

A Pivotal Moment

POPULATION, JUSTICE, AND
THE ENVIRONMENTAL CHALLENGE

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Edited by
Laurie Mazur

 **ISLANDPRESS**

WASHINGTON, D.C.
COVELO, CALIFORNIA

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Library of Congress Cataloging-in-Publication Data

A pivotal moment : population, justice, and the
environmental challenge / edited by Laurie Mazur.
p. cm.

Includes bibliographical references and index.
ISBN-13: 978-1-59726-661-1 (cloth : alk. paper)
ISBN-10: 1-59726-661-2 (cloth : alk. paper)
ISBN-13: 978-1-59726-662-8 (pbk. : alk. paper)
ISBN-10: 1-59726-662-0 (pbk. : alk. paper)

1. Population—Environmental aspects. 2. Social
justice. 3. Sustainable development. I. Mazur,
Laurie.

HB849.A15.P58 2010

304.6—dc22

2009026573

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CHAPTER I

.....

Human Population Grows Up

JOEL E. COHEN

In the next half century, humanity will undergo historic changes in the balance between young and old, rich and poor, urban and rural. Our collective and individual choices now and in the years ahead will determine how well humankind copes with its coming of age.

The current decade spans three unique, important transitions in the history of humankind. Before 2000, young people always outnumbered old people. From 2000 forward, old people will outnumber young people. Until approximately 2007, rural people always outnumbered urban people. From 2008 forward, urban people will outnumber rural people. From 2003 on, the median woman worldwide had, and will continue to have, too few or just enough children during her lifetime to replace herself and the father in the following generation.¹

The century with 2000 as its midpoint marks three additional unique, important transitions in human history. First, no person who died before 1930 had lived through a doubling of the human population. Nor is any person born in 2050 or later likely to do so. In contrast, everyone born in 1965 or earlier and still alive has seen human numbers more than double from 3.3 billion in 1965 to 6.8 billion in 2009. The fastest population growth rate ever reached, about 2.1 percent a

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year, occurred between 1965 and 1970.² Human population never grew with such speed before the twentieth century and is never again likely to grow with such speed. Our descendants will look back on the late 1960s peak as the most significant demographic event in history, even though those of us who lived through it did not recognize it at the time.

Second, the dramatic fall since 1970 of the global population growth rate to 1.1 or 1.2 percent a year today resulted primarily from choices by billions of couples around the world to limit the number of children born.³ Global human population growth rates have probably risen and fallen numerous times in the past. The great plagues and wars of the fourteenth century, for example, reduced not only the growth rate but also the absolute size of global population, both largely involuntary changes. Never before the twentieth century has a fall in the global population growth rate been voluntary.

Finally, the last half century saw, and the next half century will see, an enormous shift in the demographic balance between the more developed regions of the world and the less developed ones. Whereas in 1950 the less developed regions had roughly twice the population of the more developed ones, by 2050 the ratio will exceed six to one.⁴ These colossal changes in the composition and dynamics of the human population by and large escape public notice.

Here, I will focus on the four major underlying trends expected to dominate changes in the human population in the coming half century. The population will be bigger, slower-growing, more urban, and older than in the twentieth century. Of course, precise projections remain highly uncertain. Small changes in assumed fertility rates have enormous effects on the projected total numbers of people, for example. Despite such caveats, the projections do suggest some of the challenges humanity will face over the next fifty years.

RAPID BUT SLOWING GROWTH

Although the rate of population growth has fallen since the 1970s, current rates (as a percentage) and absolute numbers of global population growth are still greater than any experienced prior to World War II. Whereas the first absolute increase in population by a billion people took from the beginning of time until the early nineteenth century, a billion people will be added to today's population in only thirteen to fourteen years. By 2050 the world's population is projected to reach 9.2 billion, depending on future birth and death rates.⁵ This anticipated

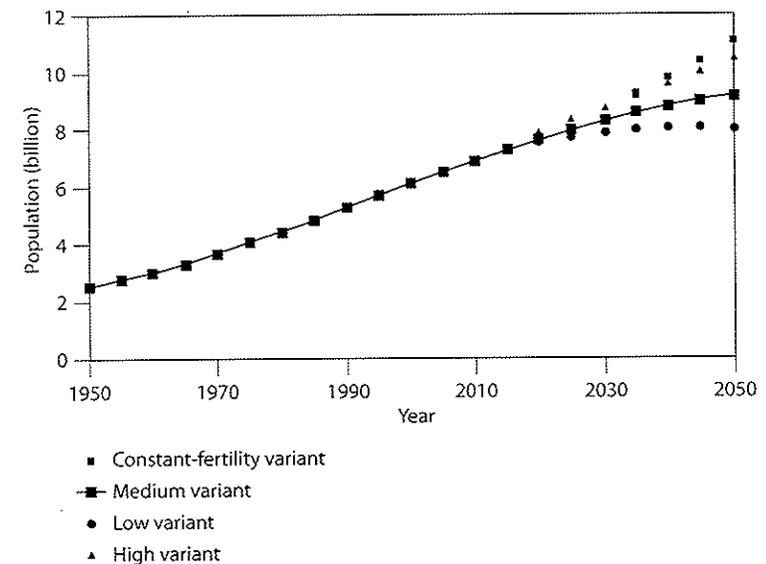


FIGURE 1.1. Population projections to 2050.

