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NPG Forum

The Most Overpopulated Nation

by Paul R. and Anne H. Ehrlich

This is the fourteenth in a series of NPG FORUM papers exploring the idea of optimum population — what would be a desirable population size for the United States? Without any consensus even as to whether the population should be larger or smaller, the country presently creates its demographic future by inadvertence as it makes decision on other issues that influence population change.

The approach we have adopted is the "foresight" process. We have asked specialists in various fields to examine the connection between alternative population futures and national or social objectives, and how policy may influence population change. In this issue of the FORUM, the Ehrlichs examine the impact of U.S. population size upon the global ecology, particularly in the context of our massive reliance on fossil fuels.

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Lindsey Grant, Editor

Those of us who deal with population issues all the time are frequently confronted by people who believe the population problem belongs to someone else. It traces, in their view, to poor Indians who do not understand how to use condoms, or to Mexican peasants who invade our country to steal our jobs, or to the Catholic hierarchy which persists in its irrational opposition to the use of effective birth control methods. But Indian peasants mostly *want* the children they have — they know how to use condoms. And at the moment Mexican immigration is probably a net benefit for the United States — although in the middle term it could become a disaster. And crazy as the Vatican's position is, relatively few Catholics pay any attention to it. After all, Italy has the smallest family sizes in the world!

But it just does not wash. Yes, poor nations have serious population problems, but in many respects rich nations have worse ones. Nothing recently has made the degree of over-population in the United States more obvious than George Bush's confrontation with Iraq. If the United States had stabilized its population in 1943, when it was in the process of winning the largest land war in history, today it would just have 135 million people. Assume that per-capita energy consumption nevertheless had grown to today's level — that is, our smaller population was still using sloppy technologies: gas-guzzling automobiles, inefficient light bulbs and pumps, poorly insulated buildings, and so on. Even if its citizens were just as profligate users of energy as we are, the 135 million United States citizens could satisfy their energy appetite *without burning one drop of imported oil or one ounce of coal.* [2]

Of course, if we had been smart, we also would have become energy efficient and would have made a transition to some form of solar-hydrogen economy. It has been estimated that an energy-efficient America could have the goods now supplied by energy use at an expenditure of about one third the energy now employed. And it is crystal clear that for the environmental health of the globe as a whole, and the United States itself, a drastic reduction in the use of energy technologies that place greenhouse-enhancing carbon dioxide into the atmosphere is mandatory.

I = PAT

The impact of a population on the environment can be roughly viewed as the product of three factors: the size of the population (P), the level of per capita consumption or affluence (A), and the measure of the impact of the technology (T) used to supply each unit of consumption. This provides the short-hand equation I = P x A x T which, although oversimplified (because the three factors P, A, and T are not independent), provides a basis for comparing the responsibility of different nations or groups for environmental deterioration.

Using the I = P A T equation, one can see that the population problem in the United States is the most serious in the world. First of all, the P factor is huge — with 250 million people, the United States is the fourth largest nation in the world. And compared with other large nations, the A and T factors (which when multiplied together yield per-capita environmental impact) is also huge — on the order of one and a half times that of the Soviet Union, twice that of Britain, Sweden, France, or Australia, fourteen times that of China,

forty times that of India, and almost 300 times that of a Laotian or Ugandan. In per-capita energy use, only a few oil-producing nations in the Middle East such as Qatar and Bahrain, plus Luxembourg and Canada are in our league, and those nations have comparatively tiny populations. When the population multiplier is considered, the *total* impact of the United States becomes gigantic, several hundred times that of Bangladesh.

Those multipliers are based on per-capita commercial energy consumption, which is the best surrogate for A x T that is readily found in government statistics. The contributions of very poor countries to environmental deterioration are underestimated by these statistics, since they don't include the impacts of use of "traditional" energy sources (fuelwood, dung, crop wastes) that comprise 12 percent of energy use globally, but a much larger component in poor countries. Considering them would not change the U.S. position as the planet's primary environmental destroyer, though.

That preeminence makes sense intuitively, too. Few Laotians drive air-conditioned cars, read newspapers that transform large tracts of forest into overflowing landfills, fly in jet aircraft, eat fast-food hamburgers, or own refrigerators, several TVs, a VCR, or piles of plastic junk. But millions upon millions of Americans do. And in the process they burn roughly a quarter of the world's fossil fuels, contributing carbon dioxide and many other undesirable combustion products to the atmosphere, and are major users of chlorofluorocarbons, chemicals that also add to the greenhouse effect and attack Earth's vital ozone shield.

We have destroyed most of America's forest cover (replacing a small fraction of it with biologically impoverished tree farms) and are busily struggling to log the last of the old-growth forests in the Northwest, threatening the long-term prosperity of the timber industry, in part to service the junk bonds of rich easterners. The western United States is one of the largest desertified areas on the planet from overgrazing by cattle and sheep — not because we need the meat (only a small portion of our beef comes from the arid West), but because of the political power of ranchers in the western states and a nostalgic view of western history. And Americans have contributed mightily to the destruction of tropical forests by purchasing products ranging from beef to tropical hardwoods derived from the forests.

