

"Nobody knows how to explain the importance of geographic literacy to citizens and leaders of the United States better than Harm de Blij. As the NBC News "geography analyst" explains in his 30th book, "Why Geography Matters," geography is much more than memorizing mountain ranges and estuaries."—*Pittsburgh Tribune Review*

"De Blij argues that most people in the United States, including the country's elected officials, are dangerously ignorant of basic geography. The consequence, he writes, is that leaders lack insights to connections in a world facing climate change, overpopulation, and the continuing threat of terrorism."—*Science News*

"If the author did nothing more than evince the extent to which geography is political destiny, he would have accomplished a worthwhile objective. But he succeeds in much more, raising thought-provoking issues on global warming, terrorism, China's ascendancy, Europe's future, Russia's role, and Africa's prospects, issues our legislative and executive branches of government as well as members of the media need to consider in geographic perspective. Every person responsible for making public policy, as well as those who interpret these complex issues for the public, should read this book."—Anthony H. Ewing, former Director of the Committee on Research Coordination for the Science Advisor, Executive Office of the President

"De Blij, an accomplished academic and regular television geography analyst, writes that by gaining a greater working knowledge of geography, Americans will be better suited to deal with the problems facing the country and the world. De Blij makes a good case for geography's importance. [His] treatment of this subject is particularly refreshing."—*San Francisco Chronicle*

"If we could mandate reading material for our leaders, [this] would be at or near the top of the list. It provides a plethora of insights."—*Cape Cod Chronicle*

"Harm de Blij packs so much useful information and so many thoughtful insights into *Why Geography Matters* that the book is indispensable to those seeking to understand our complex, changing world. The United States State Department would be well served to make this book required reading for all newly recruited foreign service officers and diplomats—and it is strongly recommended for all citizens. . . . de Blij demonstrates persuasively how the tools and findings of geographers are indispensable in understanding the world today. In its scope, analytical balance, power, originality, and readability, *Why Geography Matters* is a matchless book; the riveting chapter on Africa is the best summation of the continent's past and prospects I have ever read."—Willard DePree, Former United States Ambassador to Mozambique and Bangladesh, On Special Assignment to the Department of State

"De Blij writes from a conviction that not only the American public but also government officials can be dangerously ignorant of basic geography, so to enlighten them he discusses three topics with national security implications. His tour of Islamic radicalism has the most immediate relevance and, buttressed by a profusion of maps, it covers Afghanistan, Iraq, the Islamic 'front' in sub-Saharan Africa, and—Paraguay? Learning the significance of that outlier to the geography of Islamic terrorism (as well as its unappeasable aims) typifies many of de Blij's informational surprises, which are arranged clearly and spiced with the author's allusions to his career and travels."—*Booklist*

WHY GEOGRAPHY MATTERS

THREE CHALLENGES FACING AMERICA:
CLIMATE CHANGE,
THE RISE OF CHINA,
AND GLOBAL TERRORISM

Harm de Blij

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between the energetic people of the most progressive parts of the temperate world and the inert inhabitants of the tropics," he wrote, "is largely due to climate."

Small wonder that environmental determinism suffered the fate it did. Still, in recent years, the notion has been rediscovered and subjected to more rigorous analysis. Jared Diamond, who is on the faculty of the Department of Geography at UCLA, in his remarkable work *Guns, Germs, and Steel*, argues that it is not climate alone, but the environmental opportunities offered by a combination of natural conditions ranging from wildlife to plants and from water supply to relief that put certain peoples at an advantage over others (Diamond, 1997). Lose those opportunities, and progress is halted. Benefit from them for a long time, and advantage endures.

On one point all can agree, and it was one Huntington made time and again: climate is cyclic, and the Köppen map represents the present, not the past nor the future. In this time of global warming, A climates are gaining on C climates, C climates are shifting poleward into D climates, and in the Arctic and Antarctic, melting ice and warming water are altering natural habitats (there is even talk of the opening of a maritime northern passage from the North Atlantic to the Pacific). It has all happened before—during the previous interglacial, the Eemian, it got so warm that sealevel reached about 15 feet (4 meters) higher than it stands today. But the Eemian ended with a glacial bang, a return to glacial times so sudden that our ancestors emigrating from Africa froze in the Levant. What will the next millennium bring?

5

A FUTURE GEOGRAPHY OF HUMAN POPULATION

2

When I lived and worked in Washington, D.C., my weekly schedule often involved trips to nearby towns like Alexandria, Silver Spring, Reston, and Vienna. It was almost never easy. Year by year, the roads seemed to become more crowded. I learned to leave extra early for appointments at the University of Maryland or George Mason University because after the slow ride there would be a long search for a parking place. I remember one time, finding myself trapped in one of Northern Virginia's traffic jams with cars in front, behind, and on both sides of mine, when the traffic stopped dead. Lines in all lanes stretched as far as the eye could see, in both directions. It was a cool day, and most drivers had their windows down. A fellow in a Mercedes next to me leaned over.

"Must be the population explosion!" he shouted. "It's hit us, and we'll all expire!" He must have got a noseful of the exhaust fumes now swirling around, because he raised his windows and turned on his air conditioning. So did almost everyone else: the lineup of idling engines created a soupy atmosphere on the nearly windless afternoon.

