Big emitters: how growth in consumption drives climate change

It seems obvious that the more people there are on the planet, the more the pressure on planetary resources and the larger the emissions of greenhouse gases. So it also seems obvious that population growth must be a major driver of global warming. But it is just as obvious that very poor households contribute very little to greenhouse gas emissions. So if most of the world's population growth is among very poor households, population growth is not the culprit. The greatest human driver of global warming is the number of consumers on the planet and their consumption level. Individuals and households contribute to global warming by consuming goods and services that cause greenhouse gas emissions – for instance, by owning a refrigerator or a car. Through this they are responsible for all the fossil fuels that go into making, distributing, advertising, selling, using and disposing of it.

The lowest-income groups and global warming

A significant proportion of the world's urban and rural populations – perhaps as many as one in five people – produce very low levels of greenhouse gas emissions because their incomes, and thus their consumption levels, are so low. There are no precise figures for their numbers. But studies of resource use and consumption among low-income households show that most do not use fossil fuels (they rely on fuelwood, charcoal or agricultural wastes) and most do not have electricity (and so they have no household appliances that use electricity) (see 'Low income, low consumption, low carbon').

If they do use electricity and fossil fuels (for instance, kerosene for cooking and lighting), their consumption levels are very low. Their diets are dominated by food with low carbon footprints (unlike high-income households whose diets are very land, energy and carbon intensive). If households are so constrained in their income that family members are severely undernourished and often have to resort to only one meal a day, it is hardly likely that their consumption patterns are generating much greenhouse gas emissions.

So it is not the growth in the world's population that contributes to climate change, but the growth in consumption. This is growth not just in the number of consumers but also in consumption levels. Stable or shrinking populations may still be rapidly increasing their contribution to greenhouse gas emissions. For instance, London today has fewer people than it had 70 years ago, but the consumption levels of its population (and thus their contribution to global warming) have grown dramatically.

The contribution to global warming of a person born today depends on the circumstances into which they are born and their life possibilities and choices. To take an extreme example, an infant born into a very low-income household in Africa or Asia that dies before the age of one contributes almost nothing to global warming. Such infant deaths are not unusual; it is common for one in 10 children in these regions to die before their first birthday.

Even if a person born today avoids premature death, they may still contribute very little to greenhouse gas emissions – for instance, living a full life as a farmer with a small plot of land, or as an agricultural labourer, or as an individual living and working in a 'slum'

Policy pointers

- **It is the growth in number** of consumers and their consumption levels that drive climate change, not the growth in population.
- **Around a fifth of the** world's population have consumption levels so low that they contribute very little to climate change.
- **It falls to middle- and** upper-income households and high-income nations to show how high living standards can be delinked from high greenhouse gas emissions.

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Low income, low consumption, low carbon

In many low-income nations, most rural and urban households do not have electricity – and thus also lack household appliances that use electricity (which is often generated with fossil-fuelled power stations). For instance, in more than 15 countries, less than 10 per cent of the rural population and less than half the urban population have electricity. In many low-income nations, fuel use (for cooking and, where needed, heating) is dominated not by fossil fuels or electricity derived from them, but by charcoal, firewood or organic wastes such as dung. The most recent surveys, for instance, showed that more than three-quarters of the rural population in 28 countries still relied on these traditional fuels. This was also the case among urban populations in 15 low-income nations. Where access to fuel is commercialised, as in most urban centres, total fuel use among low-income populations will be low because fuel is expensive and difficult to afford.

Even if low-income households shift from fuelwood or charcoal to kerosene or natural gas, their consumption of these is generally very low – implying carbon

dioxide (CO₂) emissions per person per year of around 0.2 tonnes, which is very small by global standards. When low-income households obtain electricity, the few studies available suggest that their consumption levels are very low – typically one-twentieth to one-fortieth of the per person average in most high-income nations. Low-income households also use transport modes that produce no greenhouse gas emissions, such as walking and bicycling, or low emissions per user, such as buses, minibuses and trains, mostly used to more than full capacity.

