Introduction to Human Geography

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Preface

This is a story about us. You and me. It is a story about connections. To each other. To the land. To the world we inhabit. Human Geography is fundamentally about our human experience of being in the world. It is a study of the way we organize, inhabit, and utilize the earth. We humans haven't always had an easy road. We grapple with pandemics and famine. We wrestle with personal decisions, everything from what to eat to how to dress to what to do with our lives – decisions that other animals seem to not have to consider. In an effort to make things simple and easier, we tend to make things more complicated and now face problems that often feel beyond our capacity to solve.

And yet. Here we are. We come from an unbroken chain of human ancestors connecting us back to the first few people to walk this Earth. People who overcame. People who solved seemingly insurmountable problems. And so Human Geography is our collective story.

But Human Geography is not just the story of where we've been, it's an exploration of where we're going. And that story is going to be written by you. The future of Human Geography is your future. The languages you speak, the beliefs and ideals you cherish, the ideas about how Earth's resources should be used and managed will all form the backbone of Human Geography in the decades and centuries ahead.

This textbook provides an introduction to the study of Human Geography, offering an accessible springboard into the discipline for novice geographers while at the same time, encouraging readers to dig deeper and widen their understanding. The organization of this text is designed to correlate with the Advanced Placement® Human Geography course structure. This book takes a backward design approach, informed by pedagogical research, focusing on key themes and ideas in the sub-discipline and privileges depth over breadth, presenting a rich story about the way we live on Earth. Very often, the text is written to address the reader directly, and the author's voice has intentionally tried to remain present throughout the text. Since Human Geography is our story, it is one that is continually evolving, but while specific case studies and examples might change, the foundational concepts remain relatively steady. Thus, this textbook takes a concise approach that is designed to be supplemented with additional readings, articles, books, or films. In this way, the textbook provides students with a deep, foundational understanding of core concepts in Human Geography that can then be applied to more specific case studies.

This book is written for you. And since it is our story, it seems only fitting that that story should be freely accessible to everyone. Thus, this book has been published under the Creative Commons license, which means its content can be freely used, reused, remixed, and tweaked simply by crediting the author. As I explain in the introduction to my first textbook, *World Regional Geography*, Geography itself is an open discipline and anyone can be a geographer as long as they are curious about the world around them. You are a geographer. And my hope is

that whatever else you might become, you will keep an appreciation and curiosity about the world and our place within it.

Keep telling, writing, and rewriting our story.

1. Thinking Geographically

Learning Objectives

- Understand the principles of geographic study
- Describe the ways to map and analyze spatial patterns
- Distinguish between the different types of regions
- Explain the process of globalization
- Analyze the ways humans interact with the earth

1.1 What is Geography?

What brings you to this Human Geography textbook? Are you looking forward to a career in geography and this is your first step? Are you enrolled in an Advanced Placement® course and excitedly looking ahead to college? Are you interested in knowing more about the world around you? Whatever the reason, I'm glad you're here. Geography is an exciting and dynamic discipline that has never been more relevant than in today's increasingly interconnected world.

But, what exactly is "geography"? It's a simple question that seems like it should have a clear answer, but despite geography's long existence as an academic discipline, no universally agreed upon definitions exist. (There sadly wasn't a multi-national geography conference where we all sat down and decided what the best definition should be.) If you've taken a geography course previously or learned about geography in your early years of school, you likely focused on the "where" of geography, exploring where particular countries or physical features were located, for example. While this aspect of geography is undoubtedly important, it only tells half of the story. The other half is the "why" – why is a particular country located where it is? Why does its borders look a particular way? Why do the people of that country eat a particular food or practice a particular religion? Why are certain industries important to that region's economy? These types of questions start to get at the heart of geographic inquiry and are central to the study of Human Geography.

Fundamentally, the word *geography* comes from the root words *geo* and *graphos* meaning "to write about the world." And early on, that's pretty much what geographers did. We wrote about the world around us – and sometimes we may have embellished a bit when we didn't actually go somewhere or understand the cultures we encountered, so historical geographic texts should certainly be read with a critical eye. So what do modern geographers do? Well, we might have

a bit more sophisticated equipment, but in the end, we're still doing that basic task – writing about the world around us.

Geography is divided into two main branches: human geography and physical geography. **Physical geography** refers to the study of Earth's natural environment, to include the hydrosphere, biosphere, atmosphere, and lithosphere. Physical geographers might study glacial formations, hazardous weather, coral bleaching, or many other topics related to the physical world. **Human geography**, on the other hand, refers to the study of humans and their interaction with the earth. This branch of geography includes the study of cultures, politics, economics, and urbanization – essentially how humans organize themselves and utilize Earth's resources. While physical geography and human geography represent two main branches of geographic study, they are not exclusive and there is much overlap. For example, a physical geographer might research how people perceive hurricane risk using a qualitative study, and a human geographer might investigate food waste using a quantitative survey. There is much to learn and explore in our world and a variety of tools, techniques, and perspectives to utilize. What unites all geographers is an emphasis on the spatial perspective. For human geographers, then, it is a focus on the spatial aspects of human activities and an interest in how people interact and impact the environment around them.

But why learn about human geography? If we look around us, we find that the world is more interconnected than ever before. The clothes you're wearing might have been made thousands of miles away. The food you eat may have been grown by a farmer you'll never meet and shipped a long distance. As the world has become more interconnected, it's important for us to understand the causes and consequences of these connections, and to learn more about who we're connected to. When we look at the problems facing our world today, whether it's political conflicts, economic crises, or environmental concerns, we find that understanding the geographic context is critical to understanding, and hopefully solving, these larger issues. Human geography helps us to understand our own story and the interconnected web that we are a part of.

1.2 Site and Situation

If geography seeks to answer the "where" and the "why," how do we frame that answer? How do we actually talk about the location and basic features of a place? When we discuss where places are located, we can talk about both site and situation. **Site** refers to the actual, physical location of a place. It might be its latitude or longitude, which we'll get to in a moment, and it might also be its unique features, such as elevation above sea level, average climate, and so on.

Often, though, when we talk about where something is located, we refer to its **situation**. Situation is the location of a place relative to other places and geographic features. For instance, if someone asked where you were from, what would you say? You often instinctively give the situation of that location, especially if you're from a lesser known city or town. I'm from St. Petersburg, Florida, for example, and if someone didn't know where that was, I would say, "It's

outside of Tampa," which is a larger nearby city in Florida. Where are you from? How would you describe the location of your hometown to someone who was unfamiliar with the area? How would you describe both its site (where it is actually located and its physical characteristics) and its situation (where it is located relative to other things)? What physical features of your hometown are you proud of or do you find distinctive? Very often, we use site and situation together when we describe a place. If someone was meeting you for lunch, for example, you might give the address of the place along with some general directions (i.e. "It's on the left past the park.")

1.3 Maps and Map-making

If you were meeting a friend from lunch, you certainly could describe the site and situation of place, but it might be easier to provide them with a map. Maps have been used for centuries and encompass both a hand-drawn mental map you could scribble on the back of a napkin a sophisticated map created with advanced software and satellite imagery.