Source: UN World Population Prospects, 2006 Revision.

increase from 2009 to 2050 exceeds the total population of the world in 1930, which was around 2 billion.

Childbearing choices made today and tomorrow will help determine the future size of the human population. In the unlikely event that fertility did not decline at all from today's levels, population would grow to 11.9 billion by 2050, nearly doubling from 6 billion in 1999. The 9.2 billion projection above assumes that family planning will be more widely practiced and the trend toward smaller families will continue. If, instead, women average just one more child for every two women, world population could reach 10.8 billion by 2050; if women have one fewer child for every two women, world population could be 7.8 billion by 2050.⁶ A difference in fertility of a single child per woman's lifetime between now and 2050 alters the projection by 3 billion, a difference equal to the entire world population in 1960.

In short, rapid population growth has not ended. Human numbers currently increase by 75 million to 80 million people annually, the equivalent of adding another United States to the world every four years or so.

In short, rapid population growth has not ended. Human numbers currently increase by 75 million to 80 million people annually, the equivalent of adding another United States to the world every four years or so.⁷ But most of the increases are not occurring in countries with the wealth of the United States. Between 2005 and 2050, population will at least triple in Afghanistan, Burkina Faso, Burundi, Chad, Congo, Democratic Republic of the Congo, East Timor, Guinea-Bissau, Liberia, Mali, Niger, and Uganda.⁸ These countries are among the poorest on Earth.

Virtually all population growth in the next forty-five years is expected to happen in today's economically less developed regions. Despite higher death rates at every age, poor countries' populations grow faster than rich countries' populations, because birthrates in poor countries are much higher. At present, the average woman bears nearly twice as many children (2.8) in the poor countries as in the rich countries (1.6 children per woman).⁹

Half the global increase will be accounted for by just nine nations. Listed in order of their anticipated contribution, they are India, Pakistan, Nigeria, Democratic Republic of the Congo, Bangladesh, Uganda, the United States, Ethiopia, and China.¹⁰

In contrast, fifty-one countries or areas, most of them economically more developed, will lose population between now and 2050. Germany is expected to drop from 83 million to 79 million people, Italy from 58 million to 51 million, Japan from 128 million to 112 million, and most dramatically, the Russian Federation from 143 million to 112 million.

Thereafter Russia will be slightly smaller in population than Japan.¹¹

Slowing population growth everywhere means that the twentieth century was probably the last in human history in which younger people outnumbered older ones.

The proportion of all people who

were children aged four years and younger peaked in 1955 at 14.5 percent and gradually declined to 9.5 percent by 2005, whereas the fraction of people aged sixty years and older increased from a low of 8.1 percent in 1960 to 10.4 percent in 2005.¹² Around 2000, each group constituted about 10 percent of humanity. Now and henceforth, the elderly have the numerical upper hand. (Yet while young people comprise a smaller percentage of the world's population, the current gen-

The poor countries will have to build the equivalent of a city to accommodate a million people every five days for the next forty to forty-five years.

BOX 1.1

Crossroads for Population

The Challenge

Rapid population growth will boost human numbers by nearly 50 percent, from 6.8 billion now to 9.2 billion in 2050. Virtually all this growth will happen in existing or new cities in developing countries. During the same period, many richer nations will lose population. Falling fertility and increasing longevity worldwide will expand the proportion of potentially dependent elderly people.

The Solutions

Create a bigger pie, and fewer forks, and better manners: Intensify human productive capacity through investment in education, health, and technology. Increase access to reproductive health care and contraception to slow population growth voluntarily. Improve the terms of people's interactions by reforming economic, political, civil, and social institutions, policies, and practices and achieving greater social and legal equity.

eration of people under the age of twenty-five is the largest ever—see Chapter 2.)

This crossover in the proportions of young and old reflects both improved survival and reduced fertility. The average life span grew from perhaps thirty years at the beginning of the twentieth century to more than sixty-five years at the beginning of the twenty-first century.¹³ The more powerful influence, however, is reduced fertility, adding smaller numbers to the younger age groups.

