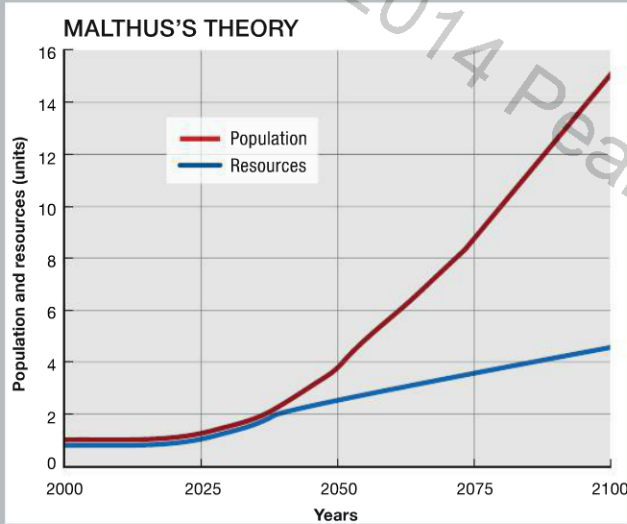


# Chapter

# 2

# Population and Health



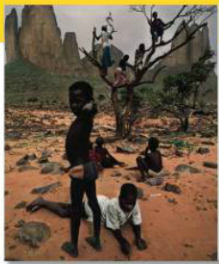
Why did Thomas Malthus think that this chart doomed humanity? Why do some people still think so? Page 60.



How did this water pump in London lead to the birth of GIS? Page 65.

## KEY ISSUE 1

### Where Is The World's Population Distributed?

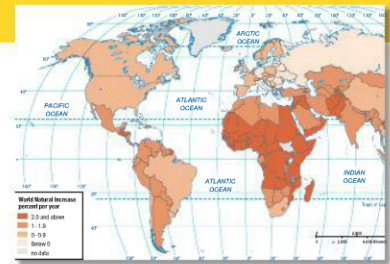


### A Crowded Planet—In Places p. 45

Manhattan's teeming throngs and Montana's wide open spaces—why aren't people spread out more evenly across Earth?

## KEY ISSUE 2

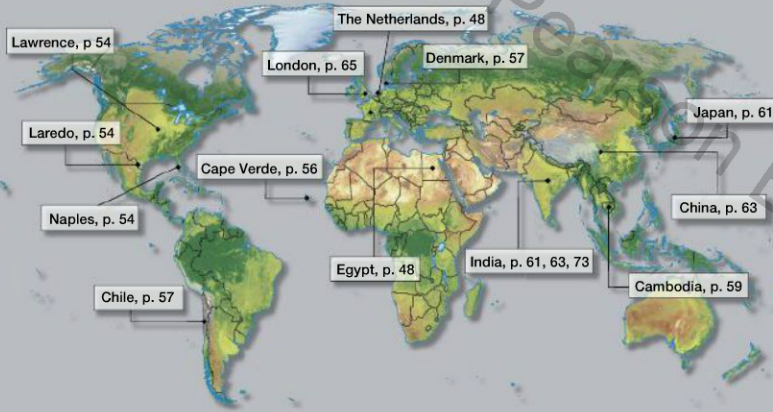
### Why Is Global Population Increasing?



### More and More of Us p. 50

All humans are born, and all must pass away—but their years on Earth vary, depending on where they live.

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▲ This family lives in Jaipur, India. When these girls are older, how many children will they have? The answer matters for the future sustainability of the world because India adds more people to its population every year than any other country. Will these people have enough food? Will they have jobs?

### KEY ISSUE 3

#### Why Does Population Growth Vary Among Regions?

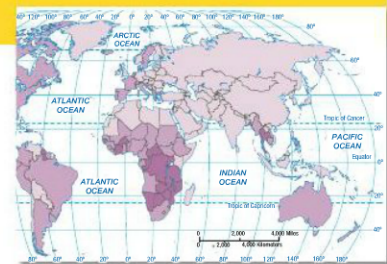


#### For Richer and for Poorer p. 56

It's probably not a surprise that poorer countries have higher birth rates. But why are the death rates higher in richer countries?