Early maps were created for a variety of reasons, quite often for navigation or to display the location of a place relative to the world around it (essentially, its site and situation.) Anaximander is credited with creating one of the first ever maps of the world, a possible reconstruction of which is shown in **Figure 1.1**. While this might not seem all that impressive in modern times, consider that this map was created around the 6th century BCE. You'll notice that the map displays Greece and Turkey at its center (Anaximander was Greek and lived in a city in modern-day Turkey), as well as the region's location relative to other places in the world – both site and situation. By the 17th century, cartography (the science of map making) became much more scientific, leading to the academic discipline of geography today.

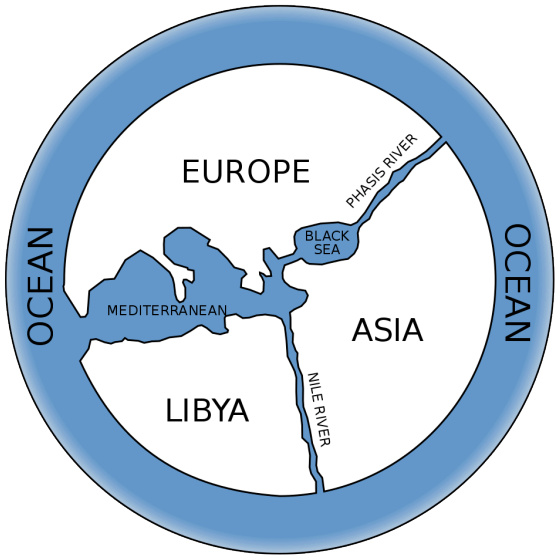


Figure 1.1: Possible rendering of Anaximander's world map (Wikimedia Commons, Public Domain)

Cartography refers to the art and science of map-making, and there are a variety of tools and techniques modern cartographers have at their disposal to create maps. Very often, modern cartographers utilize computer software. A **geographic information system**, or GIS, is a computer system that can capture, store, query, analyze, and display geographic data and this software allows us to layer information on maps and analyze them in complex and dynamic ways. With GIS technology, we have the ability to put a tremendous amount of data on the map, and make them look very professional. So, in many ways, they're seen as more accurate than the old, hand-drawn maps we used to have. Anyone can make an excellent looking map with fairly little effort.

We've mentioned that maps have been used for centuries and continue to be used today, but what exactly *is* a map? Maps are simply scale models of the real world. They serve as reference tools to help us find our way, and as communication tools to convey the human activities or physical features found in an area. One problem with maps, however, is that they depict a round earth on a flat page. Imagine if I asked you to take the peel off an orange and make it flat. How would you do it? Would you cut little slits into it to try to flatten it out? Good idea, but then the distance between the areas on the peel might be further apart than they actually are. You could squash it down, but then some areas would be a bit squished. The same challenges arise when we try and make a globe conform to a flat surface. There are a variety of ways to transfer this sphere onto a flat surface, and these types of transfers are known as **projections**. It is important to note that no reproduction of the world on a flat surface is perfect. Something must be distorted, just like in our orange peel example. And this isn't due to errors or oversights in map-making, but in simply the impossibility of taking something round and representing it exactly the same on a flat surface.

There are four basic features that can be distorted on a map: shape, distance, relative size,

or direction. When we distort the shape of something, an area might appear more elongated or more squatty than it actually is. With distorted distance, the distance between two places on a map and their distance in real life may be increased or decreased. A distortion of relative size might result in one area appearing larger than another on the map, when it is actually smaller. Finally, distorted direction simply means that the direction between two places might be distorted.

There are all kinds of different map projections and what is distorted is generally related to what the map will be used for. Let's take one of the most common maps, the Mercator projection (see **Figure 1.2**). In this image of the Mercator Projection, there are red circles known as Tissot's indicatrices, an idea presented by the French mathematician Nicolas Auguste Tissot to show distortion at a single point on a map. On a globe, these circles would all be exactly the same size and shape, as would the land underneath them. What do you notice about the circles on this map? Do you see how they get much larger away from the equator? This means that the landmasses in these areas are also much larger than they actually are in real life. On this map, Greenland for instance looks to be the size of Africa, when in reality, Greenland is only around 1/14th the size of Africa.

