The world’s growing human population has passed the 6-billion mark, four times the number just one century ago. The rate of overall growth is declining, but the actual increase continues at about 80 million per year. Reducing this annual increment is an objective advocated vigorously by the wealthier, low-growth, Western countries. Improved living standards, they argue, can be achieved only by controlling population growth. Some poorer countries, notably China, have adopted policies designed to reduce their population growth rates. But a world population conference held by the United Nations in 1994 revealed some deep disagreements among the participants. Many Islamic countries argued that population control of the kind advocated by Western nations violated Muslim precepts. (They found support in the Vatican, also represented at the conference.) Other countries maintained that the high rate of consumption in the rich Western countries constitutes a larger problem than rapid population growth in poorer regions. In a lifetime, an American will consume 30 times as much of the world’s food and other resources as, say, a Bangladeshi does. So how serious a problem is population growth? Should lowering the world’s population growth rate be a global objective at all?

A warning from the authorities in Chengdu, China.
“No matter where you are, the Indonesian island of Jawa (Java) leaves no doubt that this is one of the most densely populated places on Earth. The back roads I traveled seemed to be lined with houses for endless miles, the houses clustering into villages and towns every few minutes. Here in Jakarta, the national capital, the crush of people reminds you that this is the world’s fourth-most populous country. During much of the day, traffic is so congested that it crawls along, so that pedestrians simply mix with road vehicles. It is all a sign of a burgeoning economy, but what happens when the economy falters? Will food supply always suffice, as it does today?”
Historical geographers of the future will undoubtedly look back upon the twentieth century as the century of the human “population explosion.” After tens of thousands of years (perhaps as long as 90,000 years) of growth, the Earth’s human population at the beginning of the twentieth century stood at about 1.5 billion. By the end of that century, it exceeded 6 billion. During the 1960s and 1970s, the rate of population growth increased so fast that disaster seemed to lie ahead in the form of mass famines and global social dislocation. Since then, technological advances have expanded food production even faster than the population has grown, and the global population’s growth rate has begun to slow. But, as we will see, the problems resulting from the population explosion still prevail. Hundreds of millions of people, mostly children, remain malnourished. Many countries, mostly in the poorer parts of the world, continue to have population increases with which they cannot cope.

The study of population is termed demography (from the ancient Greek words demos, meaning populace or people, and graphe, meaning to describe). The focus of the field of population geography is on the spatial aspects of demography. Demographic problems and issues vary not only from region to region and country to country, but also within countries. Our spatial inquiry leads to some penetrating insights into demographic predicaments.

◆ KEY POINTS
◆ The world’s population is currently growing by about 80 million per year; the bulk of this growth is occurring in the world’s poorer countries.
◆ The distribution of population describes the locations on the Earth’s surface where individuals or groups live. By contrast, population density is a measure of the number of people per unit area.
◆ At a global scale, there continues to be a remarkably strong correlation between areas of high population density and areas with significant expanses of arable land.
◆ Population data often are unreliable because of the high cost and organizational challenges of census taking.
◆ The world’s three largest population concentrations all lie on the Eurasian landmass, and the smallest of the three is the most highly developed and urbanized.
◆ By itself, population density tells us little about the capacity of individual countries to support their inhabitants. This is because density does not take into account global economic position or access to technology.

◆ KEY ISSUES IN POPULATION GEOGRAPHY
In Part Two we address several fundamental issues in population geography, and others arise later in this book. First, we should acquaint ourselves with the present distribution of population at several levels of scale. We may know the total current population of a country, but where in that country are the people concentrated? Figure 4-1 reveals that about 90 percent of the people in the world’s most populous country, China, live in the easternmost one-third of its territory—creating vast interior frontiers of sparsely peopled, minority-inhabited borderland. The map suggests why China’s leaders have encouraged Han Chinese to move westward. Historic factors created the present distribution of population, but modern times often demand change.

Problems associated with population growth remain paramount in population geography. The Earth’s environments and natural resources are strained by the needs of the mushrooming population, which farms and erodes its soils, fishes and depletes its oceans, mines and consumes its minerals and fuels, and cuts and destroys its forests. But, as we will see, historically population growth has not been a linear process. Regional populations have grown and declined as a result of epidemics and famines, only after the onset of the Industrial Revolution has growth been the dominant trend.
Today, however, the populations of certain countries are again declining, not for reasons of health or food, but through other causes. Some scholars suggest that population shrinkage, which has its own set of associated problems, will become a major issue during the present century. They argue that population change, not only population growth, will challenge the world of the twenty-first century.