### KEY ISSUE 4

#### Why Do Some Regions Face Health Threats?



#### In Sickness and in Health p. 64

Humans are safer today from many once-frightening diseases, yet they are more vulnerable than ever before to new diseases.

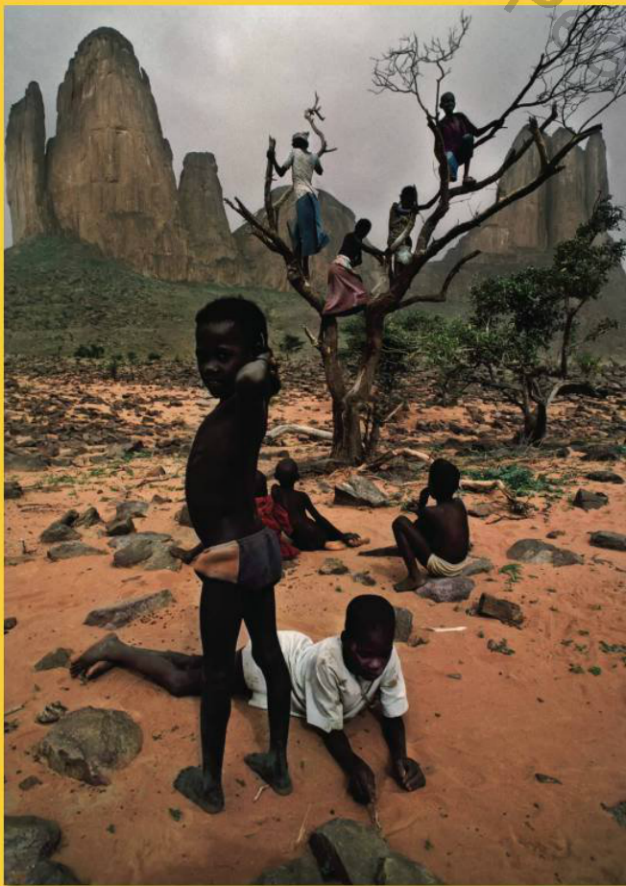


## Introducing

# Population and Health

The scientific study of population characteristics is **demography**. Demographers look statistically at how people are distributed spatially by age, gender, occupation, fertility, health, and so on. The study of population is critically important for three reasons:

- More people are alive at this time—more than 7 billion—than at any other point in Earth’s long history (Figure 2-1).



▲ **FIGURE 2-1 OVERPOPULATION IN MALI** The Sahel region of Africa, including much of the country of Mali, is threatened by overpopulation. The number of people living here is not very high, but the capacity of the environment to support life is extremely low.

- The world’s population increased at a faster rate during the second half of the twentieth century than ever before in history.
- Virtually all global population growth is concentrated in developing countries.

These facts lend urgency to the task of understanding the diversity of population problems in the world today.

As introduced in Chapter 1, geographers ask “where” and “why” questions. As we begin our study of the major topics in human geography, note the wording of the four key issues that organize the material in this chapter. The first issue asks a “where” question and the other three ask “why” questions. These four issues rely on the five basic concepts presented in Chapter 1.

Geographers study population problems by first describing where people are found across Earth’s *space*. The location of Earth’s 7 billion people forms a highly clustered distribution. The second key issue looks at why population is growing. The chapter then turns to explaining why population is growing at different rates in different *places*. The final key issue discusses why improved *connections* have put people at varying health risks.

**Overpopulation** occurs when the number of people exceeds the capacity of the environment to support life at a decent standard of living. From the perspective of globalization, some demographers argue that the world is already overburdened with too many people, or it will soon be in the future. At a local *scale*, geographers find that overpopulation is a threat in some *regions* of the world but not in others. The capacity of Earth as a whole to support human life may be high, but some regions have a favorable balance between people and available resources, whereas others do not. Further, the regions with the most people are not necessarily the same as the regions with an unfavorable balance between population and resources.