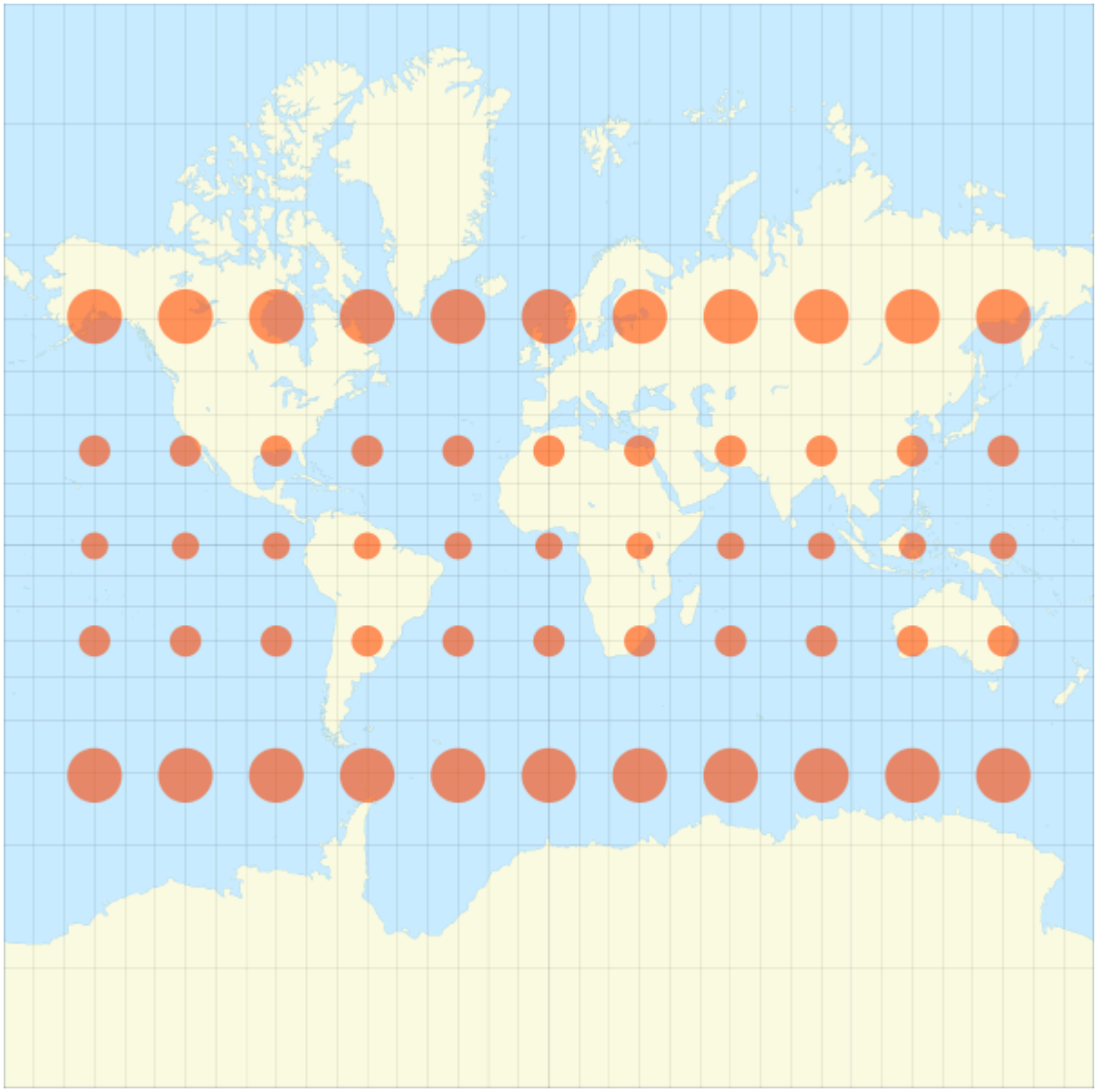


Figure 1.2: The Mercator Projection (© Justin Kunimune, Wikimedia Commons, CC BY-SA 4.0)

The Mercator projection distorts size, and you might be thinking, "What a terrible projection. Why would it be so distorted?" Again, you have to distort something and the intention of what the map will be used for can be helpful in deciding what *not* to distort. For the Mercator projection, its primary use was for navigation, which at the time would have been sailing long distances. Thus, being able to set a course between two places and keeping a constant bearing was critical, and so not distorting direction was key, but this meant that the size of areas is significantly distorted.

Today, a more commonly used map to display the world is the Winkel tripel projection, named after the German cartographer Oswald Winkel. This map is so-named because Winkel sought to minimize three types of distortion (hence "tripel," the German word for "triple"): area, direction,

and distance. Comparing this world map to the Mercator projection, it is clear that while there is some distortion, the circles appear to be roughly similar sizes, directions, and distances apart. You can also compare the size of Greenland with the size of Africa. While there is still distortion, again as is the case for all maps, if the intention is to provide students with a fairly accurate idea of what the world looks like, the Winkel tripel projection excels, and as a result, has been used by the National Geographic Society as the standard projection for world maps since 1998. There are numerous other types of projections and ways to project maps.

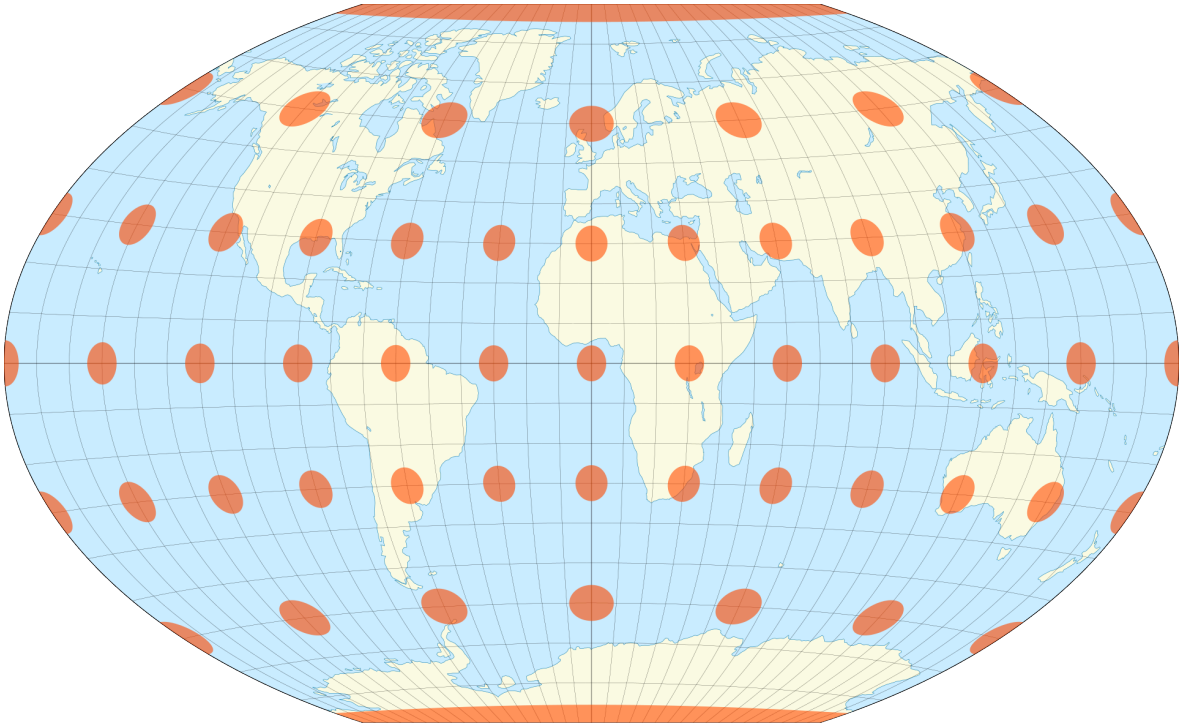


Figure 1.3: Winkle Tripel Projection (© Justin Kunimune, Wikimedia Commons, CC BY-SA 4.0)

When many people see a map, they often forget that it's a representation. It's not a photograph, and even a photograph can be incomplete. Rather, a map is a representative figure of what the world looks like. The important point is to think critically. What story is the map trying to tell? Why did the mapmaker design it the way they did (consider the projection, the colors, the extent – they're all decisions that need to be made.)

Once a map-maker decides on a projection, they must determine the **scale** at which to work, and scale can greatly affect the message conveyed by the map. Scale refers to the relationship of a feature's size on a map to its actual size on Earth. Scale can sometimes be a bit confusing for students. First, it is important to remember that scale is a *ratio*. Did you ever play with toy cars as a kid? These small cars are often 1:64 scale. What does that mean? That means that the little toy car is 1/64th the size of that same type of car in real life. So 1 centimeter on the car would be equal to 64 centimeters on a real car. Map scale works the exact same way.

If you had a 1:1 scale map, what would it look like? It would be HUGE and would have everything on it. In fact, it would be as big as the area you're mapping! (Not very easy to fold up

into a glove compartment, that's for sure.) 1:2 scale is a bit more manageable, but only slightly, because then it would be half the size, so we often use relatively small scales when mapping. "Large scale" or "small scale" doesn't refer to the landmass or to the physical size of the map. Rather, it refers to the measure of scale. If we have a scale of 1:2 and convert it to a fraction, we would get 1/2, right? As a decimal, that number is 0.5. What if we had a scale of 1:10? As a fraction, it would be 1/10 and as a decimal, 0.1. So what is a larger number, 0.5 or 0.1? 0.5 is a larger number and thus we would say that the larger scale is 1/2. Another way to remember is that typically the larger the scale, the greater the detail.