Another issue we address is migration. Waves of human migration have changed—and continue to modify—the demographic map of the world. The movement of millions of people across international borders, mostly in search of jobs and a better life but sometimes to escape war or natural disaster, continues. Indeed, immigration into certain countries adds more to the total population than natural population increase in those countries; governments try to stem the tide of migrants by closing borders or refusing domicile to those who do manage to enter. Related to the process of migration is the dislocation of millions of people who become refugees, a topic we examine in some detail.

Virtually all governments have population policies that promote national objectives, ranging from control over immigration to internal relocation. These policy responses to demographic changes often have ethnic as well as spatial overtones, favoring a particular (usually dominant) sector of the national population or promoting a country’s heartland, its core area, and its inhabitants over outlying areas. Other policies target growth rates and involve mass sterilization or support for family planning. As we will see, such policies sometimes have unintended consequences.

Later in this book we examine other issues relating to population geography, including food supply and the possibility that world population growth will again overtake total production, health and well-being, about as unevenly distributed across the globe as any social condition, and the status of women, often hidden by statistics that report averages for entire populations without revealing sharp contrasts between males and females in terms of education, income, nourishment, infant and child mortality, freedom of movement, and many other indices.

**ELEMENTS OF POPULATION GEOGRAPHY**

How can a geographic approach to issues such as those just described improve our understanding of them? To begin with, we should consider some of the spatial aspects of the human world. Not only does less than 30 percent of the Earth’s surface consist of solid ground, but of that living space, only a fraction (at most, around one-third) is arable—that is, able to produce crops and livestock. Vast stretches of land are desert, frigid, mountainous, or otherwise agriculturally unproductive, or of such low productivity that only very small human populations can subsist there.

**Population and Space**

From the very beginning, humanity has been unevenly distributed over the land, and the contrasts between crowded countrysides and bustling cities on the one hand and empty reaches on the other have only intensified—especially during the twentieth century. Even countries with huge populations, such as China and India, have large areas where people are absent or
sparsely distributed. The peoples of China and India still depend quite heavily on the food their farmers can produce, so the clustering of the population in those countries continues to reflect the availability and fertility of farmland. China’s interior deserts, cold, windswept plateaus, and snowcapped mountains remain as empty as they have always been, except for small settlements in areas where minerals or fuels are mined.

In countries with more technologically advanced economies, people tend to leave the land and to cluster in cities and towns. Mushrooming urbanization, in which rural, farm-based societies are transformed into urban, trade-based ones, is a dominant theme of contemporary human geography. To be sure, cities are also growing in such countries as India and China, but the percentage of those countries’ population that is urbanized remains far below that of, say, the United States or Western Europe. (For comparisons among these and other countries, consult Resource B, page R-10, where demographic data for all the world’s principal countries are provided.)

Population Distribution and Density

To represent contrasts of the kind just discussed on maps, population geographers use measures of population distribution and density.

The distribution of population describes the locations on the Earth’s surface where individuals or groups (depending on the scale) live. It is represented most efficiently by a so-called dot map. At the largest scale—for example, part of a rural county in the United States—such a map can actually show the location of every indi-
vidual, with each dot representing one person. At a medium scale—say an entire country such as France—one dot would represent a cluster of perhaps 5000 people, and the map would reveal where the population is concentrated and where the number of people in an area would not add up to 5000. At the smallest scale, a world map of population density would use a single dot to represent as many as 100,000 people.

Maps of population distribution have many uses. Famine-relief campaigns, for example, use them in their efforts to deliver supplies to remote areas more efficiently. Closer to home, electoral redistricting maps cannot be drawn without data on where voters live. For such purposes, too, distribution maps are needed.

Population density is another matter. Here the measure is of the number of people per unit area, such as a square kilometer or square mile. The data in Resource B (page R-10) provide the area, total population, and density per square mile for every country (but see the box, “Reliability of Population Data”).

Note, however, that no country has an evenly distributed population, so that the average derived by dividing the national area by the total number of people may not have much practical meaning. The United States, for example, with a territory of 3,717,425 square miles or 9,629,167 square kilometers (including the surfaces of lakes and ponds and coastal waters up to three nautical miles from shore) had a population of 285.4 million in 2002. This yields an average population density for the United States of just under 77 per square mile (29.6 per square kilometer). This figure is the country’s arithmetic population density, and in
a very general way it emphasizes the contrasts between the United States and such nations as Bangladesh (2644 per square mile), the Netherlands (1224), and Japan (875).