- **KEY ISSUE 1** describes *where* people live around the world. Humans are not distributed uniformly across Earth.
- **KEY ISSUE 2** examines *local diversity* in key characteristics of population. The population of a particular place increases with births and decreases with deaths. It also changes as a result of migration, which is discussed in Chapter 3.
- **KEY ISSUE 3** looks at the reason *why* population grows at different rates in different regions. Every place is at some stage in a process known as the demographic transition.
- **KEY ISSUE 4** explains reasons why patterns of health and medical care vary among places. With *globalization*, health issues are more likely than in the past to diffuse rapidly around the world.

## KEY ISSUE 1

# Where Is the World's Population Distributed?

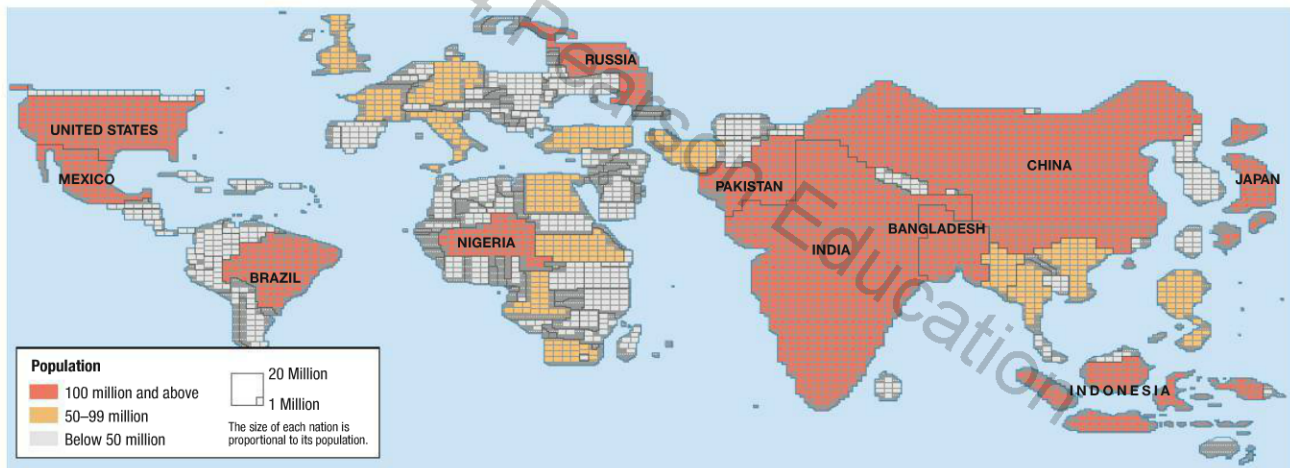
- Population Concentrations
- Population Density

Human beings are not distributed uniformly across Earth. We can understand how population is distributed by examining two basic properties—concentration and density. Geographers identify regions of Earth's surface where

population is clustered and regions where it is sparse. Several density measures help geographers explain the relationship between the number of people and available resources. The number of people is usually determined by a census of population, discussed in Contemporary Geographic Tools.

The concentration of the world's population can be displayed on a cartogram, which depicts the sizes of countries according to population rather than land area, as is the case with most maps (Figure 2-2).

When compared to a more typical equal-area map, such as the one shown in Figure 2-3, the population cartogram displays major population clusters as much larger. As you look at maps of population growth and other topics in this and subsequent chapters, pay special attention to Asia and Europe because global patterns are heavily influenced by conditions in these regions, where two-thirds of the world's people live.



▲ FIGURE 2-2 POPULATION CARTOGRAM In a cartogram, countries are displayed by size of population rather than land area.

## CONTEMPORARY GEOGRAPHIC TOOLS

# Spatial Analysis and the Census

Geography relies on statistical data to conduct spatial analysis. The single most important data source for human geographers is the **census**. Many of the maps in this book rely on census data.

In the United States, a census of population and a census of housing take place once a decade, in years ending in zero, including 2010. Censuses of various types of businesses are undertaken once every five years.