Furthermore, each additional American adds disproportionately to the nation's environmental impact. The metals used to support his or her life must be smelted from poorer ores at higher energy cost, or transported from further away. The petroleum and water he or she consumes, on average, must come from more distant sources or from wells driven deeper. The wastes he or she produces must be carried further away, and so on. Activities that created little or no environmental burden when the United States had a small population — such as putting CO_2 into the atmosphere by burning fossil fuels — increase that burden with every additional individual when the population is large.

Consuming Our Capital

Basically, like most of the rest of the world, the United States has been consuming environmental capital — especially its deep, fertile soils, ice-age ground water, and biodiversity — and calling it "growth. " Furthermore, directly and by example, it has been helping other nations to do the same. It would not be remotely possible for Earth to support today's 5.4 billion people on humanity's "income" (which consists largely of solar energy) with present technologies and life-styles — even though for billions their lifestyle is living in misery, lacking adequate diets, shelter, health care, education, and so on. And in the last decade America has retarded the worldwide movement towards population control because of the brain-dead policies of the Reagan and Bush administrations.

The key to civilization's survival is reduction of the scale of the human enterprise and thus of the impact of human society on our vital life-support systems. This can be achieved most rapidly by reducing all of the P, A, and T factors. In rich nations, this means immediate and rapid conversion to much more efficient use of energy and an immediate press towards population *shrinkage*. Fortunately, rich nations have the kind of age composition that makes the transition towards negative population growth (NPG) a relatively simple matter (a few European countries have already achieved it).

The Holdren Scenario

The best overall strategy would be based on the Holdren scenario.[3] That scenario deals with a combination of population size and per-capita energy use. As you can see in the chart below, total annual worldwide energy use today is almost 14 terawatts, produced by the combination of a relatively small population of rich people each using a great deal of energy, and a huge population of poor people each using relatively little energy. The essence of Holdren's scenario is that rich countries would become much more energy efficient, reducing their per-capita use from almost 8 kilowatts to 3 kilowatts (this means a reduction in the United States to less than one third of current use, but this clearly is technically feasible with no loss in quality of life). In poor countries, per-capita use would increase from 1.2 to 3 kilowatts, so that at the end of a century everyone would basically have the same standard of living (at least as measured by access to energy).

If population shrinkage in rich countries and population control in poor countries could limit the peak size of the human population to 10 billion, the Holdren scenario would result in a total global energy use of about 30 terawatts. Whether or not that would be sustainable for even a short time would depend, among other things, on whether or not

		POPULATION [billions $=10^9$ people]	X	ENERGY/PERSON [kilowatts = kW $= 10^3$ watts]	=	TOTAL ENERGY USE [terawatts = TW $=10^{12}$ watts]
1990	RICH	1.2		7.7		9.2
	POOR	4.1		1.1		4.5
		5.3				13.7
2025	RICH	1.4		3.9		5.4
	POOR	6.8		2.2		15.0
		8.2				20.4
2100		10		3		30 (>2X now)

the poor countries repeat the previous mistakes of the rich countries in development or concentrated on using more environmentally benign energy technologies — in particular, some form of solar power and the use of hydrogen as a portable fuel. Our guess is that it might be possible to run a world temporarily on 30 terawatts, but to prevent long-term deterioration it will be necessary to reduce population size substantially below 10 billion. Indeed, the population eventually should be reduced to the vicinity of 1 or 2 billion with an aggregate energy use of, say, 5-7 terawatts, if the health of ecosystems is to be restored and a substantial safety margin provided.

The American Role

A large part of the responsibility for solving the human dilemma rests on the rich countries, and especially on the United States. We are the archetype of a gigantic, over-populated, overconsuming rich nation, one that many ill-informed decision makers in poor nations would like to emulate. Unless we demonstrate by example that we understand the horrible mistakes made on our way to over- development, and that we are intent on reversing them, we see little hope for the persistence of civilization.

The first step, of course, is for the United States to adopt a population policy designed to halt population growth and begin a gradual population decline. Such steps can be taken without immediately targeting an eventual optimum population size, since that optimum is far below 250 million. With a little leadership at the top — say a president who kept pointing out that patriotic Americans stopped at two children *maximum* — we could probably achieve NPG in the United States within a couple of decades.