The graying of the population is not proceeding uniformly around the globe. In 2050 nearly one person in three will be sixty years or older in the more developed regions, and one person in five in the less developed zones. But in eleven of the least developed countries—Afghanistan, Angola, Burundi, Chad, Democratic Republic of the Congo, Equatorial Guinea, Guinea-Bissau, Liberia, Mali, Niger, and Uganda—half the population will be aged twenty-three years or younger.¹⁴

If recent trends continue as projected to 2050, virtually all of the world's population growth will be in urban areas. In effect, the poor countries will have to build the equivalent of a city to accommodate a million people every five days for the next forty to forty-five years.¹⁵

Projections of billions more people in developing countries and

BOX 1.2

The Migration Wild Card

Migration has little immediate effect on global population size but may accelerate the slowing of population growth. Migrants who move from high-fertility to low-fertility regions, or their descendants, often adopt the reduced-fertility patterns of their new home, with some time delay.

From 2005 to 2050, the more developed regions are projected to have about 2.2 million more immigrants than emigrants a year, and the United States is expected to receive about half of these.^a More than most demographic variables, future international migration is subject to intentional policy choices by national governments, making it difficult to predict. Assuming that recent levels of migration continue, the 98 million net migrants expected to move to the developed regions during 2005–2050 would more than offset the projected loss of 73 million people in those countries from an excess of deaths over births.^b

Different international migration scenarios would not greatly affect the sharp rise in the rich countries' proportion of dependent elderly projected for the coming century, although they could dramatically affect population size. In 2000, for example, the U.S. Census Bureau projected the nation's numbers in 2050 with different levels of immigration. Results ranged from 328 million, representing a 20 percent population increase with zero immigration, to 553 million, representing an 80 percent increase with the highest level of immigration—hypothetical net annual immigration rising to 2.8 million by 2050.^c Regardless of migration, though, the U.S. ratio of elderly to working-age people will rise steeply from 2010 until around 2035 and will gradually increase thereafter.^d By 2050 it is projected to reach 39 percent with zero immigration, and 30 percent with the highest immigration.^e

^aUnited Nations, Department of Economic and Social Affairs, Population Division, International Migration 2006. http://www.un.org/esa/population/publications/2006Migration_Chart/Migration2006.pdf.

^b*Ibid.*

^cU.S. Census Bureau, Annual projections of the total resident population as of July 1: middle, lowest, highest, and zero international migration series, 1999 to 2100, (NP-T1). Internet release date: January 13, 2000. Highest date: February 14, 2000. <http://www.census.gov/population/projections/nation/summary/np-t1.txt>.

^d*Ibid.*

^e*Ibid.*

more elderly people everywhere, coupled with hopes of economic growth especially for the world's poor, raise concerns in some quarters about the sustainability of present and future populations.

BEYOND CARRYING CAPACITY

In the short term, our planet can provide room and food, at least at a subsistence level, for 50 percent more people than are alive now. The estimated cereal production in the 2007–2008 crop year of over 2.1 billion metric tons of cereal grains¹⁶ was enough to feed more than 10 billion people a vegetarian diet, while the number of undernourished people rose by 75 million in 2007, bringing the estimated world total to 923 million, with roughly one person in seven undernourished.¹⁷ But as demographer-sociologist Kingsley Davis observed in 1991, “there is no country in the world in which people are satisfied with having barely enough to eat.”¹⁸ The question is whether 2050's billions of people can live with freedom of choice and material prosperity, however freedom and prosperity may then be defined, and whether their children and their children's offspring will be able to continue to live with freedom and prosperity, however they may define them in the future. That is the question of sustainability.

This worry is as old as recorded history. Cuneiform tablets from 1600 BC showed that the Babylonians feared the world was already too full of people. In 1798 Thomas Malthus renewed these concerns,¹⁹ as did Donella Meadows and her coauthors in their 1972 book *The Limits to Growth*.²⁰ While some people have fretted about too many people, optimists have offered reassurance that deities or technology will provide for humankind's well-being.

Attempts to quantify Earth's human carrying capacity or a sustainable human population size face the challenge of understanding the constraints imposed by nature, the choices faced by people, and the interactions between them.²¹ For example, what will humans desire and what will they accept as the average level and distribution of material well-being in 2050 and beyond? What technologies will be used? What domestic and international political institutions will be used to resolve conflicts? What economic arrangements will provide credit, regulate trade, set standards, and fund investments? What social and demographic arrangements will influence birth, health, education, marriage, migration, and death? What physical, chemical, and biological environments will people want to live in? What level of variability

will people be willing to live with? (If people do not mind seeing human population size drop by billions when the climate becomes unfavorable, they may regard a much larger population as sustainable when the climate is favorable.) What level of risk are people willing to live with? (Are mud slides, hurricanes, or floods acceptable risks, or not? The answer will influence the area of land viewed as habitable.) What time horizon is assumed? Finally, and significantly, what will people's values and tastes be in the future? As anthropologist Donald L. Hardesty noted in 1977, "a plot of land may have a low carrying capacity, not because of low soil fertility but because it is sacred or inhabited by ghosts."²²

