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No Simple Answers

Computer modeling reveals that limiting births alone will not solve the global crisis - we must change our behavior in many ways

by [Robert Gilman](#)

One of the articles in [Birth, Sex & Death \(IC#31\)](#)

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On its surface, the "population explosion" looks like a conceptually simple problem with an equally simple solution: The world is getting crowded and all these people are putting too much stress on the environment. The obvious solution: have fewer children. Of course, there are mammoth political, social and cultural roadblocks in the way, but if we could just cut the birth rate we'd have the root cause of our environmental problems licked.

So it seems. Yet what we've found in developing this issue is that this simple picture is at best only a half truth. Human family planning is part of an intricate, and fascinating, web of relationships that touch on almost every aspect of society - with many surprising consequences - and population growth is more often a symptom than a cause of our fundamental problems. This article explores that surprising web from two perspectives - one global and one very personal.

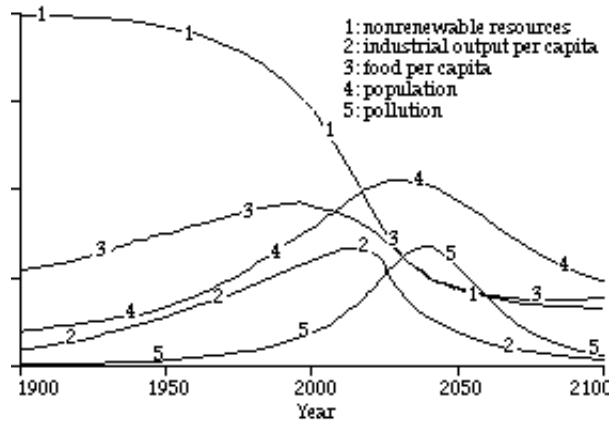
POSSIBLE FUTURES

The best tool I've found for understanding the global dynamics of population growth, and its related environmental and economic impacts, is the computer model that served as the basis for *The Limits To Growth* twenty years ago, and that has now been updated for *Beyond The Limits: Confronting Global Collapse, Envisioning a Sustainable Future*, by Donella H. Meadows, Dennis L. Meadows, and Jørgen Randers (available April 1992 from Chelsea Green Publishing Co., PO Box 130, Post Mills, VT 05058).

This model is based on the best current understanding of the global system as a whole, and it provides the clearest encapsulation of the challenges of the 21st century that I have seen. It is, of course, only a model, and because it treats the world as a unit, it necessarily involves many simplifications. Nevertheless, it is very good at illustrating the basic patterns that result from various fundamental cultural choices. We can learn a lot about "human family planning" with its help.

Figure 1 illustrates how world population, food per person, industrial output per person, remaining nonrenewable resources, and pollution have changed since 1900. It also shows how these will likely change through 2100 if we keep on with business-as-usual. The pattern

of rise and fall in these curves represents a cycle that system theorists describe as "overshoot and collapse" (see IC #30, p. 11).



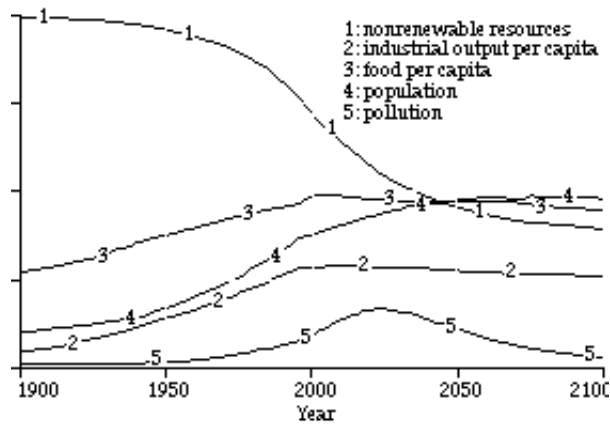
In this particular case, the collapse is caused largely by an industrial system that is crucially dependent on nonrenewable resources. As these resources become harder to extract from the earth, requiring ever increasing amounts of capital and energy just to get them into usable form, the economy becomes trapped. It can't provide what it used to in the way of investment in agriculture, consumer goods and services, and it no longer has the flexibility to restructure itself to make better use of renewable resources. The economy thus spirals down, pulling down agriculture and health care with it, yet still gobbling up lots of nonrenewable resources along the way. Death rates rise dramatically through hunger and disease, desperate humans ravage what is left of the world's ecosystems, and the foreseeable future is uniformly bleak.