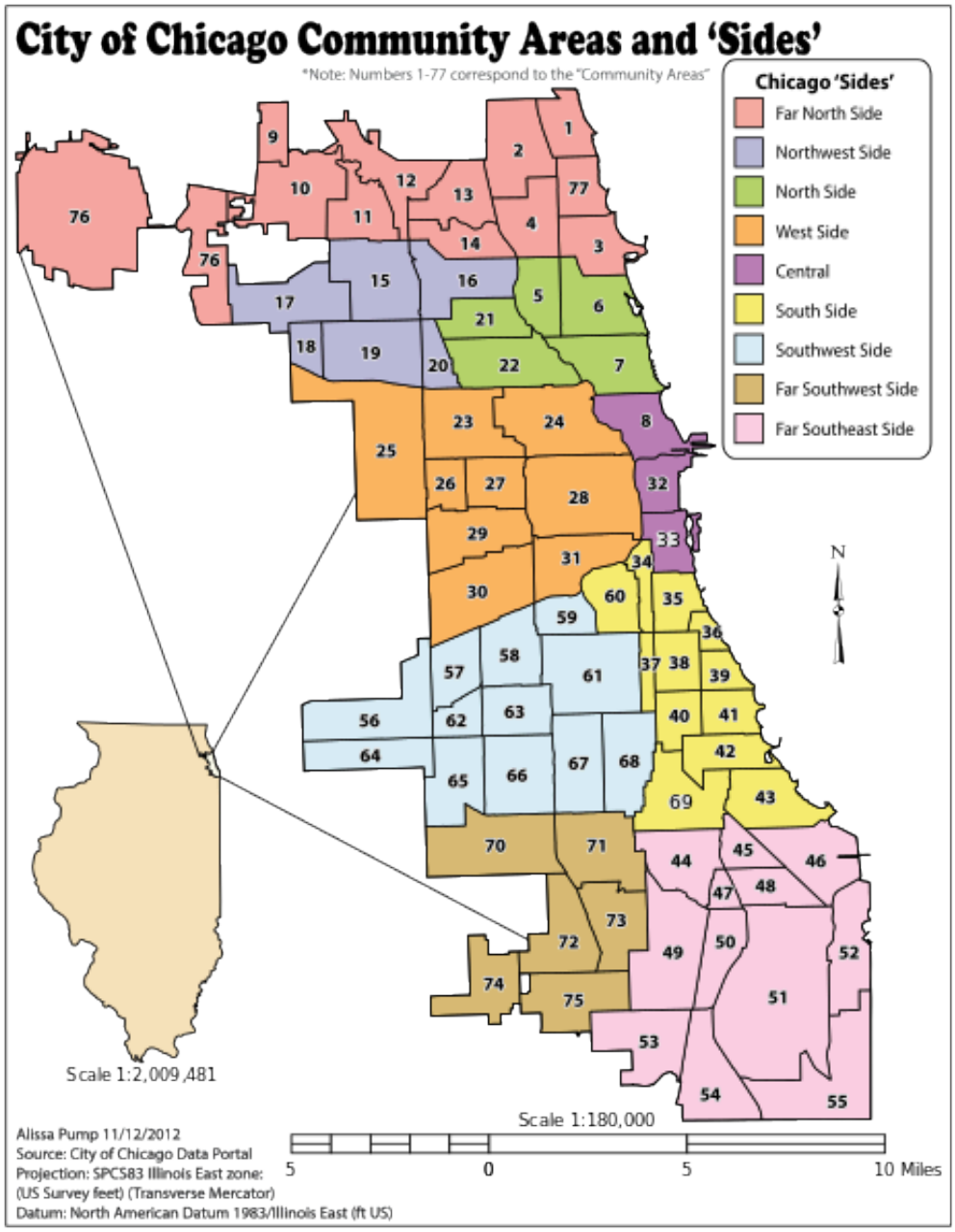


Figure 1.4: Map of Chicago Community Areas (© Alissapump, Wikimedia Commons, CC BY-SA 3.0)

A small scale map, such as 1:50,000,000, might be used to display the entire world, or a scale of 1:24,000,000 to show a particular region of the world. A larger scale map, on the other hand, might be used for a walking tour of a historic city, perhaps using 1:5,000 scale. As shown in **Figure 1.4**, a scale of 1:2,009,481 could be used to display the entire state of Illinois, while a scale of 1:180,000 could be used to illustrate particular community areas within the city of Chicago. Which one has the larger scale? The map of Chicago has much more detail and also the scale ratio as a fraction is a larger number, so the map of Chicago is a relatively large scale map while the map of Illinois is a smaller scale.

Now here's a follow-up question: which map scale is most useful? It depends. If I was traveling from my house to a neighborhood park, a larger scale map would be useful because I would need to know a lot of details and local roads. If I were traveling across the country, however, I would need a small scale map that only showed major interstates and larger cities. Map makers need to understand the intended use of the map, or the ideas the map is trying to convey, in order to select an appropriate scale. The scale of the data being mapped matters as well. A map of political affiliation by county in the United States looks very different from a map of political affiliation by state. As with projections, it is important to remember that all maps tell a story, so think critically about the decisions made by the map-maker.

Finally, two additional key terms that are important to understanding maps are **latitude** and **longitude** and these refer to the horizontal and vertical lines drawn on a map. But which is which? One way might be to think of lines of *lat*itude running *lat*erally. Thus, latitude are the horizontal, evenly spaced lines running laterally around the globe while lines of longitude are vertical and meet at the poles (see **Figure 1.5**). All locations on Earth have specific latitude and longitude coordinates. Lagos, Nigeria, for example, the most populous city in Africa, is located at 6.5244° N, 3.3792° E, so it's just north of the equator and just east of the prime meridian. Anchorage, Alaska, on the other hand, is located at 61.2181° N, 149.9003° W, quite close to the North Pole and far from the prime meridian. A simple web search for a city name and latitude and longitude will provide you with the coordinates of a particular place, or you can use Google Maps, right click on a place, and then click "What's here?" You could try it for your home and see what the exact coordinates are!