But no country has an evenly distributed population, and arithmetic population figures do not reflect the emptiness of most of Alaska and the sparseness of population in much of the West. In other cases it is actually quite misleading. Take the example of Egypt which, with a population of 71.1 million in 2002, has a seemingly moderate arithmetic population density of 185 per square mile. Egypt’s territory of 284,500 square miles, however, is mostly desert, and the vast majority of the population is crowded into the valley and delta of the Nile River. It is estimated that 98 percent of all Egyptians live on just 3 percent of the country’s land, so the arithmetic population density figure is pretty well meaningless here.

Physiologic Population Density

A superior index of population density relates the total population of a country or region to the area of cultivated land it contains. This is called the physiologic population density, defined as the number of people per unit area of agriculturally productive land. Take again the case of Egypt. Although millions of people live in its great cities (Cairo and Alexandria) and smaller urban centers, the irrigated farmland is densely populated as well. When the entire population is divided in Egypt’s confined arable land, the resulting physiologic density figure for the year 2002 is 9245 per square mile. This number is far more reflective of Egypt’s population pressure, and it continues to rise rapidly despite Egypt’s efforts to expand its irrigated farmlands.

The case of Japan is also instructive. Not only does Japan have a high arithmetic population density (more than 11 times as high as that of the United States), but Japan is a mountainous, high-relief country with limited arable land. Japan’s physiologic population density is 7950, which is almost 20 times as high as the United States. Neither Egypt nor Japan could manage without food imports.

Table 4-1 provides complete data on both arithmetic and physiologic population densities, and some of the data stand out markedly. Mountainous Switzerland’s high physiologic density should be expected: it is 10 times as high as its arithmetic density. But note Ukraine, with its vast farmlands: its physiologic density is only 1.7 times as high as its arithmetic density. Also compare the high physiologic densities in Middle America (see Puerto Rico!) to the moderate data for South America, where Argentina has one of the lowest indices in the world. Furthermore, note that India’s physiologic density is the lowest in South Asia despite its huge population (and is less than twice as high as its arithmetic density), whereas China’s physiologic density in 2002 was almost 10 times higher.

### Table 4-1 Population Densities for Selected Countries, 2001

<table>
<thead>
<tr>
<th>Country</th>
<th>Population in millions</th>
<th>Area thousands sq mi/km</th>
<th>Arithmetic Density sq mi/km</th>
<th>Physiologic Density sq mi/km</th>
<th>% Arable Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>37.5</td>
<td>1056.6–2736.6</td>
<td>35/mi 15/km</td>
<td>394/mi 132/km</td>
<td>9</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>133.5</td>
<td>51.7–113.9</td>
<td>2582/mi 997/km</td>
<td>354/mi 1362/km</td>
<td>73</td>
</tr>
<tr>
<td>China</td>
<td>1273.3</td>
<td>3600.9–9126.4</td>
<td>354/mi 137/km</td>
<td>3521/mi 1165/km</td>
<td>10</td>
</tr>
<tr>
<td>Colombia</td>
<td>43.1</td>
<td>401–1038.7</td>
<td>107/mi 41/km</td>
<td>269/mi 1036/km</td>
<td>4</td>
</tr>
<tr>
<td>Egypt</td>
<td>69.8</td>
<td>384.3–995.4</td>
<td>182/mi 70/km</td>
<td>906/mi 3106/km</td>
<td>2</td>
</tr>
<tr>
<td>India</td>
<td>1033</td>
<td>1147.9–2973.1</td>
<td>908/mi 347/km</td>
<td>1677/mi 620/km</td>
<td>56</td>
</tr>
<tr>
<td>Japan</td>
<td>127.1</td>
<td>144.6–374.7</td>
<td>878/mi 319/km</td>
<td>794/mi 3085/km</td>
<td>11</td>
</tr>
<tr>
<td>Netherlands</td>
<td>16</td>
<td>13.1–33.9</td>
<td>1221/mi 472/km</td>
<td>4849/mi 1882/km</td>
<td>25</td>
</tr>
<tr>
<td>Nigeria</td>
<td>126.6</td>
<td>351.7–910.8</td>
<td>360/mi 139/km</td>
<td>1090/mi 421/km</td>
<td>33</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>3.9</td>
<td>3.5–9.0</td>
<td>1114/mi 433/km</td>
<td>3900/mi 975/km</td>
<td>4</td>
</tr>
<tr>
<td>Switzerland</td>
<td>7.2</td>
<td>15.4–40.0</td>
<td>468/mi 180/km</td>
<td>4800/mi 1800/km</td>
<td>10</td>
</tr>
<tr>
<td>Ukraine</td>
<td>49.1</td>
<td>233.0–600.7</td>
<td>211/mi 81/km</td>
<td>363/mi 140/km</td>
<td>58</td>
</tr>
<tr>
<td>United States</td>
<td>284.5</td>
<td>3536.3–9159.0</td>
<td>80/mi 31/km</td>
<td>423/mi 163/km</td>
<td>19</td>
</tr>
</tbody>
</table>