Is the model accurate? It mimics the behavior of the world from 1900 to now remarkably well. Its description of the future, however, is based on assuming that people will keep behaving as they have during the 20th century, and that our current knowledge of important data (such as the amount of nonrenewable resources) is correct.

What if the data are wrong? Suppose, for example, that there are actually more nonrenewable resources than the model assumes. The beauty of a computer model is that it is easy to test such "what if" questions. If we double the amount of nonrenewable resources that the model assumes, the pattern of overshoot and collapse remains the same. The collapse gets delayed by about two decades, and in this case is driven by declining soil fertility and increased pollution, as well as the eventual exhaustion of nonrenewable resources.

The result of this, and many similar tests, is that reasonable variations in the data underlying the model do shift *when* the collapse occurs, but they do not change the basic *pattern* of overshoot and collapse. I should also point out that the model is not really designed for accuracy once the collapse begins, since it does not include provisions for war, social violence, or other likely breakdowns in the social system. In this sense it is probably overly optimistic and gentle about the world's likely behavior after the onset of a collapse.

What can we do to avoid such a fate? We have to change our behavior. Figure 2 provides one example of how this could be done.



In this figure, everything is the same as in Figure 1 until 1995. In that year the world (within the model) changes its behavior in the following ways:

Technology

- * We begin moving away from our dependence on nonrenewable resources so that this dependence (per unit of industrial output) gets cut in half in 20 years through greater efficiency and a greater use of renewable resources, and then keeps declining into the future.
- * We improve agricultural technologies and particularly soil conservation so that agriculture is less damaging to the land.
- * We reduce pollution so that the pollution production rate per unit of industrial output gets cut in half in 20 years, and keeps declining.

Consumption

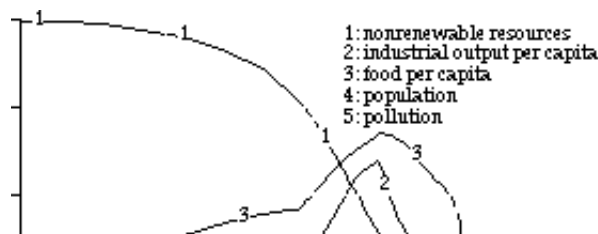
- * We limit the world's average industrial output per capita to a maximum of about 80% of current Western European standards. It is important to note that this limit is only on *output*, not consumer use. If, for example, we make products that last twice as long, *the world could have an average material standard of living about 160% of Western European standards.*

Population

- * We make effective birth control methods available to everyone.
- * The world's average "desired number of children per family" becomes two.
- * We increase the proportion of industrial output that is invested into human services by about 50%.

All of these changes, even though they would involve significant cultural and economic shifts, are well within our human capabilities. Given the stakes involved, whatever difficulties these changes might involve would be a small price to pay. The reward for doing them is clear. Population, food per capita, and industrial output per capita all stabilize at reasonable levels, and the human impact on the environment declines considerably.

Could we achieve a similar result by focusing on population growth alone? To test this, I put an extreme assumption into the model: no births after 1995. Otherwise, all the assumptions were the same as for Figure 1. Figure 3 gives the results:





Eventually (around 2060) food per capita and industrial output per capita collapse completely because there are only elders left, and no more labor force - about what you would expect from a world with no births! What I find much more interesting, however, is that the collapse in food per capita and industrial output per capita begin much earlier (around 2020), and for the same reasons that drive the collapse in Figure 1.

In other words, *the people who are already alive today are enough to drive the world to economic and social collapse if we keep on with business-as-usual*. Even this extreme example of population reduction through birth control is just too slow. A less extreme case, applying China's one child policy to the world starting in 1995, produces results that are even closer to Figure 1; indeed, the collapse is delayed by less than a decade.

Could technological change or limiting industrial output by themselves do any better? The technological changes used for Figure 2 have the most immediate impact, and delay the collapse the longest, but even these eventually reach their limits. It looks as though *the whole package is necessary to make a genuine transition to a sustainable society*. Of the three, however, population control is the slowest in its impact. If we don't move vigorously on changing to more efficient technologies and limiting our material consumption, all our efforts on population control will be too little and too late.

Another useful way of looking at this is with Paul Ehrlich's equation:

$$\text{Impact} = \text{Population} \times \text{Affluence} \times \text{Technology}$$

or $I = PAT$ for short. What we can say with some certainty is that the total human environmental impact is on an unsustainable path that will lead to social and environmental collapse if we don't soon change the growth patterns on the PAT side of the equation. Figure 2 shows how this could be done, and Figure 3 shows that we can not rely on birth control alone, even in its most extreme form.