My neighbor was joking, but he had a point. If there is anyplace in America where you can experience for yourself the impact of rapid population growth, it's in the metropolitan areas, especially in the suburbs. Where I sat waiting for the traffic to move, forests of newly built townhouses stretched in all directions, having gobbled up farmlands and meadows. Ugly pylons and wires carried electricity to the new developments. Construction crews were at work on roads, sidewalks, drains. Trucks lined up to join the highway traffic, which moved at a snail's pace if at all.

"Is it like this every day?" I asked a gas station attendant up the road.

"It's usually worse," he said. "It's pretty quiet today, people aren't even honking their horns. I'm from the Los Angeles area, and to me, this is nothing."

Being caught in slow-moving traffic is as good a time as any to reflect on a concern that is a topic of conversation wherever you go in the world: population growth and its attendant problems. People are apt to attribute most of

the world's ills, from persistent malnutrition in parts of Africa to war in the Middle East, and from unwanted immigrants to crowded highways, to overpopulation. You hear this refrain even in countries where the population is stagnant or actually declining, such as Japan, Russia, and Italy. But those who live in Western or Westernized societies and complain about problems arising from population growth simply haven't experienced the real consequences in such places as India or Nigeria. Spend some time in Kolkata or Lagos and you will soon forget the discomforts of Northern Virginia or suburban Los Angeles.

THE GLOBAL SPIRAL

The explosion of global population during the past two centuries, and especially during the twentieth century, is common knowledge now. About 200 years ago, shortly after the onset of the Industrial Revolution, the Earth's total population was only about 900 million, which is less than the present-day population of India alone. In 1820 the milestone of 1 billion was reached, and this number took more than a century, 110 years to be exact, to double. Then the upward spiral really took off. Only 45 years later (1975), 2 billion doubled to 4 billion, and at present growth rates, this number will again double, to 8 billion, around the year 2035. If there is anything to be optimistic about in these data, it is that the time it takes for the world's human population to double has lengthened from 45 to 60 years.

There are times when scary statistics are suspect, but not in this case. For thousands of years of human evolution and civilization's development, our numbers remained small, to be measured in tens, then in hundreds of millions. Even as recently as 1650, the world's human population was about 500 million—as many as are being added now every seven years or so.

Why is this happening? A combination of factors caused what is, in truth, explosive population growth. A population's natural increase over a given period is measured, simply, by subtracting deaths from births. When the number of deaths per 1,000 people in the population is close to the number of births, that population will grow very slowly. But when the number of deaths declines, the gap widens and population growth accelerates. Taking the world as a whole, death rates began to decline during the eighteenth century, while birth rates remained high. That created a widening gap, and while birth rates also started to decline in some parts of the world, this decline lagged far behind the death rate. The lag is still in effect.

Death rates declined because of major progress in hygiene and medicine associated with the Industrial Revolution and because of their export from

the source (mainly Europe) to the rest of the world. Just two inventions, effective soap and the toilet, contributed enormously to this; ever-better medicines had great impact as well. Refrigeration, water purification, and other advances also helped lower the death rate. Such progress ensured the survival of countless babies who would otherwise have died at or soon after birth. The death rate of a population reflects not only those who die after a substantial lifetime, but also those who die at birth or in infancy. Today, one of the most telling statistics reflecting a country's overall condition is its infant mortality rate, the number of babies that die within the first year of life, usually reported per 1,000. In 2004, some countries reported all-time lows of 3 (Japan, Sweden) but 18 African and several Asian countries' infant mortality rates still exceeded 100.

NATURAL INCREASE IN REGIONAL PERSPECTIVE

Enormous differences, therefore, still exist in the well-being of this planet's regional populations, as reflected not only by infant mortality statistics but by other data as well. In the mid-twentieth century, when Paul Ehrlich and others raised the "population explosion" alarm and forecast vast famines afflicting billions across the planet, the global nature of the coming crisis tended to obscure regional contrasts, although these were identifiable even then. Today, the regional geography of population change is a key concern.

At issue is the geographically variable rate of natural increase (or decrease). Populations also grow and decline through net immigration or emigration, but natural increase is what matters here. A map of the world showing the countries where population is either stagnant (0.0 percent growth rate) or declining shows a large swath of states from Japan to Sweden in this condition (Fig. 5-1). A half century ago a movement called ZPG (Zero Population Growth) called for this then-unimaginable goal as a global objective. It is now here, in regional dimensions, and it is fraught with its own problems. Countries with stagnant or declining populations face economic problems the ZPG crowd didn't think of.

Regional rates of population change vary from Russia, decreasing at 0.7 percent annually and Europe (-0.1 percent) to Sub-Saharan Africa, growing at 2.2 percent despite its terrible AIDS affliction. Middle America, led by Mexico at 2.1 percent, is the next-fastest-growing realm, followed closely by the Islamic world (1.9 percent). Even South and Southeast Asia grow more slowly than this. In North America, the United States has been growing at 0.6 percent and Canada at 0.4 percent.