Hundreds of millions of rural and urban people may have zero or negative greenhouse gas emissions per person. Among them would number many low-income urban dwellers whose livelihoods are based on reclaiming and reusing or recycling waste, where the emissions ‘saved’ from their work equals or exceeds the greenhouse gas emissions that their consumption causes. This group would also include tens of millions of small farmers able and willing to engage in sustainable agriculture and in maintaining or increasing tree cover on their land.

– because their consumption level over their lifetime is very low. By contrast, a child borne into a high-income household who lives a full life and enjoys a high-consumption lifestyle will contribute hundreds or thousands of times more to global warming.

Allocating responsibility for reducing emissions

Responsibility for greenhouse gas emissions should be allocated to individuals and households, not nations. It should be based on the greenhouse gas implications of their consumption. The wealthiest fifth of the world’s population is likely to account for more than 80 per cent of all human-induced greenhouse gas emissions and an even higher proportion of historic contributions – past emissions that are in the atmosphere and are driving climate change. Although most of these people live in high-income nations, a significant and growing proportion live in the more successful low- and middle-income nations.

Avoiding dangerous climate change will need large reductions in the emissions of these wealthy households, and far more attention needs to be directed at this. This can only be done by delinking high incomes from carbon-intensive consumption – or to put it another way, delinking a high quality of life from high consumption and waste generation. But at present,

we do not have the systems of measurement needed to link greenhouse gas emissions to consumers. The data on emissions are for nations, and are not tied to consumption but to where the emissions take place.

This is misleading because it means that greenhouse gas emissions are allocated to the nations that produce the goods, not the consumers. So if someone purchases a car, refrigerator or television made in China or Brazil, the greenhouse gas emissions that went into making these goods are allocated to China or Brazil, not the consumer (or the country they live in).

This makes the official figures for nations’ greenhouse gas emissions misleading. It also hides how much the growth in consumption has driven the growth in greenhouse gas emissions, as wealthier nations and people keep down their carbon footprint and pollution and resource use by importing all the carbon-, pollution- and resource-intensive goods from other nations.

However, even if official statistics on greenhouse gas emissions do understate how much is caused by high-income nations (or rather, middle- and upper-income groups in these nations), they still show the very small contribution of most low-income nations. Many low-income nations have per person averages for greenhouse gas emissions of under 0.2 tonnes of carbon dioxide

