

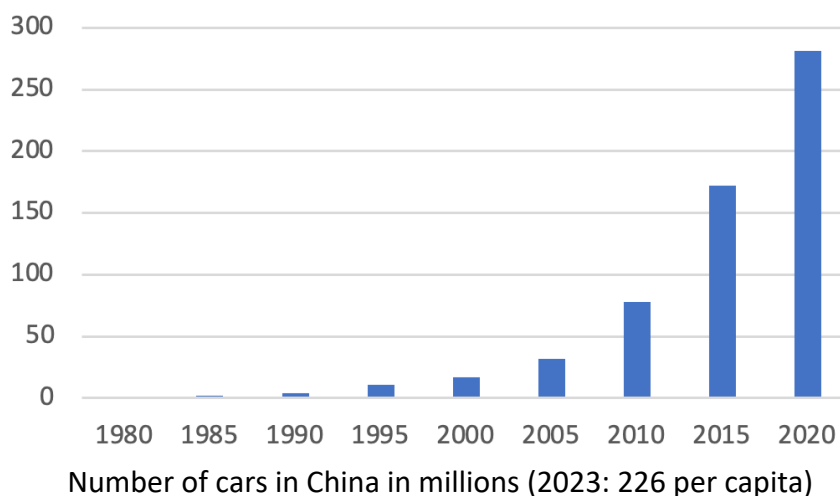
# Eight myths about overpopulation that are still widely believed

Peter Uetz

Milton Saier gave an introduction to the problem of human overpopulation in the April/May issue of *Free Inquiry* and we should applaud him for that. Here I would like to supplement his article with some data that most people do not have on their radar screen when talking about population issues. Given that climate change and biodiversity loss are existential threats for humanity, it is absolutely essential that we are aware of these facts, given that climate change is often just attributed to fossil fuel use and thus a merely technical problem. The underlying problem is either ignored or actively suppressed, namely the fact that there are too many consumers. I will break down this problem into 8 myths that are still widely held and that hold the key to many of our planetary problems.

## Myth 1. Population growth has largely stopped, hence the problem is solved

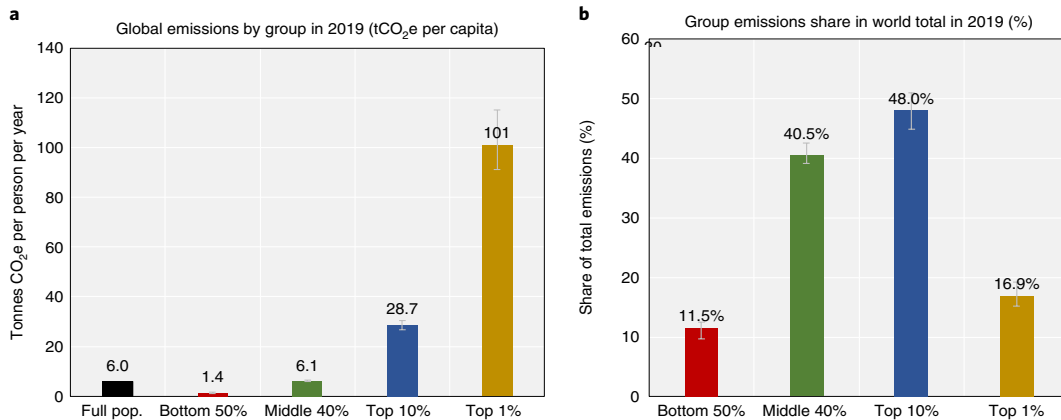
After birthrates started to drop in the 1960s and 1970s, many people started to believe that the problems of population growth will be soon solved and thus the population bomb will have been defused. It is true that fertility rates have dramatically dropped in most parts of the world (except Africa), and this process took most countries only a few decades [1]. In fact, in most countries this happened without government intervention almost by itself. For instance, the total fertility rate of Chinese women was 6.2 in 1969. By 1979, when the 1-child policy in China was started, it had already fallen to 2.7 [2]. Importantly, after the 1-child policy was implemented, it took the Chinese population more than 40 years to plateau (in 2022). The same process is happening in India right now: with Indian women having reached replacement level (2.1 children per woman) this year, the problem of population growth is considered solved. Well, not quite: like China, it will take India 40 years to reach a stable population. More importantly, even if population growth stops, consumption will keep growing. Here is the number of cars in China since the 1-child policy started around 1979: while population growth had stopped in 2023, the number of cars has exploded more than 200-fold from 1.36 million in 1978 to more than 300 million in 2023 [3].