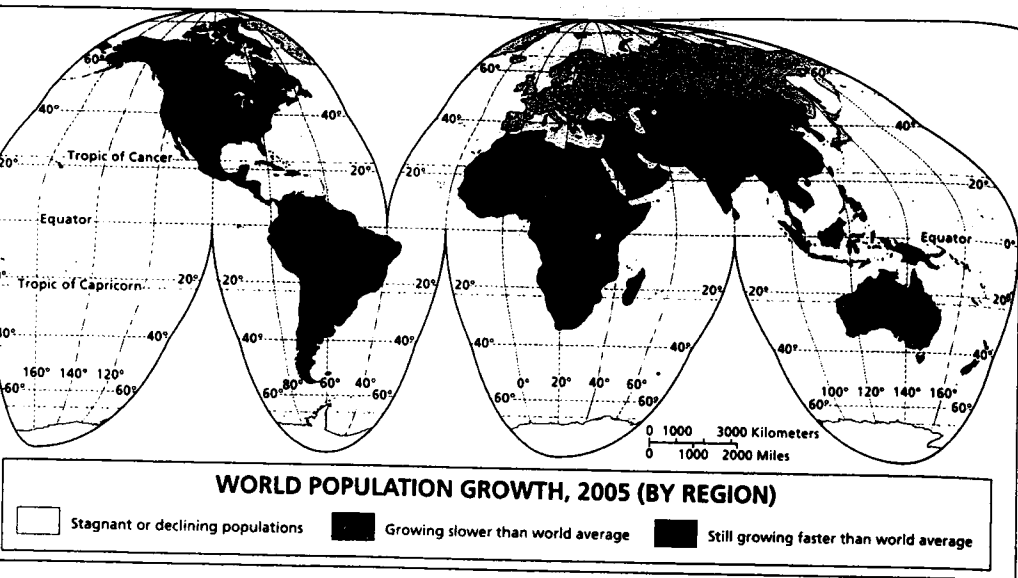


Fig. 5-1

It is important to look at the data for individual countries, however, because even within the world's dozen or so geographic realms there are regions and countries that defy the overall trend. In the Islamic world, for example, Saudi Arabia and Yemen grow much faster than the regional average, but Iran and Tunisia grow much slower. Still, all but one country in the Islamic realm grow faster than 1.0 percent; all but one country in Europe grow slower than 1.0 percent—and the exception is Muslim Albania.

It would seem logical to conclude that religion has much to do with these figures. The Roman Catholic Church is strong in Middle America, and the Vatican has sought common cause with Muslim clerics on population issues at international meetings. But it is telling that population decline is most evident in the very heartland of Catholicism, even in Italy itself. Low rates of population increase have more to do with levels of development and with the status of women in society than with the strictures of various faiths. Another factor is democracy. Efforts to slow population growth by coercion in India led to massive resistance and voter retaliation. In communist China, an authoritarian government could decree a "One-Child Only" policy and generally make it stick. Today, India is still growing at 1.7 percent; China's rate is down to 0.7, almost on a par with the United States and Australia. But even at a low 0.7 percent, China is adding between 9 and 10 million people to its realm's population—equivalent to a Sweden—every year.

THE CONSEQUENCES FOR EUROPE

The United States and Canada are in the fortuitous position to have a still-healthy rate of natural increase that, coupled with substantial legal immigration, is sustaining economic growth and optimistic demographic projections. But Europe faces trouble. According to a recent UN study, the Earth's total population by 2050 will approach 9 billion. The (anticipated) 27 countries of the European Union, however, will see their populations decline from 482 million to 454 million in 2050. Italy may drop from nearly 58 million to 45; Germany from 82 to 69 and, if things do not change, to a mere 25 million by 2100. As Charlemagne writes in the July 19, 2003, issue of the *Economist*, "Combine a shrinking population with rising life expectancy, and the economic and political consequences are alarming. In Europe there are currently 35 people of pensionable age per 100 people of working age. By 2050, on present demographic trends, there will be 75 pensioners for every 100 workers; in Spain and Italy the ratio of pensioners to workers is projected to be 1:1." Because pensions are paid out of tax revenues, taxes will have to rise sharply to fund the generous pensions Europeans are accustomed to. Workers will demand that taxes be kept down, and labor unrest will become even more endemic in Europe than it already is. Further, countries with fairly stable populations, such as the Netherlands and the United Kingdom, will resent being enmeshed in the financial problems of other EU countries, creating potential schisms in the European Union.

One answer, it would seem, is more immigration and naturalization, but this creates its own social, political, and even economic problems. Estimates suggest that immigration (which is coming mainly from Muslim North African countries and Turkey) would have to increase five- to ten-fold to compensate for the rate of natural decrease prevailing in Europe today. The associated social strains would be unmanageable. As Europe's population shrinks and its proportion of the world population declines, dreams of an economic superpower fade. The implications of Europe's demographic data are far reaching indeed.

PATTERNS OF THE FUTURE

If we divide the world in a very general way into rich and poor, the populations of the rich countries today are growing at 0.25 percent annually and the poor countries at 1.46 percent annually (Cohen, 2003). The populations of the least-developed areas of the world, the 50 countries with the nearly 700 million poorest inhabitants, are growing by more than 2.4 percent annually. By the middle of the century, various agencies estimate, the world's

overall population growth will be down to an encouraging 0.33 percent, but by then the poorest countries will still be growing at 0.4 percent while the rich countries will be shrinking at a still-accelerating 3.14 percent, further widening the quantitative gap between the well-off and the rest.