Let's take this a step further by asking the fundamental population question. Are there too many people? What is the Earth's carrying capacity for humans? How much is enough? Figure 2 says that the Earth could sustainably support, with a decent standard of living, about 8 billion of us - in other words the Earth is not necessarily overpopulated now. In my reading of the population literature, I find three underlying reasons for claiming that there are already too many people:

* A factual disagreement on the Earth's carrying capacity. Assessing this is far from easy, and depends heavily on what one assumes for the A and T parts of PAT. There is lots of room for disagreement here, and it is a topic that deserves increased attention.

* A desire to minimize the social and economic changes required to reduce A and T. "If they would just stop having so many children, I could go on living in the style to which I am accustomed." As Figure 3 illustrates, this often unspoken, but nevertheless all too common attitude is based on a fundamental misunderstanding of the time scales involved. Even the most extreme birth reduction will not eliminate the need for substantial changes in A and T.

* An essentially negative view of the value of human life. Here we get down to what may be an even more fundamental question: Can humans be a blessing to the planet? For those to whom the answer is no, the fewer humans the better. My own feeling is that one could well argue that today humanity as a whole is not a blessing, but I see enough examples of people who *are* that I can well imagine the balance shifting to the positive.

Are there too many people on the Earth? I would put it differently. There is too much human impact, too much wasteful consumption, too many unloved children, too many uncaring people, and too many powerful institutions that reinforce uncaring and destructive behavior. History is forcing us to confront these excesses and social failures now. Once we

have done so, we will be in a much better position to decide how many caring humans are enough for the Earth.

GETTING PERSONAL

These issues are not just abstract policy questions; they are also very personal. They hit home most profoundly in the question, "Should I have children?" We've encountered a great deal of debate, opinion and emotion (and generated some of our own!) on this pivotal personal question. I'd like to share some of what I've learned out of this debate as another illustration of the intricacy of the issues around population control.

Let's start with a sore spot in the culture: Many people who have chosen to be childless, in part due to environmental concerns, feel unappreciated by those with children. On the other hand, many parents (who are raising those who will keep the society going as we all get older) feel unappreciated by the childless. Both have a point, yet both, from my perspective, do more harm than good when they argue that either voluntary childlessness or voluntary parenting is, *in some general sense*, better.

Consider first the flaws in the notion, often unconsciously assumed in our society, that every adult who can have children should do so:

* This idea is simply out of touch with historical reality. Most past societies have had a significant minority of voluntarily childless adults. Even as recently as 1920 in the US, 25% of women past childbearing age had never had children. If we find this at all strange, it is simply that our fragmented, nuclear-family-oriented society has lost its sense of history and lost the web of relationships that used to keep childless aunts and uncles still very much part of the family.

* In addition, concerns about overpopulation *are* legitimate, certainly legitimate enough so that no one should feel an *obligation* to have children just to keep the species going!

* Finally, many people can contribute much more fully to society without carrying the burdens that parenting often imposes.

Does this then mean that we should invert the society's bias and uphold childlessness as an ideal? Consider:

* As Figure 3 illustrates, even worldwide complete childlessness would not avert the collapse to which business as usual is taking us.

* Society needs good parents and well-raised children.

* Making childlessness into an ideal sends a powerful anti-parent and anti-child message - with far-reaching repercussions. In the US this is already illustrated by the great rise during the 1980s in the percentage of children living below the poverty line. We have tolerated this as a society because we increasingly see children (especially other people's children) as a burden, not a blessing. In other parts of the world the same attitude is dramatically illustrated by the systematic killing of street children in Brazil, and much more broadly, by the low priority given to the needs of mothers and children. Ironically, low status for women and high death rates for children are two of the key factors *driving* the population explosion. So by sending out a "too many people" message we inadvertently, yet significantly, contribute to a cultural climate that produces both more rapid population growth and lower quality childhoods!

So is it better to have children, or not to have them? The question itself is, I believe, wrong. There is no general answer. It all depends on who you are. The environment can benefit from fewer children *and* from well-raised children. There are selfish and unselfish reasons for both choices. Only in the specifics of each person's life can any judgment be made. The sooner we can celebrate the diversity that makes it good for one person to choose childlessness and simultaneously good for another to choose parenting, the sooner we will be able to get on with the real challenge of making the changes throughout our society that will lead to a humane and sustainable future.

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