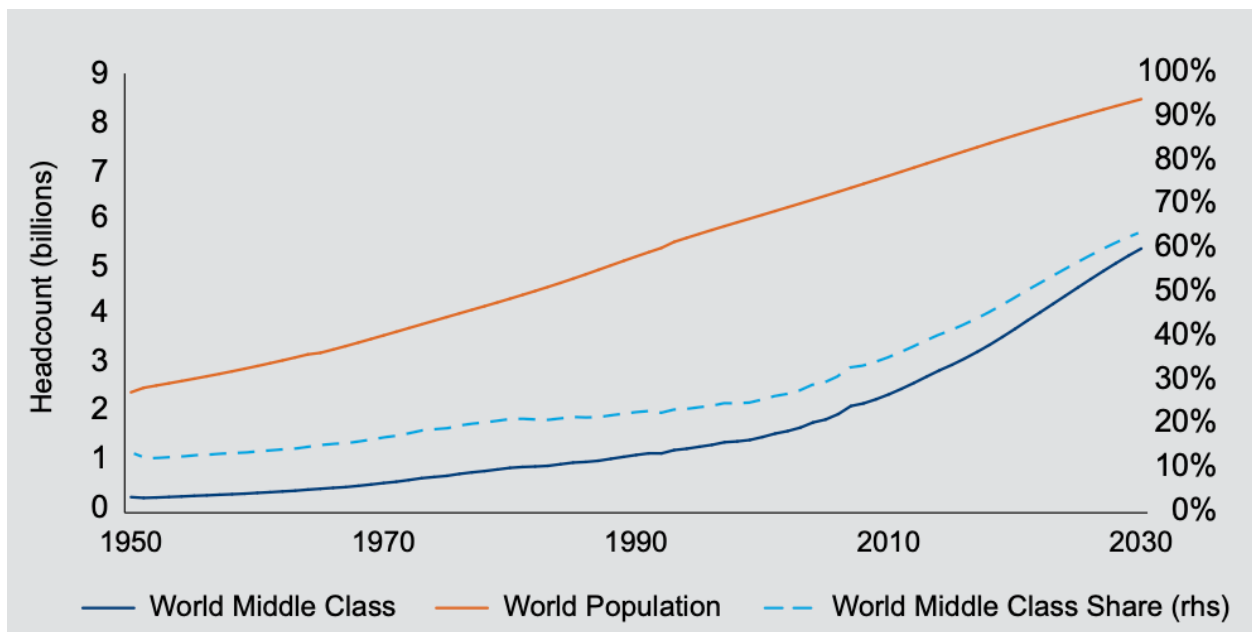
In other words: stopping population growth, doesn't stop its problems. Only stopping excessive consumption will. Which brings us to the next myth.

**Myth 2. Population and consumption are separate issues**

In fact, they are, but not the way many people think. Especially those engaged in social justice, argue that it is not overpopulation that matters, but overconsumption, especially in rich countries. Of course, most rich people consume too much to be sustainable. The top 1% of consumers produce 100 tones of CO<sub>2</sub> per capita and per year, compared to 1 or 2 tones at the bottom, so we can ignore the poor who hardly emit anything, right? Not quite.



It is still the rich half of the world that produces most greenhouse gases, but the contribution of the poorer half steadily increases, because more and more people rise to the middle class [4]. As soon as the poor leave the bottom 50%, the resulting middle class (currently 40% of the world population) produces already 40% of all CO<sub>2</sub>, and this global middle class is growing by 70 or 80 million people per year [4b]:

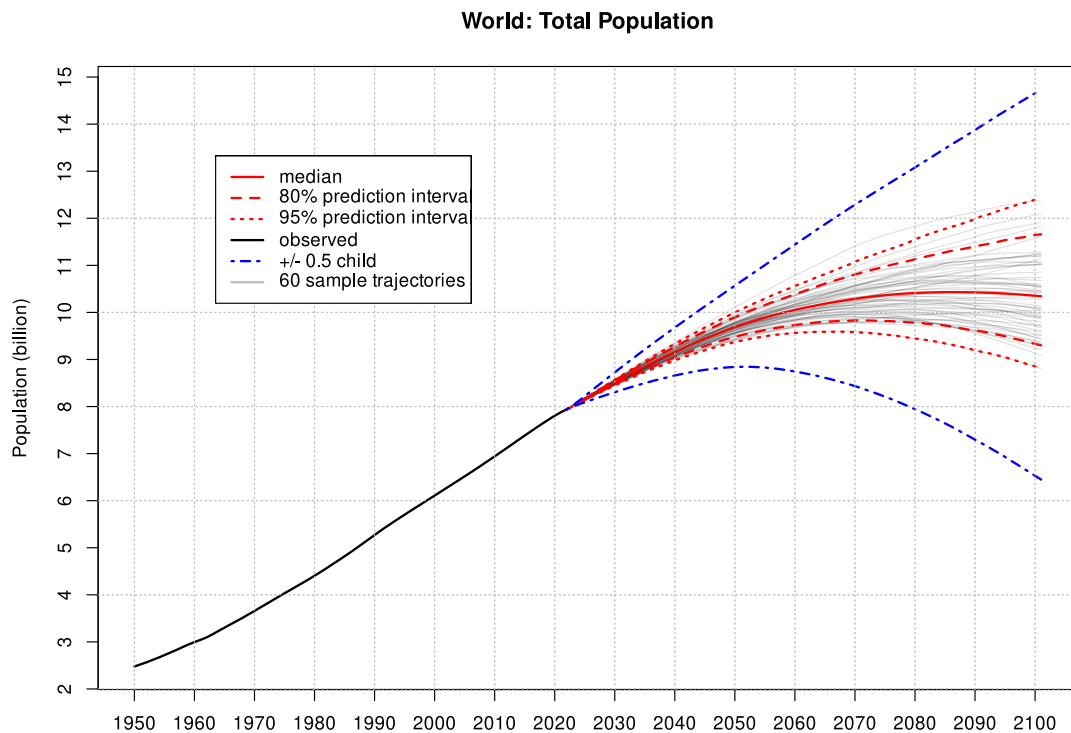


In other words: the global middle class not only grew from 1.8 billion in 2009 to about 3.2 billion in 2020, it will keep growing to an estimated 4.8 billion in 2030 (or 60% of the world population). It's practically impossible that the resulting population will consume less and it's very unlikely that the rich consume less either (except in terms of energy which will shift to renewables to a significant extent). The truly poor have shrunk to about 10% of the world population over the past decades – and that's good! In fact, if poorer people do not improve their situation in their own countries, they will migrate to richer countries as we can see in both North America and Europe. The goal for almost everybody is to live a better life and, of course, to consume more.

### Myth 3. We are having too few children soon!

According to Elon Musk, the world population is facing extinction soon, which seems to be the main reason why he has 10 children. It is true that most projections predict a decline of the human population towards the end of the century. In fact, most projections agree that that the world population will start to fall by the end of the century [5].

Pope Francis suggested a few years ago that every woman should have three children [6]. What would happen if women followed his recommendation? Right now, the average is about 2.3 children per woman – and the population is still growing about 70 million per year. If we had half a child more (about 3, as per the pope's recommendation), we would have about 15 billion people by the end of the century! If every woman would have half a child less (on average) the world population would drop to about 6 billion. Here is the projection by the UN showing this:



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United Nations, DESA, Population Division. *World Population Prospects 2022*. <http://population.un.org/wpp/>

In other words: having half a child more or less (2.8 vs. 1.8 per woman) would cause a difference of almost 8 billion people after just 80 years! Dan Spears, an economist who is worried about a falling world population (given the dramatic impact on the economy), estimates that it will take about 300 years until we reach 2 billion people. This level would be roughly what the Global Footprint Networks recommends as a “sustainable” level at current Western consumption levels [7] – which is nowhere near sustainability.