Where will the bulk of this poorer majority reside? In the burgeoning cities that already mark the “developing” regions of today. Cohen reports that, of the projected 2.2 billion increase in population between 2000 and 2030, all but 100 million will crowd into cities, so that urban areas will grow at about twice the rate of global population increase. In his just-cited article, Cohen reminds us that the rural population of the rich countries peaked around 1950, after which it declined everywhere, making “rich” countries synonymous with “urbanized” countries. The rural population of the presently poor countries is expected to peak around 2025 and will then begin a similar decline. Projections suggest that urbanization in the poor parts of the world will rise from 40 percent in 2000 to 56 percent in 2030, which is about where the rich countries were in 1950. But the numbers of residents marking the burgeoning cities of the poorer world will dwarf anything seen in the rich world during its heyday. Conurbations of 50 million or more will anchor regions of India (which is likely to become the world’s most populous country) and China. As much as 80 percent of the populations of some now-poor countries will crowd into their largest cities. Already, the world’s population is more than 50 percent urbanized today; urban life will be the norm for the great majority in the future.

In the process, many things will change worldwide: family relationships (proportionately more children born out of wedlock), the proportion of youngsters in the population (shrinking and destined to be exceeded by oldsters), life expectancies (longer), schooling and literacy rates (higher), and secular lifestyles (more common). The unanswerable question is how the countries of the richer world will relate to the overwhelming numbers and growing economic and military power of the currently poor.

WILL THE WORLD'S POPULATION STABILIZE?

Given the projections just cited, it is not surprising that some geographers who study population questions have been tempted to extrapolate to the end of the curve, that is, to the point where global population will stop growing altogether. If the rate of global population growth is now declining past 1.4 percent, is likely to reach 0.4 percent by 2050, and continue downward, isn't it logical to conclude that the world is going the way of Europe, reaching a stagnant population and even starting a decline?

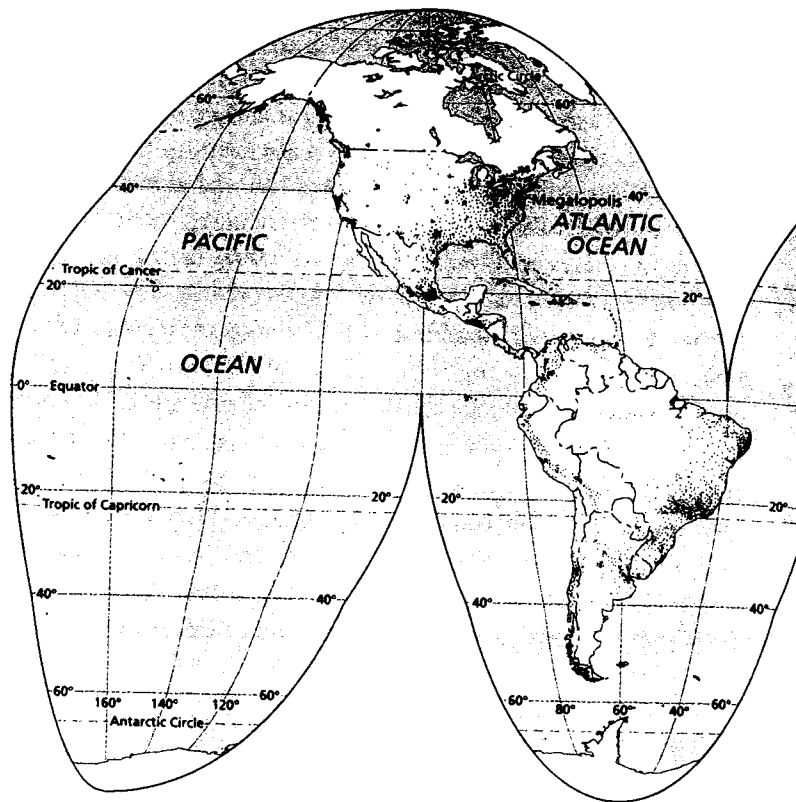
You could ask the same question about individual countries. If Japan, after “exploding” to 127 million in 2004, is now starting a decline, what about the United States, Mexico, Brazil, or India?

It is clear from the various projections published by agencies and scholars that these remain elusive questions. A 1995 estimate suggested that China would stabilize at 1.4 billion by 2090, but China is already well past 1.3 billion today and is likely to reach that total in about eight years, not 80. Today China’s ZPG moment is still foreseen as coming before the end of the century, but at 1.9 billion, not 1.4. That means that India’s stabilization level will be closer to 2 billion than the 1.6 billion recently projected for 2050. As to the United States, estimates have risen from 276 million in 2035 (already exceeded) to 480 million by the end of the century (including immigration). Obviously all these projections need to be taken with more than one grain of salt, but the fact remains: barring some unanticipated upturn in fertility, the twentieth century’s population explosion may be followed, if not by a twenty-first-century implosion, then by a stabilization no one in the mid-twentieth century even contemplated. What this may mean for the future of the planet is similarly beyond informed conjecture.