Note that the population data in this table may not correspond precisely to statistics from other sources. (See box, “Reliability of Population Data.”)
MAJOR POPULATION CONCENTRATIONS

Figures 4-1 and 4-2 show patterns of distribution and density in the world population. Figure 4-1 displays distribution using the dot method, whereas Figure 4-2 illustrates density via the isopleth method. Both maps confirm that the world’s three largest population concentrations are all found on the same landmass: Eurasia. They also remind us that the overwhelming majority of the world’s population inhabits the Northern Hemisphere.

East Asia

Although the distribution map (Fig. 4-1) requires no color contrasts, Figure 4-2 depicts population density through shading: the darker the color, the larger the number of people per unit area. The most extensive area of dark shading lies in East Asia, primarily in China but also in Korea and Japan. About one-quarter of the world’s population is concentrated here—nearly 1.3 billion people in China alone.

The East Asian population cluster adjoins the Pacific Ocean from Korea to Vietnam; the number of people per unit area tends to decline from this coastal zone toward the interior. Also visible are several ribbon-like extensions of dense population (Fig. 4-2 A and B). These extensions represent populations that are clustered in the basins and lowlands of China’s major rivers. This serves to remind us that the great majority of people in East Asia are farmers, not city dwellers. True, China has large cities, such as Shanghai and Beijing. However, the total population of these and other cities is far outnumbered by the farmers, who produce crops of wheat and rice to feed not only themselves but also those in the cities and towns.
South Asia

The second major population concentration also lies in Asia and is similar in many ways to that of East Asia. At the heart of this cluster lies India, but the concentration also extends into Pakistan and Bangladesh and onto the island of Sri Lanka. Again, note the riverine and coastal orientation of the most densely inhabited zones and the finger-like extension of dense population on the plain of the Ganges River in northern India (Fig. 4-2 C). This is one of the greatest concentrations of people on the Earth.

There are about 1.5 billion people in the South Asia population cluster. Our map shows how sharply this region is marked off by physical barriers: the Himalaya Mountains to the north and the desert west of the Indus River Valley in Pakistan. This is a confined region with a rapidly growing population. The capacity of the region to support this population has, by almost any estimate, already been exceeded. As in East Asia, the overwhelming majority of the people here are farmers, but in South Asia the pressure on the land is even greater. In Bangladesh, nearly 133 million people, almost all of them farmers, are crowded into an area about the size of Iowa. Over large parts of Bangladesh the rural population density is between 3000 and 5000 people per square mile. By comparison, in 2002 the population of Iowa was about 3 million people, and less than 40 percent lived on the land rather than in cities and towns. The rural population density was under 30 people per square mile.
Further inspection of Figures 4-1 and 4-2 reveals that the third-ranking population cluster also lies in Eurasia—at the opposite end from China. An axis of dense population extends from the British Isles into Russia and includes large parts of Germany, Poland, Ukraine, and Belarus. It also includes the Netherlands and Belgium, parts of France, and northern Italy. This European cluster contains about 700 million inhabitants, which puts it in a class with the South Asia concentration—but there the similarity ends. A comparison of the population and physical maps indicates that in Europe terrain and environment are not as closely related to population distribution as they are in East and South Asia. For example, note that lengthy extension marked D in Figure 4-2, which protrudes far into Russia. Unlike the Asian extensions, which reflect fertile river valleys, the European extension reflects the orientation of Europe’s coal-fields. If you look more closely at the physical map, you will note that comparatively dense population occurs even in mountainous, rugged country, such as the boundary zone between Poland and its neighbors to the south. A much greater correspondence exists between coastal and river lowlands and high population density in Asia than in Europe generally.

Another contrast can be seen in the number of Europeans who live in cities and towns. The European population cluster includes numerous cities and towns, many of which developed as a result of the Industrial Revolution. In Germany, 85 percent of the people live in such urban places; in the United Kingdom, over 90 percent; and in France, 74 percent. With so many people concentrated in the cities, the rural countryside is more open and sparsely populated than in East and South Asia.
where about 30 percent of the people reside in cities and towns.

The three major population concentrations we have discussed—East Asia, South Asia, and Europe—account for over 4 billion of the total world population of approximately 6 billion people. Nowhere else on the globe is there a population cluster even half as great as any of these. Look at the dimensions of the landmasses in Figure 7-1 and note that the populations of South America, Africa, and Australia combined barely exceed the population of India alone.