So, will the world population collapse? Almost certainly not (if the biosphere hasn’t collapsed by then, that is). The main reason why women have fewer children today, at least in rich countries, is the difficulty of accommodating both children and a career in a short window of their lifetime with often little support from fathers or governments. Although other issues certainly play a role too, such as more diverse interests that do not have family life at their center. Given that increasing automation and artificial intelligence will replace much of today’s work there is much hope that these issues can be resolved.

Even at the “precipitous” decline of fertility that the media have been lamenting about, at current trends it will take at least 200-300 years for the human population to reach 2 billion people. That will be enough time to figure out solutions for declining birth rates. By contrast, solutions for the environmental crisis need to be found NOW, at least within the next decade or so, to avoid catastrophic biodiversity loss and climate change.

#### **Myth 4. People want children**

Most do. And they can have their cake and eat it too. However, the cake, that is, the number of children will be smaller (1 or 2), even though we may want to have 2 children per family again in a 100 or 200 years. Until then, we should cut down on reproduction.

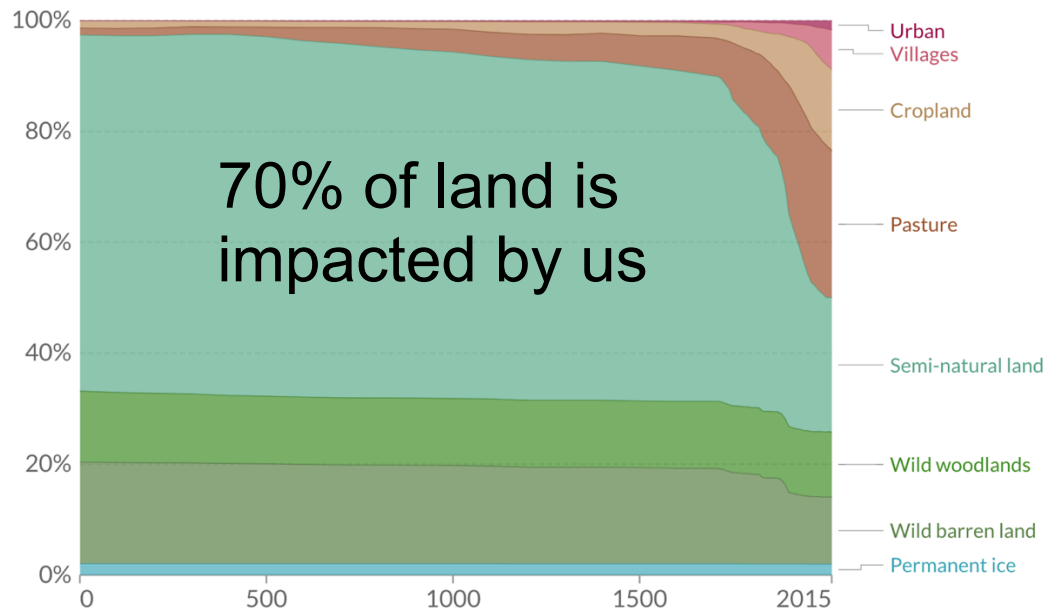
If couples have a choice between a high standard of living or a large family, they will almost certainly chose the former – which is exactly what we see today: the number of children born to American women has been consistently at or below 2 for the past 50 years – simply because most Americans cannot afford to have more than 2 kids. Or maybe they could, if they cut down on other expenses, houses, cars, vacations, gadgets etc. – but they rather chose to cut down on children.

#### **Myth 5. The world can easily feed 10 or 20 billion people**

Well, sure, it can, hence it’s not a myth. The myth part starts, as usual, with the conditions: IF we are willing to give up nature, as we know it. At 8 billion people, we have already altered and used about 70% of arable land [8]. If 20 billion people need industrial agriculture, irrigation, pesticides, and deforestation to grow all that food, there won’t be much nature left, if any. Especially if climate change increasingly pummels the natural land left, which is exactly what we see right now.

Our dominance over nature is actually directly measurable. For instance, there are about 6000 species of mammals, ranging from tiny mice to elephants and whales. If we add up the weight of all wild mammals and compare them to the weight (or biomass) of all humans and their livestock, the latter make up a whopping 96% of that weight [9]. In other words, we (and our

livestock) haven't just replaced wild animals, we are just overwhelming their livelihood by our sheer land grabbing voracity.