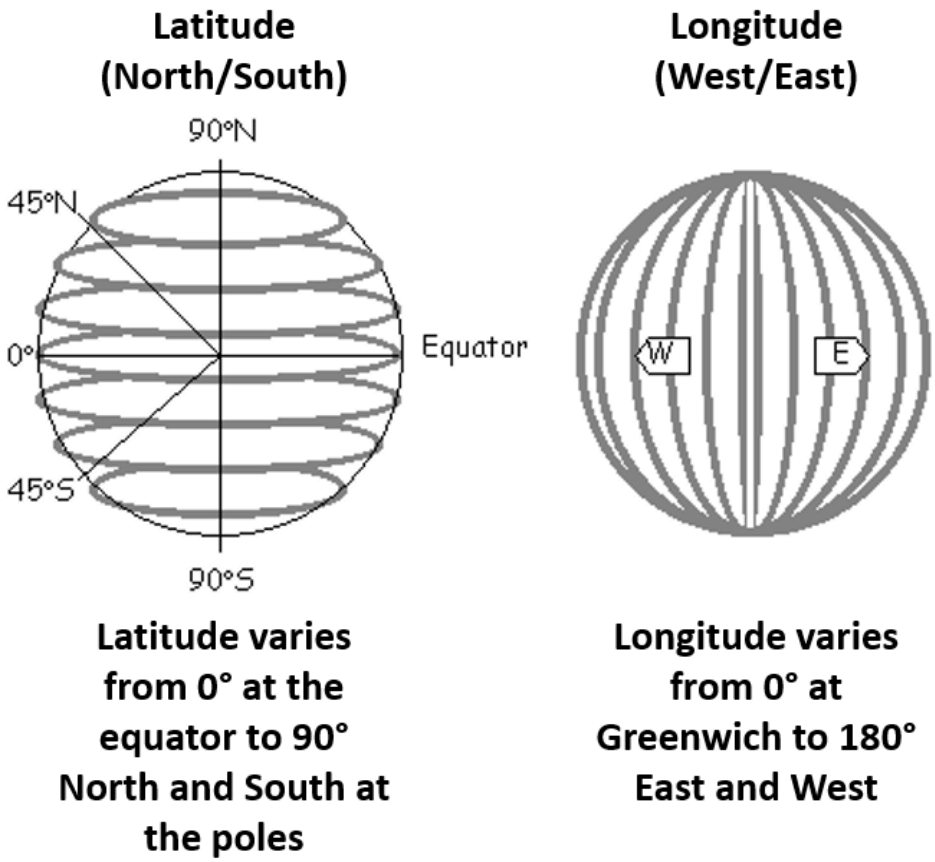


Figure 1.5: Lines of Latitude and Longitude (Figure adapted by author, Wikimedia Commons, Public Domain)

If maps are commonly used tools by geographers, how do we actually gather and analyze the data they illustrate? There are a wide variety of ways to gather spatial data. In general, data can either be classified as quantitative (such as population data, climate data, etc.) or qualitative (which might include interview transcripts, photographs, etc.) Maps generally display quantitative data, and with GIS, this data can be layered in order to use spatial analysis techniques. If you wanted to build a new school, for example, what kinds of data might you need to determine the best location? It would be helpful to have population data for the neighborhoods within a region. It might also be helpful to layer road networks, to determine where bus routes might be located. You could also include real estate information to identify vacant land. How would you collect this information? You could use census data, perhaps county records, satellite imagery, or publicly-available data on local roads. You could also collect your own data, perhaps by interviewing local residents about where they would most like a new school to help identify some possible locations. Maps help give us the information needed to make critical decisions.

1.4 Understanding Spatial Patterns

As we've discussed, maps tell a story, but they can also be powerful analytical tools. The patterns displayed on a map can help answer deeper questions. Here's a simple example: imagine you're a geographic researcher working alongside archaeologists on an excavation in South America. You find evidence of fruit trees in an area and are wondering whether those trees were intentionally planted by an ancient indigenous group who used to live there. If you mapped the tree locations and analyzed them, you could see whether they were evenly spaced, which would indicate that they were domesticated and planted.

When we analyze a map, we can look for three key measures of the spatial distribution of features: density, concentration, and pattern (see **Figure 1.6**). **Density** refers to the frequency of a particular feature within a given area. If we look at the density of people within a city, for example, we might find that there are relatively few people or quite a lot. But *where* are those people within a city? This question is best answered by the concepts of concentration and pattern. **Concentration** refers to how clustered or dispersed a particular feature is within an area. People living in a city, for example, might be heavily clustered around a downtown area. Or they might be relatively dispersed around the entire town. Finally, **pattern** refers to how those features are arranged, perhaps in a random arrangement or spaced evenly or predictably. In a planned neighborhood, for example, houses might be evenly spaced along roads, whereas in another area, houses might be fairly randomly spaced.

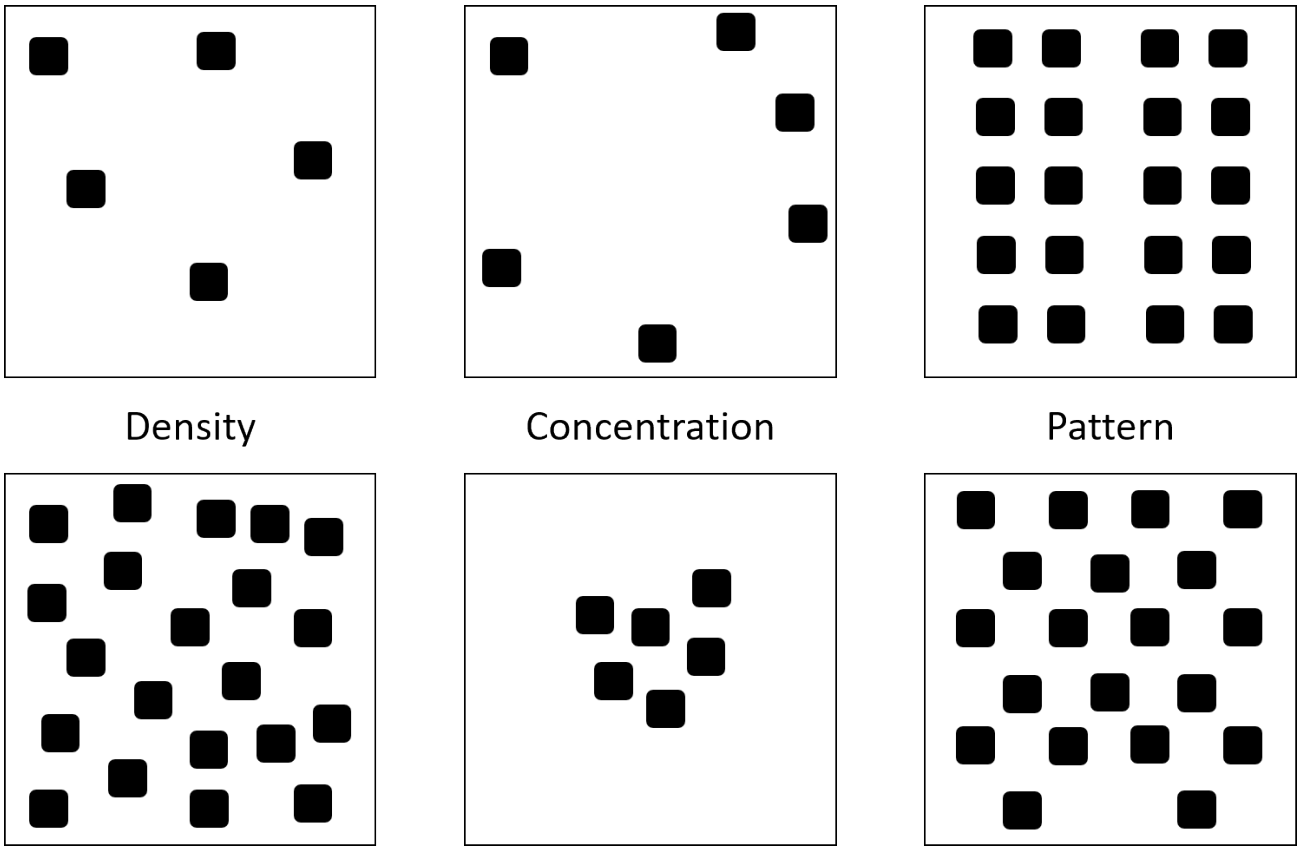


Figure 1.6: Measures of Spatial Distribution (Figure by author)