Despite its importance, the census is controversial in many countries, for two reasons:

- **Nonparticipation.** Homeless people, ethnic minorities, and citizens

of other countries who do not have proper immigration documents may be less likely to complete the census form. These individuals may fear that the census could turn over the forms to another government agency, such as the FBI or the Department of Homeland Security in the United States.

- **Sampling.** Statistical sampling techniques can be utilized to get a more accurate count, as well as to identify detailed characteristics of people, housing, and businesses. The district boundaries of the U.S. House of Representatives, as

well as of the 50 state legislatures, must be redrawn every decade so that each has the same number of people. The U.S. Supreme Court has ruled that Article 1, Section 2 of the U.S. Constitution prevents using sampling to redraw district boundaries. Politicians sympathetic to the needs of the homeless and immigrants have been especially vocal in support of sampling, whereas those from small towns and rural areas, where the census count is more accurate, are more inclined to oppose it.



## Population Concentrations

### Learning Outcome 2.1.1

Describe regions where population is clustered and where it is sparse.

Two-thirds of the world's inhabitants are clustered in four regions (Figure 2-3). The four population clusters occupy generally low-lying areas, with fertile soil and temperate climate. Most live near the ocean or near a river with easy access to an ocean, rather than in the interior of major landmasses.

### CLUSTERS

The four major population clusters—East Asia, South Asia, Europe, and Southeast Asia—display differences in the pattern of occupancy of the land.

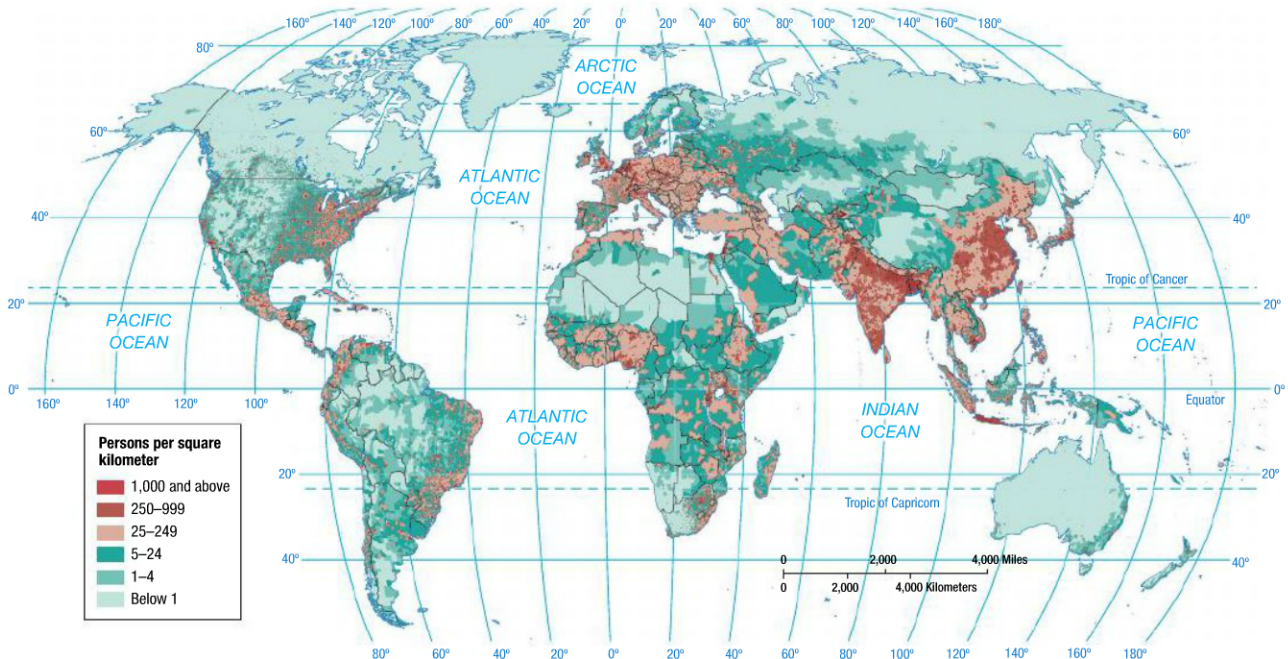
**EAST ASIA.** Nearly one-fourth of the world's people live in East Asia. The region, bordering the Pacific Ocean, includes eastern China, the islands of Japan, the Korean peninsula, and the island of Taiwan. The People's Republic of China is the world's most populous country and the fourth-largest country in land area. The Chinese population is clustered near the Pacific Coast and in several fertile river valleys that extend inland, though much of China's interior is sparsely inhabited mountains and deserts. More than one-half of the people live in rural areas where they work as farmers. In sharp contrast to China, more than three-