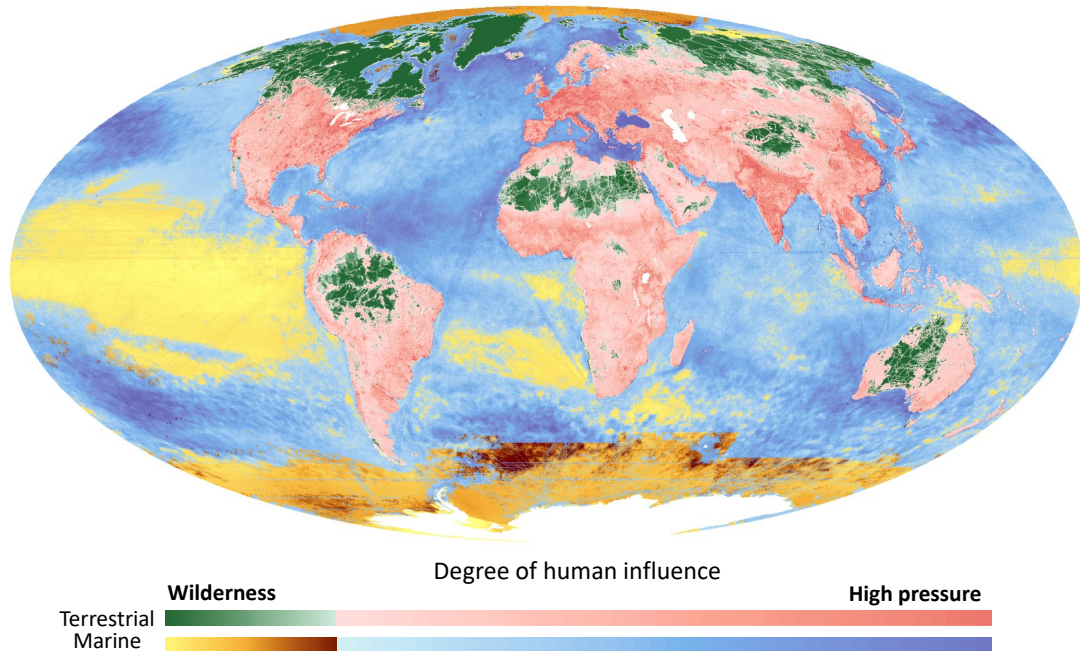
Source: Ellis, E. C., Beusen, A. H., & Goldewijk, K. K. (2020). Anthropogenic Biomes: 10,000 BCE to 2015 CE. OurWorldInData.org/biodiversity • CC BY

### Myth 6. We have plenty of nature left

Many people would say that they are perfectly happy without insects (and mosquitos in particular). Unfortunately, 75% of our crops are more or less dependend on insect pollinators and about 35% of crop production is [9b]. Removing insects would simply be suicidal. And removed they will be. A recent assessment of 71,000 species showed that about 50% of them experienced a decline in population size [10]. Only 3% increased their population size (and a substantial number of these are invasive species, so that's not exactly good news). We published a study a few years ago in which we showed that 1 in 8 reptile species (or a total of about 1000 species) is only known from a single locality [11]. That is, if someone decides to clear a patch of land where they occur, that species is likely gone (and possibly dozens of others with a similarly restricted distribution).

Conservation biologists have long known that reducing population sizes makes species less adaptable and thus more prone to extinction, especially when factors such as climate change exacerbate extinction pressure [12, 13].

As a last example, coral reefs are almost certainly doomed, given the projected warming of the oceans and their sensitivity to both warming and acidification [14]. Everybody who has seen a nature documentary knows that coral reefs are teeming with a bewildering diversity of life – but probably not for much longer.