What spatial patterns do you notice in your daily life? What is the road network like in your area? Is it laid out like a grid or more like nodes? How are the houses or apartments spaced in your neighborhood? Where are the major stores located? As we consider spatial patterns, we can also add the element of time. **Distance decay** refers to the idea that the likelihood of interaction between two things decreases as their distance apart increases. For instance, how likely would you be to go to a grocery store located 5 minutes away? What about a grocery store located an hour away? How likely are you to know someone on your hall within your dorm? What about a fellow student who lives on the other side of campus?

In today's society, though, the relative distance between people and places has decreased. Just think about it – could you video chat with someone on the other side of the world? Could you hop on a plane in the morning and be in another country by the end of the day? Places might still be the same distance apart on a map, but due to technological advances in transportation and communication, the space between us is shrinking. This concept is known as **time-space compression.** Understanding these relationships – between places, between time and space, between locations and the larger area where they are located – and how these relationships change and evolve is critical to analyzing spatial patterns.

1.5 Regions

As we begin to understand and analyze maps and the world around us, we notice that certain places seem quite similar to other places in terms of their physical and/or cultural characteristics. These are known as **regions**, global areas that are broadly divided based on their physical or human characteristics. What regions are there within your state or province? Perhaps your city is part of a larger metro area, or perhaps you are in a region characterized by a distinct physical characteristic. There are three main types of regions: formal, functional, and vernacular.

Formal regions are perhaps the easiest to identify. These are sometimes also called a uniform region or a homogeneous region. **Formal regions** are areas where there is one or more characteristic shared in common. What are some examples of formal regions? Again, we're looking for ways to divide an area based on shared characteristics. What about major religious groups? Political affiliation? If you're a gardener, you have likely checked out the plant hardiness zone map to see what plants grow well in your region. Why would a map of major crop areas be considered a formal region, as in **Figure 1.7**? These regions are formal because they are created based on a shared characteristic; in this case, the dominant crop found in the area. Does this mean that only rice is grown in northern India? No, simply that it is the dominant crop found in this region.

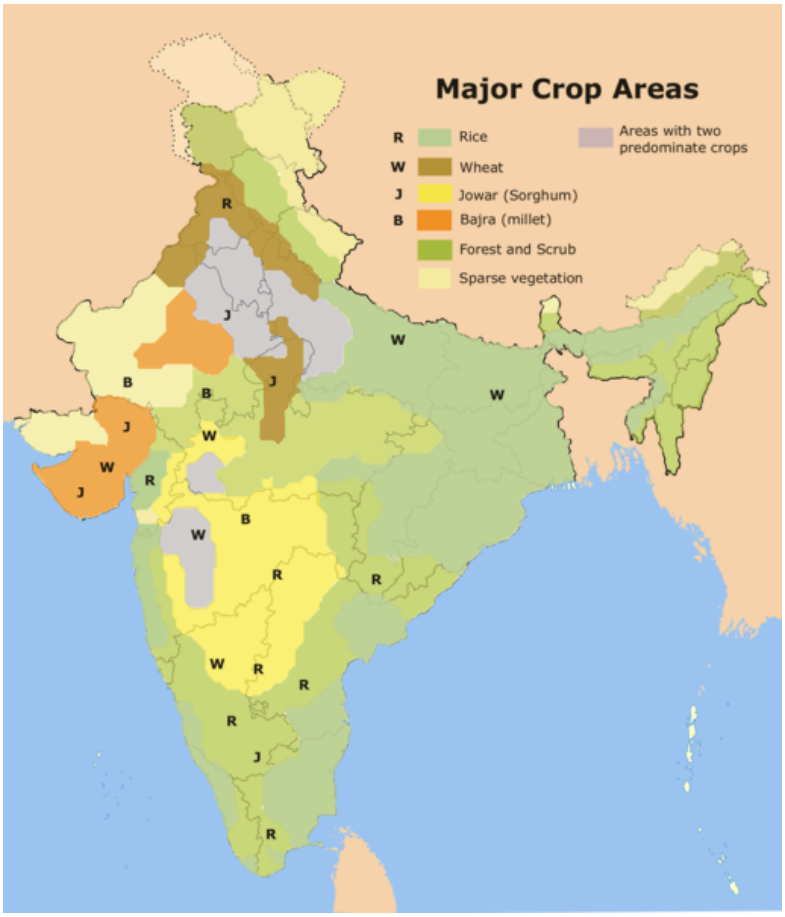


Figure 1.7: The Major Crop Areas of India (© User:Amog, Wikimedia Commons, CC BY-SA 2.5)

Functional regions are a bit more tricky. These are regions that are organized around a particular node, or focal point, and are often sometimes called nodal regions. Imagine you have a network, with a central node and other smaller nodes connected to it, and even smaller nodes connected to those. If this describes a region, what would be at the center node? What about a big city, with medium sized and smaller cities connected to it? What about a radio station, with the broadcast tower in the center and nearby cities surrounding it? What about an area serviced by a subway system, with a few central nodes and then surrounding stations? These are all examples of functional regions. Functional regions are united more by their *function* than by shared features. Most commonly, this function is economic. Take a metropolitan area like Washington, DC, for example (see **Figure 1.8**). Does the region of Washington, DC only correspond to the actual boundaries of the District of Columbia? Or does it include the surrounding area? If anyone has traveled along the Interstate 95 corridor in this region, particularly on a weekday morning, you'll notice that traffic is incredibly thick heading into the city and the surrounding counties. In the afternoon, it's the reverse. Thus, this is a region not because it has a common political affiliation, physical landscape, or ethnic identity, as would be the case with formal regions. Rather, it is united by its economic function.