fourths of all Japanese and Koreans are clustered in urban areas and work at industrial or service jobs.

**SOUTH ASIA.** Nearly one-fourth of the world's people live in South Asia, which includes India, Pakistan, Bangladesh, and the island of Sri Lanka. The largest concentration of people within South Asia lives along a 1,500-kilometer (900-mile) corridor from Lahore, Pakistan, through India and Bangladesh to the Bay of Bengal. Much of this area's population is concentrated along the plains of the Indus and Ganges rivers. Population is also heavily concentrated near India's two long coastlines—the Arabian Sea to the west and the Bay of Bengal to the east. Like the Chinese, most people in South Asia are farmers living in rural areas.

**EUROPE.** Europe includes four dozen countries, ranging from Monaco, with 1 square kilometer (0.7 square miles) and a population of 33,000, to Russia, the world's largest country in land area when its Asian part is included. In contrast to the three Asian concentrations, three-fourths of Europe's inhabitants live in cities, and fewer than 10 percent are farmers. The highest population concentrations in Europe are near the major rivers and coalfields of Germany and Belgium, as well as historic capital cities such as London and Paris.

**SOUTHEAST ASIA.** Around 600 million people live in Southeast Asia, mostly on a series of islands that lie between the Indian and Pacific oceans. Indonesia, which consists of 13,677 islands, is the world's fourth-most-populous country. The largest population concentration is on the island of Java, inhabited by more than 100 million people.



▲ **FIGURE 2-3 POPULATION DISTRIBUTION** People are not distributed uniformly across Earth's surface.

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Several islands that belong to the Philippines contain high population concentrations, and population is also clustered along several river valleys and deltas at the southeastern tip of the Asian mainland, known as Indochina. Like China and South Asia, the Southeast Asia concentration is characterized by a high percentage of people working as farmers in rural areas.

**OTHER CLUSTERS.** The largest population concentration in the Western Hemisphere is in the northeastern United States and southeastern Canada. This cluster extends along the Atlantic Coast from Boston to Newport News, Virginia, and westward along the Great Lakes to Chicago. The largest cluster in Africa is along the Atlantic coast, especially the portion facing south. Nigeria is the most populous country in Africa. As in the three Asian concentrations, most West Africans work in agriculture.

### Pause and Reflect 2.1.1

Why isn't North America one of the four major population clusters?