THE GLOBAL POPULATION MAP TODAY

When it comes to depicting the current world population on a map, it is well to remember that no single map can adequately represent the complexities involved. At the global scale, the best we can hope for is an instructive impression. Population can be mapped in terms of density, that is, the number of people per unit area (but for a page-size map, that unit would have to be pretty large), or in terms of general distribution, using the dot method. This is the method used in Figure 5-2, where one dot represents 100,000 people. The downside of a dot map, of course, is that the dots not only coalesce but overlap in certain places, for example large metropolitan areas.

Still, this map yields valuable insights. It is a powerful reminder that, on the approximately 30 percent of the planet that is land (some of it under ice), populations continue to cluster in relatively well-defined areas, reflecting the fact that of this 30 percent, two-thirds is arid, frigid, mountainous, or otherwise inhospitable to large human numbers. Of the three greatest concentrations of humanity, all of which lie on the Eurasian landmass, two—East Asia and South Asia—lie centered on ancient river basins whose fertile soils and ample drainage supported the earliest population explosions millennia ago. China and India are the modern heirs to this ancient drama, and rivers such as the Yellow (Huang) and Yangzi in China and the Ganges (Ganga) in



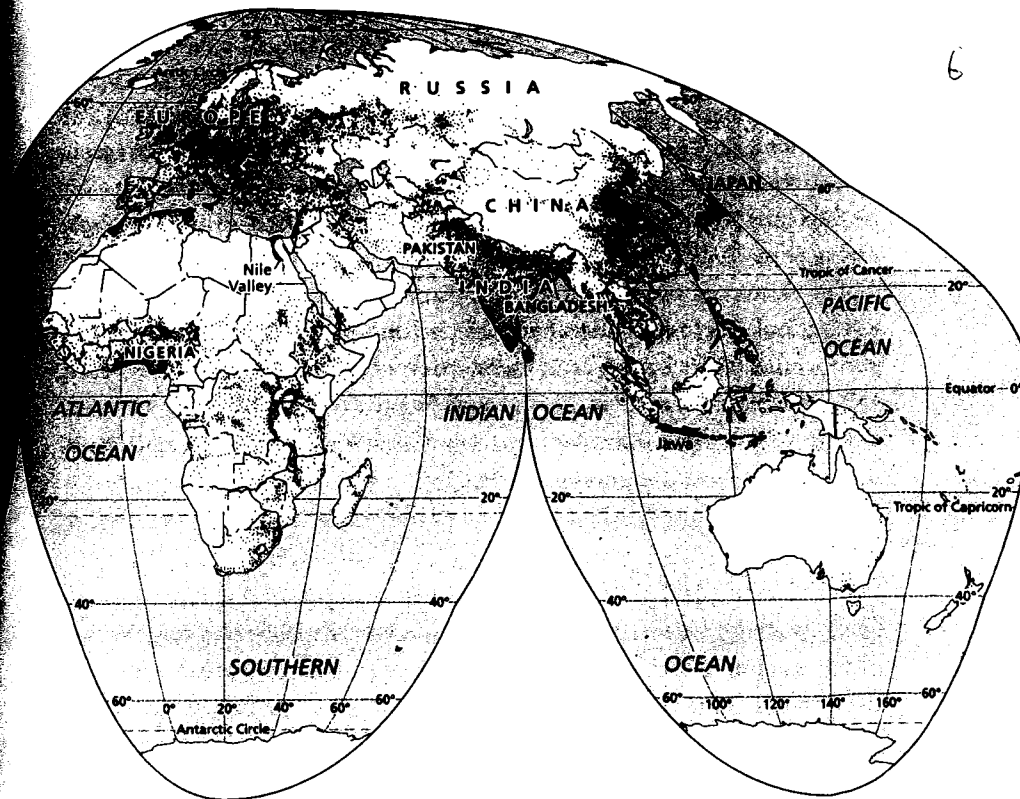
**WORLD POPULATION
DISTRIBUTION**
One dot represents 100,000
people

0 1000 2000 3000 Kilometers
0 500 1000 1500 Miles

Fig. 5-2

India are the arteries of human civilization, just as the Tigris-Euphrates and the Nile were in less-crowded Southwest Asia. In these historic regions, the majority of people still live and subsist on the land, but the inexorable migration to the cities grows and an urbanized era is in the offing. In 2004, China reported that nearly 40 percent of its people now live in cities, and India nearly 30 percent. But remember the sizes of these two giants' populations: it means that more than 500 million Chinese now live in cities and towns, and more than 300 million Indians.

The third Eurasian population cluster readily visible on the map is Europe, petering out eastward into Russia. This population, even including some still quite rural countries, is three-quarters urbanized, and some Eu-



ropean countries are more than 90 percent urban. Here the transition from mostly rural to dominantly urban is nearly complete, and familiarity with urban life is a significant element in Europe's political convergence.

What is also remarkable about the distribution of population in Eurasia is the vast area of relatively sparsely populated, even open space still extant. Even China, synonymous with burgeoning population and crowded urban areas as well as rural areas, has a vast nearly empty interior. Russia's Siberia and Central Asia's steppes east of the Caspian Sea also remind us of the natural limits of settlement.