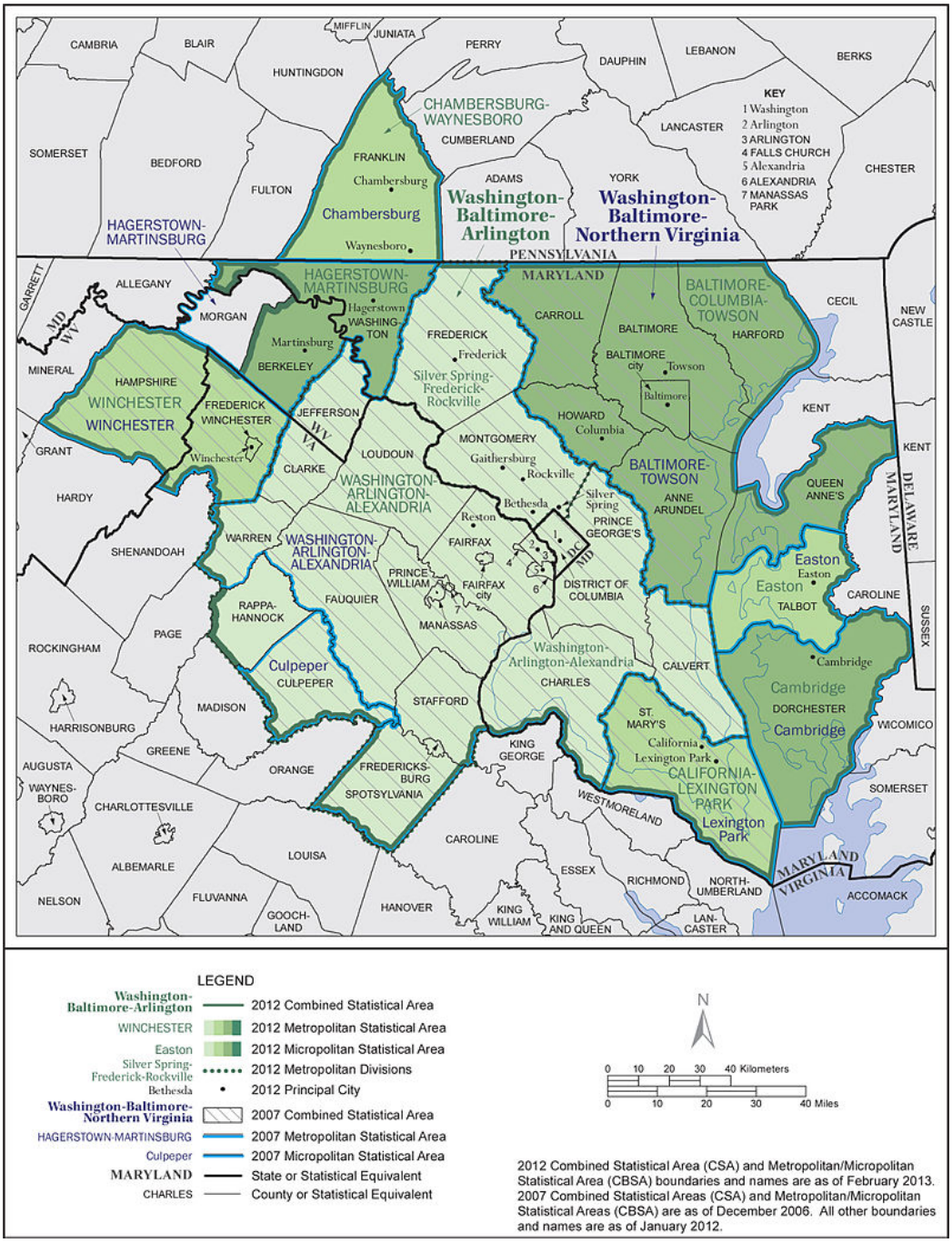


Figure 1.8: Map of the Washington-Baltimore-Arlington Metropolitan Area (U.S. Census Bureau, Economics and Statistics Administration, U.S. Department of Commerce, Public Domain)

Vernacular regions are different. Whereas formal and functional regions have fairly well-defined boundaries, vernacular regions do not. These are regions that are *perceived* to exist. That's not to say that they aren't "real" in the sense that the region can't be identified at all or that the region has no impact, but that because it is merely perceived to exist, the boundaries

are a bit fuzzy. Think about the United States a moment: where is "the south"? Where would you shade it in on a map? Would your regional boundaries exactly match your classmates'? What features would you use to determine where "the south" is? (Perhaps the accent, religion, etc.) There might be some areas where most of us would agree constitute "the south," while other areas like South Florida or northern West Virginia, would be up for debate (see **Figure 1.9**).

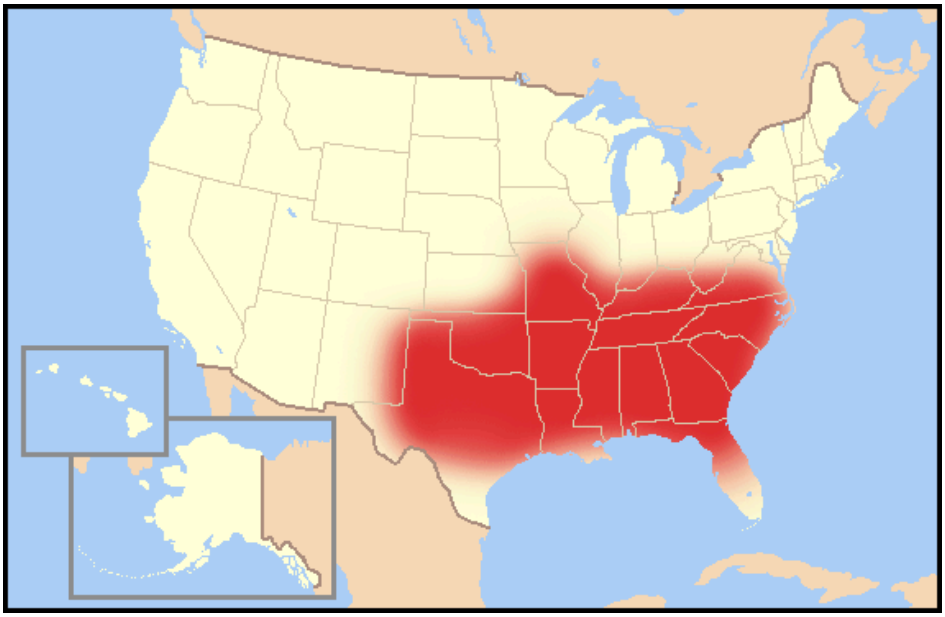


Figure 1.9: Map of the U.S. "South" Vernacular Region (© Qz10, Wikimedia Commons, CC BY-SA 3.0)

Many times, vernacular regions are related to the compass location, such as the "Midwest," but what other vernacular regions might exist? Are there any vernacular regions in your hometown? Do you have a "downtown"? Is there an "arts district," or what about a "riverfront" area? Often, vernacular regions are used as marketing tools, so there might be signs and symbols that signal that you're in a particular area, and yet the boundaries remain unclear.