Most published estimates of Earth's human carrying capacity have uncritically assumed answers to one or more of these questions. In my book *How Many People Can the Earth Support?* I collected and analyzed more than five dozen of these estimates published from 1679 onward. Those made in just the past half century ranged from less than a billion to more than 1,000 billion. These estimates are political numbers, intended to persuade people, one way or another: either that too many humans are already on Earth or that there is no problem with continuing rapid population growth. Scientific numbers are intended to describe reality. Because no estimates of human carrying capacity have explicitly addressed the questions raised above, taking into account the diversity of views about their answers in different societies and cultures, no scientific estimates of sustainable human population size can be said to exist. Too often, attention to long-term sustainability is a diversion from the immediate problem of making tomorrow better than today, a task that does offer much room for science and constructive action. Let us therefore briefly consider two major demographic trends, urbanization and aging, and some of the choices they present.

BOOM OR BOMB?

Many major cities were established in regions of exceptional agricultural productivity, typically the floodplains of rivers, or in coastal zones and islands with favorable access to marine food resources and maritime commerce. If the world's urban population roughly doubles in the next half century, from 3 billion to 6 billion, while the world's rural population remains roughly constant at 3 billion, and if many cities expand in area rather than increasing in density, fertile agricultural lands around those cities could be removed from production, and the

waters around coastal or island cities could face a growing challenge from urban waste. Right now the most densely settled half of the planet's population lives on 2 to 3 percent of all ice-free land. If cities double in area as well as population by 2050, urban areas could grow to occupy 6 percent of the land. Withdrawing that amount mostly from the 10 to 15 percent of land considered arable could have a notable impact on agricultural production. Planning cities to avoid consuming arable land would greatly reduce the effect of their population growth on food production, a goal very much in the urbanites' interest because the cities will need to be provisioned.

Unless urban food gardening surges, on average each rural person will have to shift from feeding herself (most of the world's agricultural workers are women) and one city dweller today to feeding herself and two urbanites in less than a half century. If the intensity of rural agricultural production increases, the demand for food, along with the technology supplied by the growing cities to the rural regions, may ultimately lift the rural agrarian population from poverty, as has happened in many rich countries. On the other hand, if more chemical fertilizers and biocides are applied to raise yields, the rise in food production could put huge strains on the environment.

For city dwellers, the threats of urbanization include frightening hazards from infectious disease unless adequate sanitation measures supply clean water and remove wastes. Yet cities also concentrate opportunities for educational and cultural enrichment, access to health care, and diverse employment. Therefore, if half the urban infrastructure that will exist in the world of 2050 must be built in the next forty to forty-five years, the opportunity to design, construct, operate, and maintain new cities better than old ones is enormous, exciting, and challenging.

After 2010, most countries will experience a sharp acceleration in the rate of increase of the elderly-dependency ratio—the ratio of the number of people aged sixty-five and older to the number aged fifteen to sixty-four. The shift will come first and most acutely in the more developed countries, whereas the least developed countries will experience a slow increase in elderly dependency after 2020. By 2050 the elderly-dependency ratio of the least developed countries will approach that of the more developed countries in 1950.

Extrapolating directly from age to economic and social burdens is unreliable, however. The economic burden imposed by elderly people will depend on their health, on the economic institutions available to

offer them work, and on the social (including familial) institutions on hand to support their care.

The sustainability of the elderly population depends in complex ways not only on age, gender, and marital status but also on the availability of supportive offspring and on socioeconomic status—notably educational attainment. Better education in youth is associated with

“Virtually everything that needs doing from a population point of view needs doing anyway.”

better health in old age. Consequently, one obvious strategy to improve the sustainability of the coming wave of older people is to invest

in educating youth today, including education in those behaviors that preserve health and promote the stability of marriage.²³ Another obvious strategy is to invest in the economic and social institutions that facilitate economic productivity and social engagement among elderly people.

No one knows the path to sustainability because no one knows the destination, if there is one. But we do know of many actions we could take today to make tomorrow better than it would be if we do not put our knowledge to work. These include investments in education, health, and technology; better access to reproductive health care and contraception to slow population growth voluntarily; and reforms that promote greater social and legal equity. As economist Robert Cassen remarked,²⁴ “virtually everything that needs doing from a population point of view needs doing anyway.”

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