North America's eastern population cluster, centered on the coalesced cities of the east called Megalopolis by the geographer Jean Gottmann, is far smaller than its Eurasian counterparts, and South America is more sparsely peopled still. At the turn of the century Mexico City and São Paulo ranked, with Tokyo, among the world's largest conurbations, but urban agglomerations far larger than these are emerging in East and South Asia. Africa, too,

is sparsely peopled for so large a landmass—there are more people in India alone than there are all of the countries of Africa—and as the map shows, the major clusters of African population lie in West Africa, centered on Nigeria, and in East Africa, focused on the Great Lakes. The Sahara is Africa's great population void, but large parts of the landmass elsewhere remain comparatively empty as well. As for the continent of Australia, the mapping method on display here truly shows how empty it remains, a function of the aridity of its "outback."

The clusters of population seen on Figure 5-2 are the repositories of the civilizations of modern humanity, the civilizations Samuel Huntington argued would find themselves in twenty-first-century conflict (Huntington, 1996). For the moment, we confine ourselves to other implications of a map that provides ammunition for those who argue that overpopulation lies at the root of most of the world's troubles.

POPULATION AND POLITICS

Obviously population growth is a key issue in environmental context. Before we assume that urbanization will improve conditions in the countryside (for example by slowing deforestation) through out-migration, we should recognize that burgeoning urban centers place enormous demands on rural areas in the form of food, water, and resources, and that the pollution emanating from huge industrializing metropolitan areas far exceeds what an equivalent number of people in the countryside would generate. People who move to the cities tend to start favoring more varied diets including more meats and poultry, resulting in deforestation in the countryside to make way for pastures.

The United Nations organizes frequent conferences on environmental issues, and I remember one in particular, the 1992 UN Conference on Environment and Development in Rio de Janeiro. When I saw the agenda, I was surprised at the lack of attention given to the population issue. When I got the roster of participants (delegations consisted of political representatives, scholars, and hangers-on) I was less surprised: few if any were geographers. The population issue was not a salient topic, but it should have been. There's little point in making commitments to protect what remains of global natural environments without taking demographics into account.

The United States delegation had an uneasy time at this conference, and the president, George H. W. Bush, came under some severe criticism for not providing sufficiently strong leadership on environmental issues. But there was plenty of censure to go around. One reason so little was said about pop-

ulation policies had to do with the fact that the Roman Catholic Church was still very powerful in Brazil (that power has waned in recent years as evangelical churches have made inroads). Pope John Paul II had made a visit to Colombia a few years earlier and reiterated his opposition to artificial birth control, in effect exhorting Colombians, and tens of millions of listeners throughout the realm, to have as many children as they wished. This was not a good place or time to promote practices that would have a more salutary effect on future global environments than all the touted pollution-reduction programs combined.

This does not mean that United States policy on population has been focused or steady. Successive administrations have alternately helped and hindered family-planning programs here and elsewhere.

And yet, what is happening to population growth worldwide should be of direct concern to all Americans. Underdeveloped countries coping with high growth rates see their hopes of improved living standards dashed and their dependence on foreign help raised. Overpopulation leads to economic conditions that generate desperate emigrations—and the migrants often cross American borders. Mushrooming populations stress the capacities of governments to exercise control—and American relief efforts plus, as in Somalia, policing campaigns cost lives and money. Lately, the American public has begun to worry about these issues, and the immigration question is moving higher up on the national agenda. The overwhelming approval of Proposition 187 in California during the November 1994 elections reflected a rising anti-immigrant feeling—in a nation forged of immigrants. More recently, we have seen television coverage of illegal border crossings and reports on efforts to erect physical barriers to stem the tide of illegal immigration from Mexico; CNN has almost daily news reports under the rubric "broken borders." But on the question of assisting other countries in family-planning campaigns, there is no consensus in the United States.

POPULATION AND ENVIRONMENT

Even if human population stabilizes some time in the second half of this century, and even if it then commences an overall decline, it will be too late for much of what remains today of forests and wildlife that sustain environments and link us with our past. Biologists estimate that there may be as many as 25 million types of organisms on Earth, perhaps even more; most have yet to be identified, classified, or studied. *Homo sapiens* is only one of these, and in ten millennia our species has developed a complex culture that is transmitted from generation to generation by learning and is to some

degree encoded in our genes. We are not unique in possessing a culture: gorillas, chimpanzees, and dolphins have cultures, too. But ours is the only species with a vast and complex array of artifacts, technologies, laws, and belief systems.

No species, not even the powerful dinosaurs of epochs past, has ever affected earthly environments as strongly as humans do today. The dinosaurs, and many other species, were extinguished by an asteroid impact. Some biogeographers see an analogy and suggest that the next great extinction may be in the offing, caused not by asteroids but by humans, whose numbers and demands are destroying millions of species—and with them the inherited biodiversity of this planet.