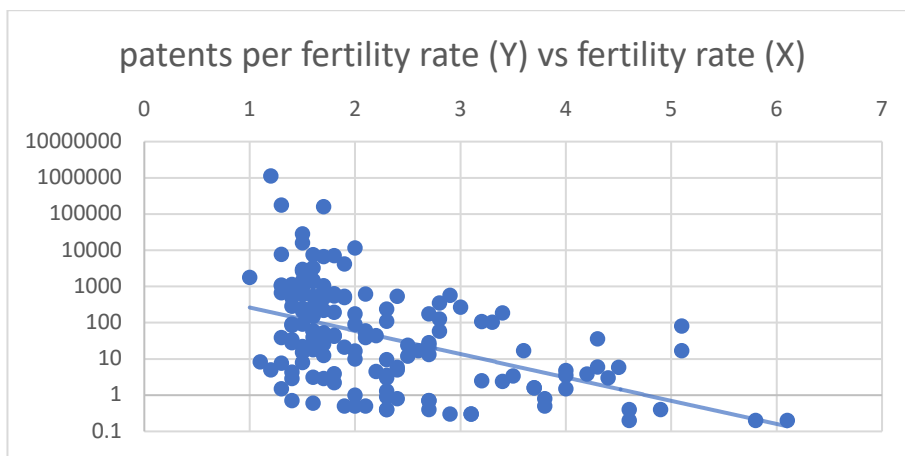
A pathetically small amount of nature is in a truly pristine state. This map shows the worlds remaining wildernesses, that is, areas that are not or hardly impacted by humans [15]. Two of them, the Sahara region and central Australia, are deserts which do not have much biodiversity anyway. Three of them are hardly habitable, namely the subarctic areas of Canada and Russia, and the Tibetan plateau, which leaves only the Amazon as a biodiversity hotspot – and that is still under immense pressure from deforestation and agricultural expansion.

**Myth 7. We need more people to drive the economy and to take care of our aging society**

Indeed, more people will increase the number of producers and consumers, which is good for the economy. However, in the long run, a liveable planet will be more important for humanity than a vibrant economy. So, the question becomes how can our society deal with a stagnant or even shrinking population and thus a potentially shrinking economy. Unfortunately, there are no simple solutions [16], except that that there is simply no alternative to a shrinking economy (at least as far as the number of consumers and their consumption goes). There is some hope that further automation and AI will increase productivity and some studies have shown that countries like China, which faces a shrinking population, can keep up economic output and productivity, especially with an increase in technology. More specifically, an ageing society has to deal with the changing dependency ratio (DR), that is, the ration between those who need to be taken care of (children and old people in particular) and those in the labor force. More recent attempts have tried to factor in productivity at various ages into the dependency ratio and some studies suggested that such adjusted DRs are predicted to remain relatively constant in countries like China for the next couple of decades because of improving productivity. However, this may require investments in (life-long) education and child health to maintain social stability even when populations age [17].

### Myth 8. We need more young people who will drive innovation to combat climate change

This is related to the previous myth, but it is different in one important way: it's not true – even though the Economist claimed it is [18]. First, it's not the sheer number of people who drive innovation. **Culture** of discovery and innovation is much more important than the sheer **number** of people, no matter how old they are. That's why Silicon Valley, MIT, the Institut Pasteur, or RIKEN (in Japan) are centers of innovation. I carried out my master's thesis at the Max-Planck-Institute for Medical Research in Heidelberg, Germany, which had more Nobel Prize winners than the whole Muslim world (50 countries) *combined*. Are muslims more stupid than Germans? Certainly not! But we know that some societies foster a culture of curiosity, risk-taking, and discovery and others do not. Not surprisingly, the least amount of innovation comes exactly from those countries that have the highest birth rates:



There is not a single country with more than 2 children per woman (= total fertility rate, TFR) that is anywhere near the high patent nations (all of which have low fertility rates). Note the logarithmic scale, so the effect is actually much more pronounced than it seems. TFR from <https://unfpa.org>, patent numbers from <https://indexmundi.com>.

Notably, the speed of discovery has constantly increased, and that increase was *not directly* a function of total population size, but rather a function of education, wealth, and culture. That is, most technological developments are driven by a small number of highly trained people, hence increasing education and training efforts has a much bigger impact than just making more people. In addition, technology progresses at an ever increasing rate. For instance, the throughput of DNA sequencing has increased from a few base pairs (per day and researcher) to billions of base pairs within a few decades. AI will almost certainly bring about another boost in both discovery rates and reduce the number of people needed to make such progress.