## SPARSELY POPULATED REGIONS

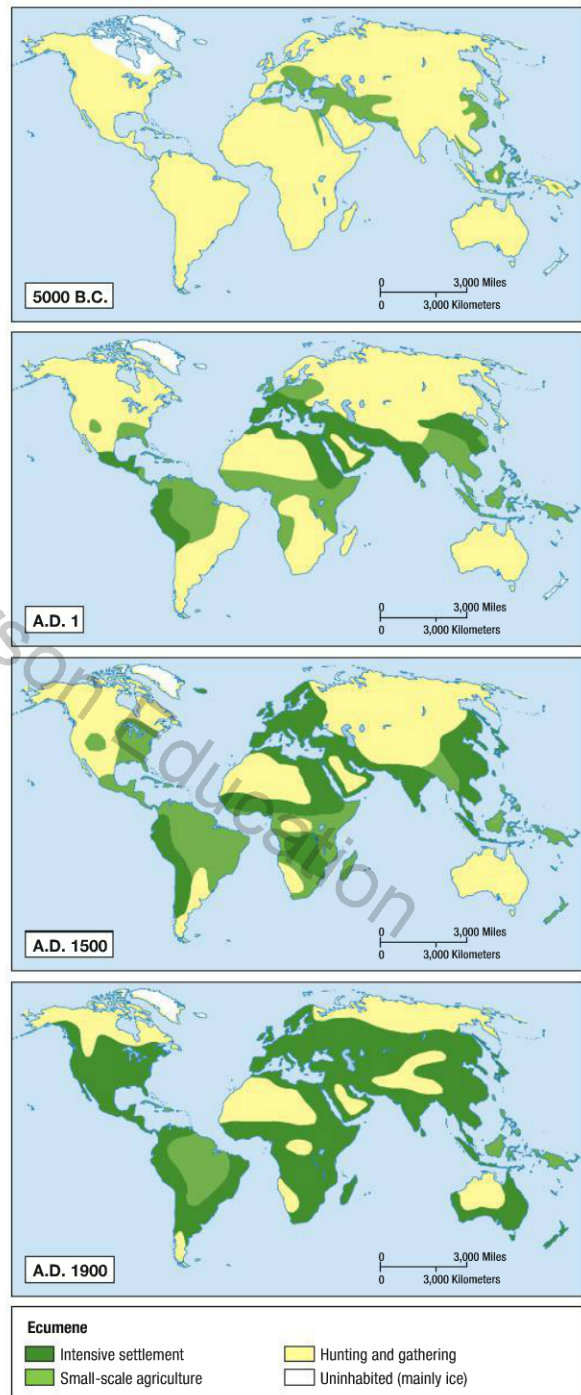
Human beings avoid clustering in certain physical environments. Relatively few people live in regions that are too dry, too wet, too cold, or too mountainous for activities such as agriculture. The areas of Earth that humans consider too harsh for occupancy have diminished over time, whereas the portion of Earth's surface occupied by permanent human settlement—called the **ecumene**—has increased (Figure 2-4).

**DRY LANDS.** Areas too dry for farming cover approximately 20 percent of Earth's land surface. Deserts generally lack sufficient water to grow crops that could feed a large population, although some people survive there by raising animals, such as camels, that are adapted to the climate. Dry lands contain natural resources useful to people—notably, much of the world's oil reserves.

**WET LANDS.** Lands that receive very high levels of precipitation, located primarily near the equator, may also be inhospitable for human occupation. The combination of rain and heat rapidly depletes nutrients from the soil and thus hinders agriculture.

**COLD LANDS.** Much of the land near the North and South poles is perpetually covered with ice or the ground is permanently frozen (permafrost). The polar regions are unsuitable for planting crops, few animals can survive the extreme cold, and few humans live there.

**HIGH LANDS.** The highest mountains in the world are steep, snow covered, and sparsely settled. However, some high-altitude plateaus and mountain regions are more densely populated, especially at low latitudes (near the equator) where agriculture is possible at high elevations.



▲ **FIGURE 2-4 ECUMENE** Seven thousand years ago humans occupied only a small percentage of Earth's land area, primarily in Southwest Asia, Eastern Europe, and East Asia. Even 500 years ago much of North America and Asia lay outside the ecumene. Still, approximately three-fourths of the world's population live on only 5 percent of Earth's surface. The balance of Earth's surface consists of oceans (about 71 percent) and less intensively inhabited land.



## Population Density

### Learning Outcome 2.1.2

Define three types of density used in population geography.

Density, defined in Chapter 1 as the number of people occupying an area of land, can be computed in several ways, including arithmetic density, physiological density, and agricultural density. These measures of density help geographers describe the distribution of people in comparison to available resources.

### ARITHMETIC DENSITY

Geographers most frequently use **arithmetic density**, which is the total number of objects in an area (Figure 2-5). In population geography, arithmetic density refers to the total number of people divided by total land area. To compute the arithmetic density, divide the population by the land area. Table 2-1 shows several examples.