This destructiveness is not just a matter of modern technology and its capacity to do unprecedented damage, whether by wartime forest defoliation, peacetime oil spills, or other means. Human destructiveness manifested itself very early, when fires were set to kill whole herds of reindeer and bison, and entire species of large mammals were hunted to extinction by surprisingly few humans. The Maori, who arrived in New Zealand not much more than 1,000 years ago, inflicted massive destruction on the native species of animals and plants in their island habitat, long before modern technology developed more efficient means of extinction. Elsewhere in the Pacific realm, Polynesians reduced the forest cover to brush and, with their penchant for wearing feather robes, had exterminated more than 80 percent of the regional bird species by the time the first Europeans arrived. The Europeans proceeded to ravage species ranging from snakes to leopards. Traditional as well as modern societies have had devastating impacts on their ecologies, and on the ecologies of areas into which they migrated.

Is wanton destruction of life a part of human nature, whatever a society's cultural roots? The question is as sensitive as questions about racism and sexism. Still, regional differences in attitude and behavior can be discerned. African traditional societies hunted for food or for ceremonial reasons, but not for entertainment or amusement. The notion of killing for fun and fashion was introduced by Europeans. Hindu society and religious culture in India are more protective of the natural world than many others. The extermination and near extermination of many species of animals in India took place during (Muslim) Moghul and European colonial times.

Malevolent destruction of the environment continues in various—indeed many—forms today, ranging from the deliberate spilling of oil and setting of oil fires by Iraqis during the 1991 conflict over Kuwait, to the mercury poisoning of Amazonian streams by Brazilian gold miners. For the first time in human history, however, the combined impacts of humanity's destructive

and exploitative actions are threatening the entire Earth's biodiversity. Most of that biodiversity has been concentrated in, and protected by, the great equatorial and tropical rainforests of South America, Africa, and Southeast Asia. Now the onslaught on this last biogeographical frontier is under way, and for the future of the planet, the consequences may be catastrophic.

THE PENALTY OF POVERTY

How is it that the poorest of the world's countries tend to have the highest rates of population growth? Neither poverty nor hunger seems to slow rates of natural increase in such countries as Ethiopia, Nigeria, or Bangladesh. For a period during the third quarter of the twentieth century, Kenya had a population growth rate of 4 percent—the highest in the world as Kenyan women had seven, eight, even nine children. As a geographic realm, Sub-Saharan Africa grew faster than any other in the world. This reflected Africa's rural character and the strength of its cultural traditions: having many children was a matter of family security and status. Several children would die early, the father wanted sons, and a high number of births improved the odds. Infant and child mortality (the number of offspring who die before their fifth birthdays) in poor countries is horribly high, even today, but they're lower than they were during the past century. Combine the continued fertility with declining mortality, and you get skyrocketing growth rates.

And you get vulnerability to disease among the survivors. In the last quarter of the twentieth century the affliction called AIDS—Acquired Immune Deficiency Syndrome—appeared in Africa and spread worldwide. By 2004, according to UN data, more than 40 million people were infected, 33 million in Sub-Saharan Africa. In 2003, the latest year for which information is available, 2.6 million people died of AIDS, 2 million of them in Africa. AIDS was spreading in Russia, India, and China, but the hardest-hit realm of the world was also the poorest—Sub-Saharan Africa.

As the number of deaths from AIDS rises, African countries' vital statistics show the demographic impact. In hard-hit South Africa, where 20 percent of all persons aged 15 to 49 may be infected, life expectancy declined from 66 to 51 in just ten years. In neighboring Botswana it fell from 60 to 39 between 1994 and 2004, the latter a figure not seen since the Middle Ages. In Zimbabwe, population growth dropped from 3.3 percent to 0.9 percent. Some demographers are projecting population declines of 10 to 20 percent in the worst-afflicted countries. Meanwhile, AIDS is killing parents in Africa at such a rate that, by 2010, it will have an estimated 20 million orphans.

AIDS is battering Africa's already weak economies. Ordinary Africans

cannot afford the treatments available to the sick in the richer countries of the world, and tens of billions of dollars are needed for a coordinated, continent-wide attack on the pandemic. President Thabo Mbeki of South Africa angered much of the world by arguing that AIDS has its origins in poverty, not the human immunodeficiency virus (HIV), and while he was wrong on the science he was right on the social front: poverty condemns tens of millions of Africans to inadequate treatment or none at all. This is yet another manifestation of aggregate misfortune that has plagued Africa—more than any other world geographic realm—for millennia.

And let us not forget that hundreds of millions of people (825 million, by one recent UN estimate, a majority of them children) still suffer from malnutrition or worse in these early years of the twenty-first century. They pay the price for being in the wrong place at the wrong time, because the truth is that all people on Earth today could be fed—not well, but adequately for survival—if there were ways to distribute food to them and to make it affordable for them. Tragically, that is still not happening. True, many millions who live in remote isolation and depend almost totally on what they grow and raise are subject to the vagaries of their environment and suffer when droughts or other natural disasters strike. But many more millions go hungry because of the failure of governments to achieve stability and security. Decades of war in equatorial Africa have caused dislocation on a massive scale and starvation across a region where subsistence is the way of life. To the north, the government of Sudan has used food as a weapon, denying it to millions of refugees from a decades-long war between the Muslim regime in Khartoum and the African minority in the far south. When a settlement to this conflict, having taken its dreadful toll, was signed in January 2005, a new humanitarian crisis arose in the country's west. While the UN debated terminology (could this be defined as genocide?) thousands of villages in Darfur Province were burned, hundreds of thousands of Africans were displaced, and lands that should have been planted for next season's harvest lay fallow. To the east, in Somalia, competing warlords were quite prepared to starve their adversaries to death, and foreign military intervention led to disaster, as Americans well remember.