### What can we do?

We don't have to go as far as Milton Saier suggested in his essay and "Don't Give Birth!" It would be breakthrough if humanity could reduce its fertility by half a child (see figure under Myth 3), but it's likely not sufficient. We need a plethora of measures to reduce birth rates (until a stable level of 2-3 billion). At the same time, we need to overcome the problems of an aging population (with a high demand for caretakers and a robust retirement system). However, that's not enough, our whole agricultural and industrial system has to be overhauled, with less land-intensive food production, renewable energy and a circular economy. Equally

important, women and girls need full access to education and contraception and the same rights as men. Similarly, our education system has to teach the value of our natural resources and the limits to growth.

As a response to declining birth rates in many countries, 55 governments have already started to promote pro-natalist policies, that is, they actively encourage women to have more babies [19]. These policies appear justified, given the panic about sinking birth rates, but they are misguided for the aforementioned reasons.

It would be a better short-term solution to coordinate the lack of babies in some countries with the surplus of babies in others. Population growth in the US and Canada has been entirely driven by immigration. While immigration should be limited to sustainable levels (e.g., towards stabilization of the North American population), that would still allow the immigration of close to a million immigrants to this area. The same is true for the EU which could absorb about a million immigrants a year and STILL have a slowly shrinking population. At the same time, rich countries and their immigrants should pay for the development of poorer countries, to help them industrialize and to develop their infrastructure and education systems.

It is clear that further population growth or even stabilization at a high level will be catastrophic for the planet, especially if human consumption and the destruction of nature keeps growing. We need to stop population growth **and** consumption, so that human civilization **and** nature have a chance to survive.

#### References and footnotes:

- [1] <https://ourworldindata.org/grapher/fertility-rate-with-projections>
- [2] The Economist, 3 June 2023, p. 50
- [3] Wang et al. 2014, Low Carbon Economy, 5, 133-138, <http://dx.doi.org/10.4236/lce.2014.54014>, and Statista (for post-2014 years)
- [4] Chancel, L. (2022) Nature Sustainability, <https://doi.org/10.1038/s41893-022-00955-z>
- [4b] Kharas, H. (2017) The unprecedented expansion of the global middle class. Brookings Institution, [https://www.brookings.edu/wp-content/uploads/2017/02/global\\_20170228\\_global-middle-class.pdf](https://www.brookings.edu/wp-content/uploads/2017/02/global_20170228_global-middle-class.pdf)
- [5] <https://www.nytimes.com/interactive/2023/09/18/opinion/human-population-global-growth.html>
- [6] <https://www.washingtonpost.com/news/morning-mix/wp/2015/01/20/pope-says-3-children-per-family-is-about-right-catholics-dont-need-to-breed-like-rabbits/>
- [7] Wackernagel & Beyers (2019), Ecological footprint, New Society Publishers
- [8] Ellis, E. C., Beusen, A. H., & Goldewijk, K. K. (2020). Anthropogenic Biomes: 10,000 BCE to 2015 CE. <https://ourworldindata.org/grapher/global-land-use-since-10000bc>
- [9] Greenspoon, L. (2023) PNAS 120 (10), <https://doi.org/10.1073/pnas.2204892120>
- [9b] <https://ourworldindata.org/pollinator-dependence>
- [10] Finn, C. et al. (2023) Biol. Reviews, <https://doi.org/10.1111/brv.12974>
- [11] Meiri, S. et al. (2017) Diversity and Distributions, <http://dx.doi.org/10.1111/ddi.12678>
- [12] Scott, P.A. et al. (2020), Science 370 (6520): 1086-1089, <http://dx.doi.org/10.1126/science.abb0421>



- [13] Murali, G. et al. 2023, Nature 615: 461, <https://doi.org/10.1038/s41586-022-05606-z>
- [14] <https://www.nytimes.com/2021/10/04/climate/coral-reefs-climate-change.html>
- [15] Watson & Venter 2021, Current Biology 31, R1141–R1224, <https://doi.org/10.1016/j.cub.2021.07.041>
- [16] Jackson, T. (2016), Prosperity without Growth, Routledge / Taylor & Francis
- [17] Marois, G. (2021), PNAS 118 (40), <https://doi.org/10.1073/pnas.2108900118>
- [18] The Economist, 3 June 2023, p. 16
- [19] UN Population Division (2021), World Population Policies 2021, UN DESA/POP/2021/TR/NO. 1.

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