Immigration and Population

Americans would also, of course, have to recognize that for every immigrant that arrives in the United States who is not balanced by an emigrant, a birth must be forgone. We can never have a sane immigration policy until we have a sane population policy. What the mix of births and immigrants should be is a difficult question which must be solved by public debate. Our own view is that immigration adds important variety to our population and permits America to give refuge to people who really need it. So our preference would be to maintain a reasonable level of immigration and compensate for it with fewer births. But many others would consider the small family sizes that required too high a price to pay, or they simply do not like 'foreigners' (or are outright racists) and would prefer much stricter limits on immigration. Throughout this debate, it must be kept in mind that from a global environmental perspective, immigration into the United States is not neutral. Immigrants from poor nations, often among the brightest and most ambitious members of their societies, are frequently very successful financially and even the less well-off quickly acquire American superconsuming habits. They tend to bring with them the reproductive habits of their societies, so that they also produce larger families of superconsumers than those of us whose families immigrated earlier. So even though immigration to the U.S. does not produce a net increment to the global population[4], it does produce a net increment in total environmental impact.

The immigration issue is extremely complex and ethically difficult[5], but it must be faced. Equally daunting, after a decision on levels of immigration is made, is monitoring the flow and enforcing the quotas. Badly needed now is a wide-ranging discussion first of population policy and then of immigration within the context of that policy.

Optimum U.S. Population

Which brings us finally to the question of an optimum population for the United States. What can be said about it in light of the foregoing discussion? About the only thing that is certain is that the optimum will depend upon the scale of the A and T factors. And with a quality of life that more or less resembles today's or a superior quality, and present or foreseeable technologies, the optimum would be far below the present population.

Calculating an optimum size for any human population today is no easy task. First of all, the optimum will depend on the standard of living of the average individual. A population of vegetarian Gandhis can be much larger than one made up of superconsuming Trumps. Then it depends on the environmental impacts of the technologies used to support the life-style. An optimum population that uses light, highly fuel-efficient vehicles for personal transportation can be larger than one that drives Detroit gas-guzzlers. And one that uses commuter trains, buses, carpool vans, or even re-

designs its cities to eliminate most commuting can be even bigger. The optimum size also depends, on this interdependent globe, on population sizes, technologies, and life-styles adopted by other populations. And, of course, the optimum population size depends upon the answer to the question: 'For how long will it be sustained?' With a Reaganesque program of consuming all natural resources for the exclusive benefit of people now alive, the optimum will certainly be much higher than one that gives importance to the long-term maintenance of society.

Finally, optimum population depends upon the aggregate of life-style choices of individual citizens. An America where nearly every family wanted to live on at least a five-acre parcel of land would have a much lower optimum population size than an America populated with people who loved crowded living in action-filled cities.

With all of these caveats, let us give some personal opinions on optimum population for the United States. No sensible reason has ever been given for having more than 135 million people. The putative reason for choosing that number is that America fought and won (with lots of help from others) the greatest war in history with that number of people. But there is no sign today, indeed there wasn't during the World War II, that brute numbers led to victory. The Germans and Japanese, with tiny populations compared to the allies, almost won the war — with a combination of, on average, better military leadership, better weapons, interior lines of communication, and, often, superior troops. The struggles of Germany with the Soviet Union and Japan with China highlighted these factors — clearly if the other allies hadn't been involved, David would have mopped up Goliath in both cases. And, of course, Israel today puts permanently to rest the notion that a large population is essential for military power.

Our personal preference would be to design a nation with a maximum of life-style options, so if we were forced to make an estimate of the optimum population size of the United States, we'd guess around 75 million people. That was about the population size at the turn of the century — a time when the United States had enough people for big, industrial cities and enough wilderness and open space that people who wanted it could still find real solitude. At about that number we believe a permanently sustainable nation with a high quality of life could be designed — if it were embedded in a world that was similarly designed.

The critical point, though, is that views of an optimum are going to change as society and technology change and as we learn more about the environmental constraints within which society must operate. It is fun to make guesses now, but those guesses may be far from the consensus view of our society a century hence (when, for example, the concept of solitude may be well-nigh forgotten). Unless there is a disaster, it will probably take a century or more even to approach an optimum — plenty of time for research and discussion. It suffices today to say that for our huge, over populated, superconsuming, technologically sloppy nation, the optimum was passed long ago. And because of decades of destruction of natural capital, the optimum will surely be lower the second time we approach it, and lower still for every year we postpone the turnaround. For our own sakes, and that of humanity as a whole, a rapid move to NPG is essential.

NOTES

1. Documentation for many of the statements found in this article can be found in P.R. Ehrlich and A.H. Ehrlich, 1990 *The Population Explosion* (Simon and Schuster, New York) and in P.R. Ehrlich and A.H. Ehrlich, 1991, *Healing the Earth* (Addison Wesley, New York) *in press*. We thank Gretchen C. Daily for helpful comments on the manuscript.
2. Technically the economic system would not have worked quite that way as demand varied, but the point is valid nonetheless.
3. John P. Holdren, 1990, "Energy in Transition," *Scientific American*, September 1990.
4. Most likely it produces a net decrement, since the high TFRs of the immigrants tend to fade in a generation or so, but presumably would have remained higher in the country of origin.
5. See P.R. Ehrlich, D.L. Bilderback, and A.H. Ehrlich, 1979 *The Golden Door* (Ballantine Books, New York).

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