Arithmetic density enables geographers to compare the number of people trying to live on a given piece of land in different regions of the world. Thus, arithmetic density answers the “where” question. However, to explain why people are not uniformly distributed across Earth’s surface, other density measures are more useful.

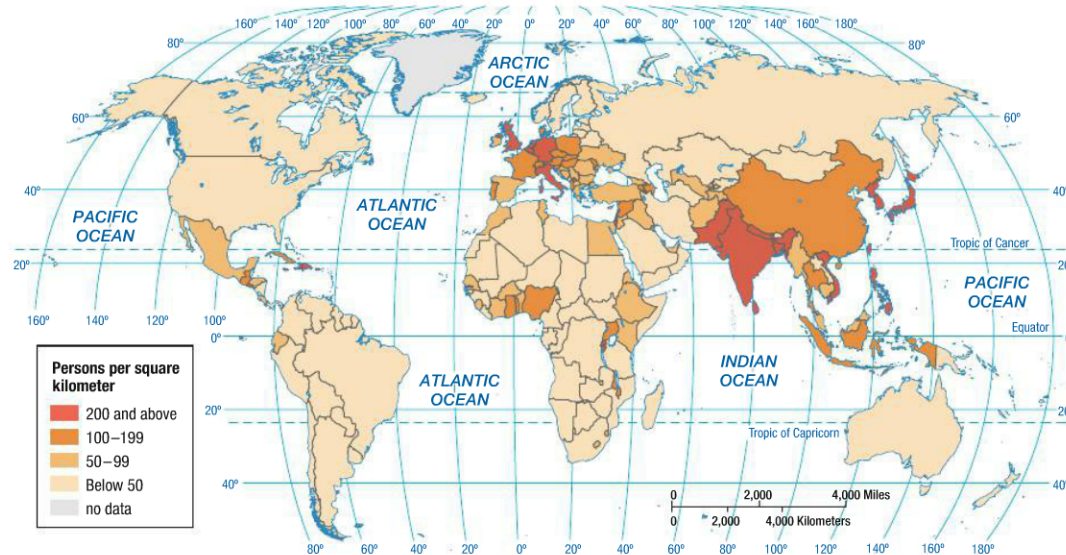
### PHYSIOLOGICAL DENSITY

Looking at the number of people per area of a certain type of land in a region provides a more meaningful population measure than arithmetic density. Land suited for agriculture is called arable land. In a region, the number of people supported by a unit area of arable land is called the **physiological density** (Figure 2-6).

Comparing physiological and arithmetic densities helps geographers understand the capacity of the land to yield enough food for the needs of the people. In Egypt, for example, the large difference between the physiological density and arithmetic density indicates that most of the country’s land is unsuitable for intensive agriculture. In fact, all but 5 percent of Egyptians live in the Nile River valley and delta because it is the only area in the country that receives enough moisture (by irrigation from the river) to allow intensive cultivation of crops.

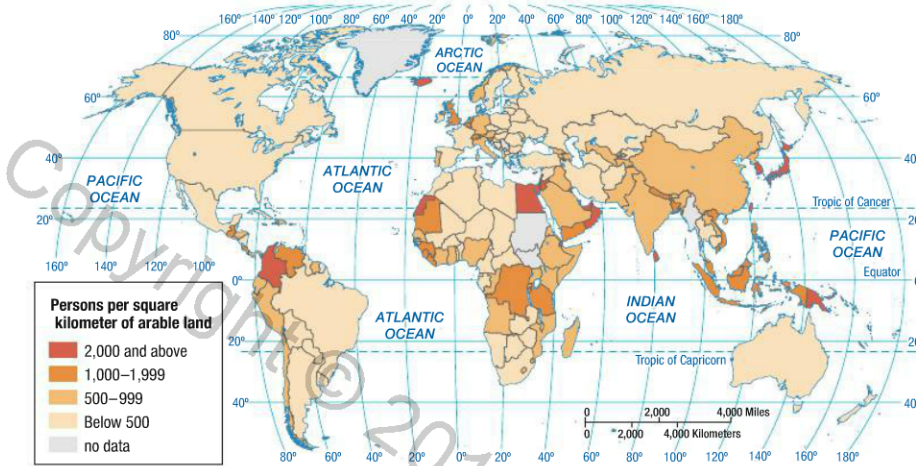
**TABLE 2-1** ARITHMETIC DENSITIES, PHYSIOLOGICAL DENSITIES, AND AGRICULTURAL DENSITIES OF FOUR COUNTRIES