Government failure to protect people from hunger is not an exclusively African phenomenon. Reports of widespread starvation resulting directly from government policy in North Korea, and severe malnutrition in Afghanistan in the chaotic early 1990s form part of this depressing global picture. But politics and ideology are not the only threats to powerless people. Government economic policies also play a role. It is not enough to produce a quantity of food for people to sustain themselves; they must also be able to

afford to buy it. Well-stocked markets most of whose local customers cannot pay for a pound of rice do not reflect an absence of malnutrition.

MOMENTOUS TRANSITION

When the English economist Thomas Malthus in 1798 published a warning that the population in Britain was growing faster than the means of subsistence, he predicted that population growth would be checked by hunger within 50 years, leading to the disintegration of the social order. For three decades after sounding the alarm, Malthus faced severe criticism from those who saw the future differently, but he gave as good as he got. The exchange is one of the most interesting debates ever recorded. In the end, both Malthus and his critics were proven wrong. Food production has not, as Malthus prophesied, increased in linear fashion: it has grown exponentially, recently during the dramatic Green Revolution and today through genetic engineering of an even more invasive kind. And populations did stabilize, though not because of lack of food.

Twentieth-century apostles of Malthusian credo, called neo-Malthusians, forecast scary scenarios of a twenty-first-century planet with tens of billions of inhabitants in a continuous, mortal struggle for the means of survival. The notion of “doubling times” for growing populations was posited as though it conformed with reality: since Brazil in 1970 had about 100 million inhabitants and was growing at 2.8 percent, and since a population growing at 2.8 percent would double in 26 years, Brazil would have 200 million inhabitants in 1996, 400 in 2022, and 800 around the middle of this century. The fact that the growth rates of many European populations were already declining was not deemed relevant: the European demographic “model” was not applicable to the rest of the world. Today, you don't hear much anymore about doubling times. Growth rates virtually everywhere are declining, and no population is likely to be double its present size in a couple of decades.

This is not to suggest that population growth is no longer a concern. The Earth's population overall is still growing rapidly if unevenly, so that the present decade will see an additional 600 million people, most of them in the poorer parts of the world. But it is also clear that the world is in a momentous demographic transition. Today, optimistic projections suggest that the human population will never exceed 10 billion. That is far too many; the neo-Malthusians say that the planet should support no more than 2.5 billion. On the other hand it is far fewer than neo-Malthusian projections of the twentieth century predicted.

The question is how much of the natural world still remaining will survive

this transition. Even as Brazil's rate of population growth has declined (it was 1.2 percent in 2004) and its level of urbanization increased (65 percent) the rate of destruction of the Amazonian rainforest has accelerated. Even as African populations ceased growing rapidly as a result of AIDS as well as lower fertility, the rate of deforestation has increased. Before we blame Brazilians and Africans alone for this, remember that the products yielded by the forests, from lumber to leather, are in demand at high prices in the urbanized rich world. In this era of globalization, the consumer demands of wealthy urbanites thousands of miles away can determine the fate of a patch of forest in the tropics.

So this final surge of the population explosion will have key consequences that must be mitigated. But there is now some hope for the future. It is always possible that the whole process will be derailed by some catastrophic event—a global natural disaster such as an asteroid impact, abrupt climate change, a pandemic of some unstoppable disease, an outbreak of nuclear war—but if things continue as they are now, it is conceivable that the world may be planning for a ZPG environment in a half century or so. Of course this will produce its own problems. Who will do the work? How will the costs of longevity and lengthy retirements be paid? What will happen to the concept of Social Security? So far, the European model certainly is no guide. Still, it is conceivable that hunger will at last have been defeated and the gap between the rich and the poor (there will always be one) will narrow.

Meanwhile the world's populations may be modernizing and advanced economies may be globalizing, but old habits die hard. Cultural preferences and religious differences continue to divide a world in which hundreds of millions of farmers still subsist in ways as old as history itself. And despite what you hear and read about the flood of migrants invading the United States, Europe, and other parts of the richer world, consider this: in the middle of the present decade, with the global population numbering 6.7 billion, only about 150 million, or 2.2 percent of the total, live outside their region of birth. Every year, some 2.5 million migrants leave the poorer world and immigrate to the richer countries. The United States is the largest recipient of this stream of migrants: about 1.2 million annually. The next ranking country, Germany, receives about 210,000. UN projections suggest that China, Mexico, India, the Philippines, and Indonesia will be the largest source countries for this global migration network in the decades ahead, but no major increase in the overall volume is anticipated. Indeed, some indicators suggest that the coming slowdown in world population growth coupled with increasing urbanization in the poorer countries will cause a decline in the number of interregional migrants.

Even as we catch a glimpse of light at the end of the population tunnel, another concern arises. After the half century of comparative stability during the two-superpower Cold War, and despite the proxy conflicts that Cold War entailed, the world is now a far more volatile place, in which further nuclear proliferation threatens, civilizational compulsions drive new forms of conflict, and economic globalization meets cultural mobilization on a new and dangerous battleground.