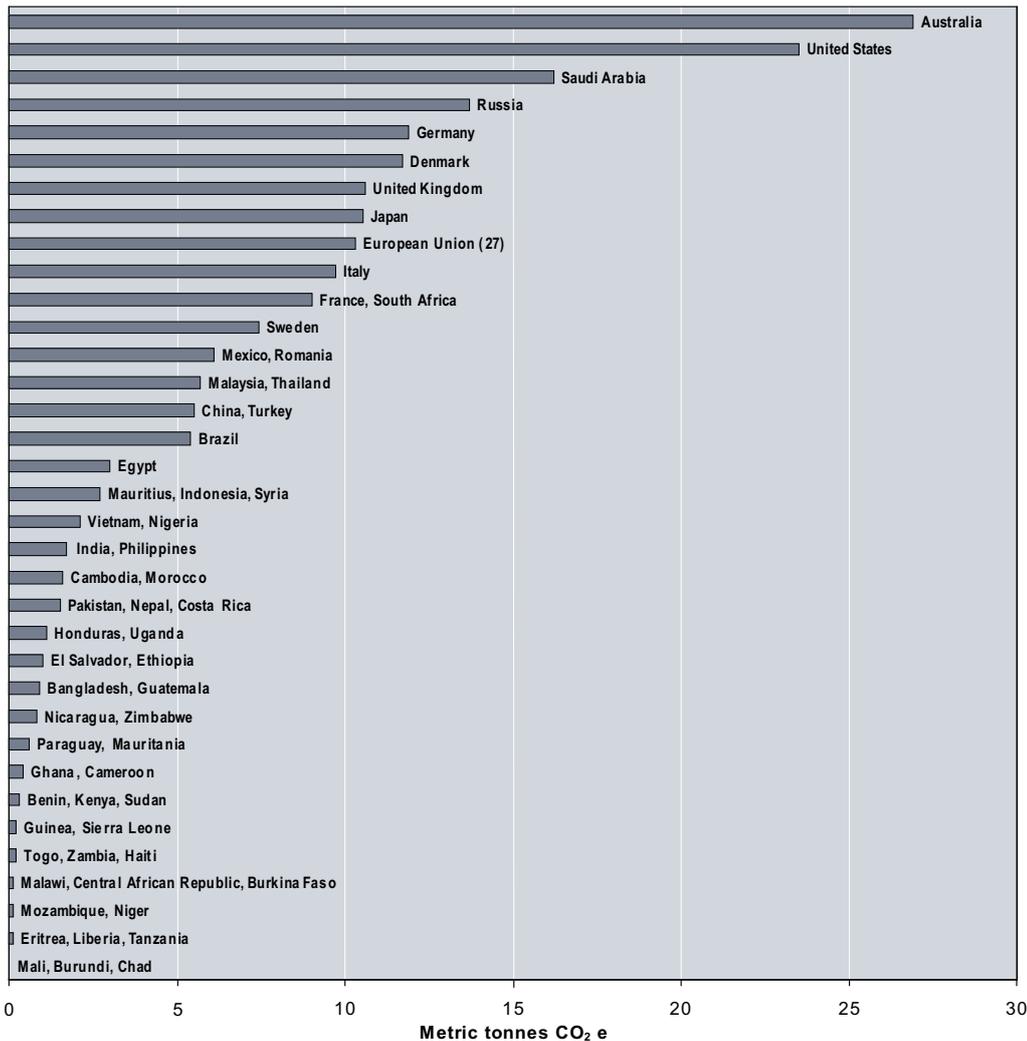


Figure 1. Average greenhouse gas emissions per person by nation, 2005

Source: The data are drawn from CAIT (Climate Analysis Indicators Tool) Version 6.0, World Resources Institute, Washington DC. See <http://cait.wri.org/cait.php>.

equivalent (CO₂e) a year – compared to most European nations, with over 8 tonnes a year, and Canada and the United States with over 20 tonnes a year (see Figure 1).

Does population growth drive climate change?

Again, because statistics on greenhouse gas emissions are for the emissions produced within nations and not for the emissions caused by consumption, it is not possible to say how much or little greenhouse gas emissions have been driven by population growth. The data are also incomplete on each nation's contribution to global warming from land-use changes (including deforestation) and greenhouse gases other than CO₂. But even accepting these limitations, much of the growth in CO₂ emissions from 1980 to 2005 have been in nations or regions that have slow population growth (see Figure 2, overleaf). During those 35 years, sub-Saharan Africa had 18.5 per cent of the world's population growth but its share in the growth of CO₂

emissions was just 2.5 per cent. The United States and Canada had 4 per cent of the world's population growth but its share in the growth of CO₂ emissions was 13.9 per cent. China had 15.3 per cent of the world's population growth and 44.5 per cent of the growth in CO₂ emissions. And this actually understates the contributions of high-income nations for two reasons.

The first reason was noted above – the fact that emissions from producing goods are allocated to nations where the production is located, not to the consumers of those goods. The second is that the United States and Canada, and much of Europe, already had very high levels of greenhouse gas emissions in 1980. Europe's share in CO₂ emission growth over these 35 years was negative – as so much industry closed down or shifted to low- and middle-income nations. If greenhouse gas emissions were allocated to consumers, the contributions of Europe, the United States and Canada to the growth in such emissions over these years would be much higher and that of China much lower.