Country	Arithmetic Density	Physiological Density	Agricultural Density	Percentage Farmers	Percent Arable Land
Canada	3	65	1	2	0.5
United States	32	175	2	2	1.7
The Netherlands	400	1,748	23	3	0.01
Egypt	80	2,296	251	31	0.03



**▲ FIGURE 2-5 ARITHMETIC DENSITY** Geographers rely on the arithmetic density to compare conditions in different countries because the two pieces of information—total population and total land area—are easy to obtain. The highest arithmetic densities are found in Asia, Europe, and Central America. The lowest are in North and South America and South Pacific.

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**▲ FIGURE 2-6 PHYSIOLOGICAL DENSITY** Physiological density provides insights into the relationship between the size of a population and the availability of resources in a region. The relatively large physiological densities of Egypt and the Netherlands demonstrates that crops grown on a hectare of land in these two countries must feed far more people than in the United States or Canada, which have much lower physiological densities. The highest physiological densities are found in Asia, sub-Saharan Africa, and South America. The lowest are in North America, Europe, and South Pacific.

**Pause and Reflect 2.1.2**  
 Name a country other than Egypt that has high physiological and agricultural densities.

### AGRICULTURAL DENSITY

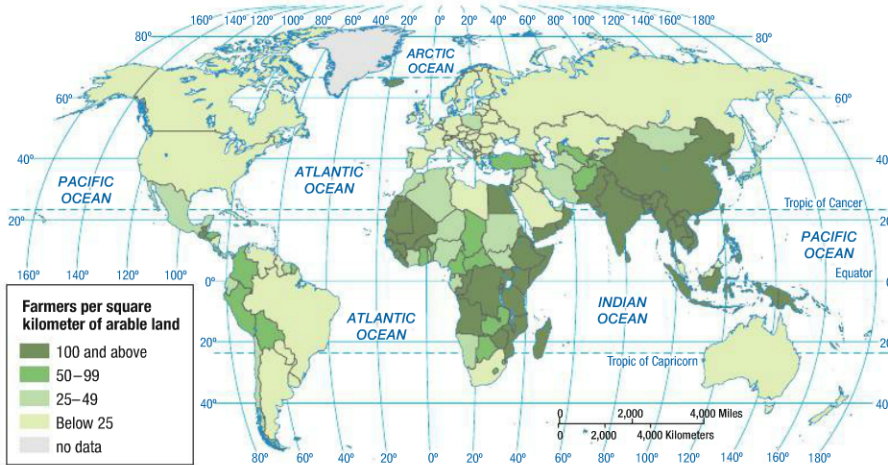
Two countries can have similar physiological densities but produce significantly different amounts of food because of different economic conditions. **Agricultural density** is the ratio of the number of farmers to the amount of arable land (Figure 2-7). Table 2-1 shows several examples.

Measuring agricultural density helps account for economic differences. Developed countries have lower agricultural densities because technology and finance allow a few people to farm extensive land areas and feed many people.

**CHECK-IN: KEY ISSUE 1**

**Where Is The World's Population Distributed?**

- ✓ Most of the world's population is highly clustered in four regions.
- ✓ Arithmetic, physiological, and agricultural densities are different approaches to describing the distribution of people.



**▲ FIGURE 2-7 AGRICULTURAL DENSITY** The highest agricultural densities are found in Asia and sub-Saharan Africa. The lowest are in North America, Europe, and South Pacific.