South America, Africa, and Australia do not have population concentrations comparable to those of East Asia, South Asia, and Europe. The region does not have large, contiguous high-density zones like those of Europe or East and South Asia.

The North American population cluster outdoes Europe in some respects. As in the European region, much of the population is concentrated in major cities while rural areas are relatively sparsely populated. The major focus of the North America cluster lies in the urban complex along the eastern seaboard from Boston to Washington, which includes New York, Philadelphia, and Baltimore. Urban geographers use the term megalopolis to refer to such huge urban agglomerations, and predict that it is only a matter of time before these agglomerations coalesce into an enormous megalopolis. Other major focal points of the North American population cluster are Chicago, Detroit, and Cleveland, and with some interruptions, San Francisco, Los Angeles, and San Diego. If you study Figure 7-1 carefully, you will note other prominent North American cities standing out as small areas of high-density population; they include Pittsburgh, St. Louis, Minneapolis-St. Paul, and Seattle.

Other Regions

Further examination of Figures 4-1 and 4-2 reveals substantial population clusters in Southeast Asia. These are actually discrete clusters rather than a contiguous population concentration. The largest of them is the Indone-
sian island of Java (Java), with more than 120 million inhabitants. Elsewhere in the region populations cluster in the lowlands of major rivers, such as the Mekong. Neither these river valleys nor the rural surroundings of the cities have population concentrations comparable to those of either China or India, and under normal circumstances Southeast Asia is able to export rice to its neighbors. Over many decades of strife, however, the region has been disrupted to such a degree that its productive potential has not been attained.

South America, Africa, and Australia do not have population concentrations comparable to those we have considered so far. Sub-Saharan Africa’s nearly 650 million inhabitants cluster in above-average densities in West Africa (where Nigeria has a population of some 130 million) and in a zone in the east extending from Ethiopia to South Africa. Only in North Africa is there an agglomeration comparable to those found on the crowded riverine plains of Asia. This cluster is in the Nile Valley and delta, which has over 66 million residents. Note that the pattern of the Nile agglomeration—not the dimensions—resembles the pattern seen in Asia. As in East and South Asia, the Nile Valley and delta teem with farmers who cultivate every foot of the rich and fertile soil. However, the lowlands of the Ganges, Chang Jiang (Yangzi), and Huang He (Yellow) rivers contain far more inhabitants.

The large light-shaded spaces in South America and Australia, and the peripheral distribution of the modest populations of these continents, suggest that there is some space here for the world’s huge population. Indeed, South America could probably sustain more than its present 360 million people if reforms were made in patterns of land ownership and use in the region. At present, while the people of South America as a whole are well fed, poverty and malnutrition occur in some areas, such as northeast Brazil.

This raises an issue that is central to any study of population density and the capacity of a country to support its people: level of technology. You will note that Japan, a small island country, has a population of over 127 million. Its population density is at least as great as that of parts of China and India, but its farmlands are quite limited, not only by its small size but, as we noted, also by its mountainous character. What makes such a large population in Japan possible is Japan’s technologi
cal prowess, industrial capacity, and money-producing exports. Japan imports raw materials from all over the world, converts them into finished products, and exports those products to most parts of the globe. With the in
come brought in by these exports, Japan can buy the food that it cannot produce at home. Thus it is not enough to say that a country cannot support more than a specific number of people. We should qualify this statement by observing that under present economic, politi
cal, and technological conditions it can or cannot support a given population, depending on its status in the world market. So, while Australia could not find a place for tens of millions of Chinese farmers, if tens of millions of Japanese came to Australia with their skills, technolo
gies, factories, and international connections, Australia would be quite capable of accommodating them—and many more.

Having examined the distribution and general density of global and regional populations, we now come to the crucial issue: population growth—its history, dimensions, and spatial expression. The next chapter links the maps of distribution and density with the dynamics of demographic change.
1. If the arithmetic density measure is of so little practical use, why do you suppose it is listed in virtually every database published by population-monitoring agencies? Which State in the United States has the lowest arithmetic density, and how meaningful is that statistic? When it comes to physiologic density, this measure is much more relevant, in practical terms, for some countries than for others. Compare the Netherlands and Bangladesh in this context.

2. Some of the world’s largest cities, such as Mumbai (Bombay), Shanghai, and Cairo, lie in countries that rank among the world’s least urbanized societies. Explain this apparent contradiction.

3. An international food-relief agency has asked you to prepare a report to help make food distribution in a certain area, threatened by famine, more efficient. Will you use maps of population distribution (dot maps) or population density (isopleth maps) to support your case? What role will scale play in your presentation?