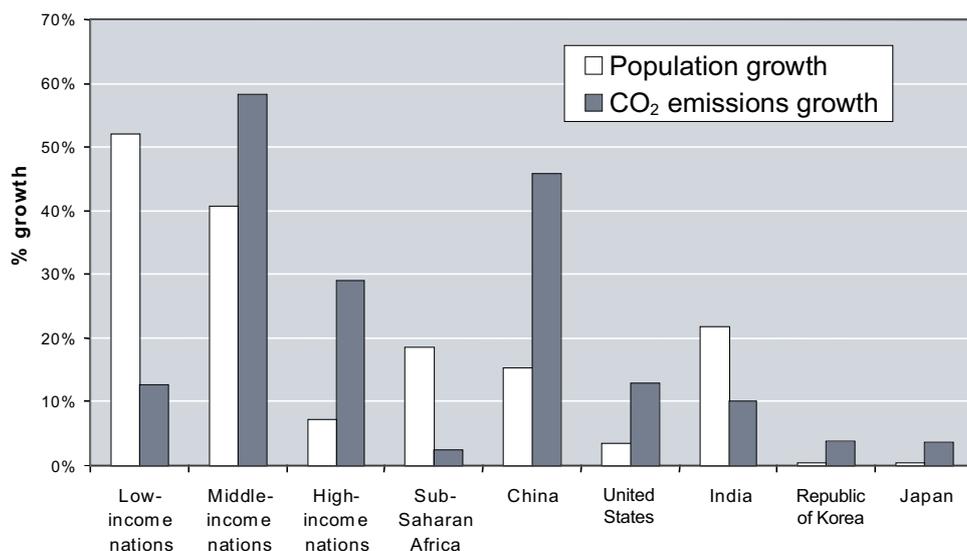


Figure 2. Contributions to the global growth in CO₂ emissions and population, 1980-2005

Source: Satterthwaite, D. 2009. The implications of population growth and urbanization for climate change. *Environment and Urbanization* 21:2, 545-567. This drew on CAIT (Climate Analysis Indicators Tool (CAIT) Version 6.0, World Resources Institute, Washington DC. See <http://cait.wri.org/cait.php>.

Some conclusions

The two key issues in tackling climate change are, first, how to slow, stop and then reduce global emissions; and secondly, how to build resilience to the impacts of climate change. The first depends on reducing the greenhouse gas emissions driven by consumption. This means reducing emissions per person among middle- and upper-income groups and in effect demonstrating how a high quality of life can be combined with much lower emissions. It falls to governments in high-income nations to demonstrate how this can be done. Without this demonstration, why should the successful low- and middle-income nations whose greenhouse gas emissions are rising rapidly agree to act on this – especially if their emissions per person are still so far below that of high-income nations?

Adaptation – that is, building resilience to the storms, floods, heat waves, water supply constraints and other impacts of climate change – depends on good development. The reason so many people in low- and middle-income nations are at risk from climate change is because they have been failed or bypassed by development. They live in poor-quality housing on sites that lack the needed protective infrastructure and services.

A very important part of development, and of building people's resilience to the impacts of climate change, is good-quality, easily available and affordable healthcare. This includes emergency services (ambulances, accessible hospitals) to respond to acute illness or injury and disasters. It obviously also means good sexual and reproductive healthcare, including advice on family planning, and care for other key areas of health, especially for infants and children. Good healthcare will help address one of the most intractable failures of development – the very high rates of infant, child and maternal mortality in low-income and most middle-income nations.

It will also help slow population growth. So too will other aspects of development – for instance, good-quality schools and provision for water, sanitation and flood protection, more stable livelihoods and better-quality housing. These will also greatly reduce the vulnerability of low-income groups to climate change impacts, although they will not necessarily reduce greenhouse gas emissions. However, if the wealthy demonstrate the needed commitment to reducing their emissions, the planetary implications of the additional emissions implied by achieving the above are not very large and should be accommodated.

■ **DAVID SATTERTHWAITE**

Further reading & websites

Chakravarty, S. et al. 2009. Sharing global CO₂ emission reductions among one billion high emitters. *PNAS* 106:29, 11884-11888. See www.pnas.org/cgi/doi/10.1073/pnas.0905232106. ■ Pearce, F. 2009. Consumption growth dwarfs population as main environmental threat. From *Yale Environment 360*, Guardian Environment Network. See www.guardian.co.uk/environment/2009/apr/15/consumption-versus-population-environmental-impact. ■ Satterthwaite, D. 2009. The implications of population growth and urbanization for climate change. *Environment and Urbanization* 21:2, 545-567. See <http://eau.sagepub.com/cgi/content/abstract/21/2/545>.

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CONTACT: David Satterthwaite
david.satterthwaite@iied.org
 3 Endsleigh Street,
 London WC1H 0DD, UK
 Tel: +44 (0)20 7388 2117
 Fax: +44 (0)20 7388 2826
 Website: www.iied.org



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