As we examine the boundaries on a map, especially those between two regions, countries, or continents, what seems like a stark line separating two areas is generally actually marked by an area of transition. These areas are known as transition zones. **Transition zones** are areas marked by gradual spatial change. Take the border between Europe and Asia, for example. Typically, the Ural Mountains form the dividing line, but is Eastern Europe that different from Western Asia? What about the border between the United States and Mexico? In southern Texas, is the physical and cultural landscape that different from northern Mexico? Just as we're learning to read maps with a critical eye, look at regions with a critical eye as well. Consider whether there is indeed a clear boundary. Consider why the boundaries have been drawn the way they have, especially in the case of vernacular regions. In the case of the continents, for example, why are there seven? Why isn't Europe and Asia just a single continent called Eurasia? Why isn't South Asia it's own continent considering that it is on its own tectonic plate? Why does North America typically include Panama even though the country is more similar to its

southern neighbors than it is to Canada? Why do we even divide the world based on chunks of land when really, it is the sea that often unites us, as in the case of the Mediterranean. Regions are certainly useful ways to divide and analyze the earth, but they are generalizations and it is important to consider them critically.

1.6 Globalization

Before we dive right in to the details of globalization, take a few moments to consider the term. How would you define globalization? Do you think globalization is good for everyone? What's an example of globalization? Students often have strong ideas about globalization, but just as in the case of our ideas about regions and borders, it is important to think critically about our understanding and identify where our knowledge might be incomplete.

Put simply, **globalization** is the notion that the world is becoming increasingly interconnected. It relates to the notion of time-space compression in that our relative locations are shrinking. Think about how easy it is to connect with the world around us, either virtually or physically. Globalization, in many ways, is an amazing phenomenon. Through globalization, I can eat at my favorite Indian restaurant just down the street. I can connect with my nephew in the Philippines. I can enjoy advances in medicine made possible by a research partnership across two countries. In globalization, however, it is important to remember that there are winners and losers. Here in the United States, I enjoy significant benefits as a result of globalization, from cheaper food and clothing to lightning fast communication technologies. For poorer countries deep in debt, however, the world might not feel so flat.

Furthermore, at the same time globalization is occurring, there are also struggles for local preservation. As American fast food chains have made their way overseas, they have often replaced locally-owned and operated restaurants. As goods and services are increasingly manufactured by large, multi-national firms, they have often put family-owned companies out of business. Globalization is thus creating a more uniform and interdependent world, for better or for worse, and thus the process of globalization has numerous pros and cons.

1.7 Human-Environment Interaction

Although human geography is fundamentally focused on the human experience, as humans we interact with and reshape the environment around us. The relationship between humans and the environment is complex. Humans can be destructive toward the environment, and natural forces in turn can be destructive against humans and the built environment. Humans can attempt to control nature, improve nature, or live within it. If this interaction is so complex, how can we begin to analyze and make sense of it?

Historical geographers viewed the relationship between humans and the environment as deterministic. The term **environmental determinism** characterizes this notion that human activities are *determined* by our environmental conditions. And what's wrong with that? After all, we find that cultures who live in cold climates often wear thick fur, while those in an arid environment typically wear loose, flowing garments. While the environment certainly has an impact on the range of our activities, to say that the environment *determines* cultural traits leaves out the possibility of human adaptation and innovation. In addition, many environmental determinists held racist views, believing that certain cultures were superior or harder working as a result of an advantageous climate and physical environment (ignoring indigenous cultural development and legitimizing a history of colonization and imperialism.)

Setting aside the problematic notion of environmental determinism, how can we acknowledge the environment's impact on human society while also leaving space for human ingenuity. **Possibilism** is the theory that the physical environment may limit some human actions, but people have the ability to adjust to the environment. Thus, the environment gives us a range of *possibilities* rather than *determining* our actions.

Now more than ever, humans have reshaped our physical environment, sometimes with catastrophic consequences. But does the way we use the land always have to be so destructive? One model for human-environment interaction is known as **sustainability**. Environmental sustainability refers to the ability of a natural system to be productive indefinitely, meaning that humans could make use of the resources within an environment now and infinitely into the future. Sustainable development more broadly refers to the ability to develop today without compromising the economic, social, or environmental well-being of future generations. When we think about using the environment sustainably, what does that mean? When we think about human geography, we've discussed that in many ways, it is a telling of our collective story, and so you might think of environmental sustainability as an acknowledgement that it is indeed a collective story, of which we are only a small part, and that we intend for that story to continue in the future. And thus, rather than farm in a way that destroys topsoil, we might use alternative methods that reduce or eliminate large-scale plowing. Rather than degrade the physical environment of another country in order to produce our goods more cheaply, we might use alternative resources that have only a minimal environmental impact. Rather that burn non-renewable fossil fuels, we might invest in renewable forms of energy that can sustain us indefinitely in the future. Finding solutions to environmental problems or development concerns can be a challenge, but by approaching these challenges from the point-of-view of sustainability, we work to ensure that our solutions will still be effective long into the future.

2. Population and Migration

Learning Objectives

- Understand the primary ways to measure population distribution and structure
- Explain the Demographic Transition Model
- Discuss the effects of a changing population
- Describe why people migrate
- Identify the changing characteristics of migrants to the United States

In 1800 CE, the world's population stood at 1 billion people. Think about that a moment: it took the entirety of human history up until the year 1804 to reach its first billion people. The next billion came just 100 years later in the late 1920s. Today, the world's population stands at close to 8 billion people. But where do many of those people live? Where is the world's population growing the fastest? Why do some people migrate to other areas? And what factors influence population distribution and dynamics? This chapter examines both population and migration.

2.1 Population Distribution

If you could live anywhere, where would you want to live? What type of climate and physical environment do you enjoy? I'm partial to a tropical beach, but you might be more inclined to choose a picturesque mountain landscape. Why do people live where they do? Well, just think of the characteristics of your ideal place. Most people tend to avoid living anywhere where there are environmental extremes, areas that are extremely wet, dry, cold, or high. Thus close to the poles, we see almost no human habitation. Similarly, very few live in arid deserts. Rather, most people tend to live in relatively temperate areas near water. In fact, only around 10% of people in the entire world live over 10km (or just over 6 miles) from a source of fresh surface water. Why might this be the case? Today, in more developed countries, you can generally turn on the faucet and easily access fresh water. But how did our ancestors care for crops and access drinking water? Not having an easily accessible source of fresh water would have made an area inhospitable. And while we might have more flexibility with where we choose to live today, the historical patterns of where towns and cities were located has influenced the distribution of our global population even today.

Figure 2.1: The Earth at Night (NASA/NOAA, *Public Domain*)

If we look at the world at night (see **Figure 2.1**), we can see where the major clusters of population are located in the world today. Most of our population today is clustered in one of four areas: Europe, East Asia, South Asia, and Southeast Asia (see **Figure 2.2**). Around two-thirds of people in the world today live in one of these areas.

So how do we measure population? We could just count the number of people in a particular country, but it's helpful not just to know the number of people, but to analyze how those people are distributed within an area. If we examine population density, we can better understand the spatial pattern of people living in a particular area. There are three primary measures of population density: arithmetic, physiological, and agricultural. **Arithmetic density** is simply the number of people per unit area. It's the easiest to calculate, since you just need to know the number of people and the size of the area of land. If you have a 10 by 10 kilometer square and 100 people in that area, the arithmetic density would be 100 people per 100km^2.

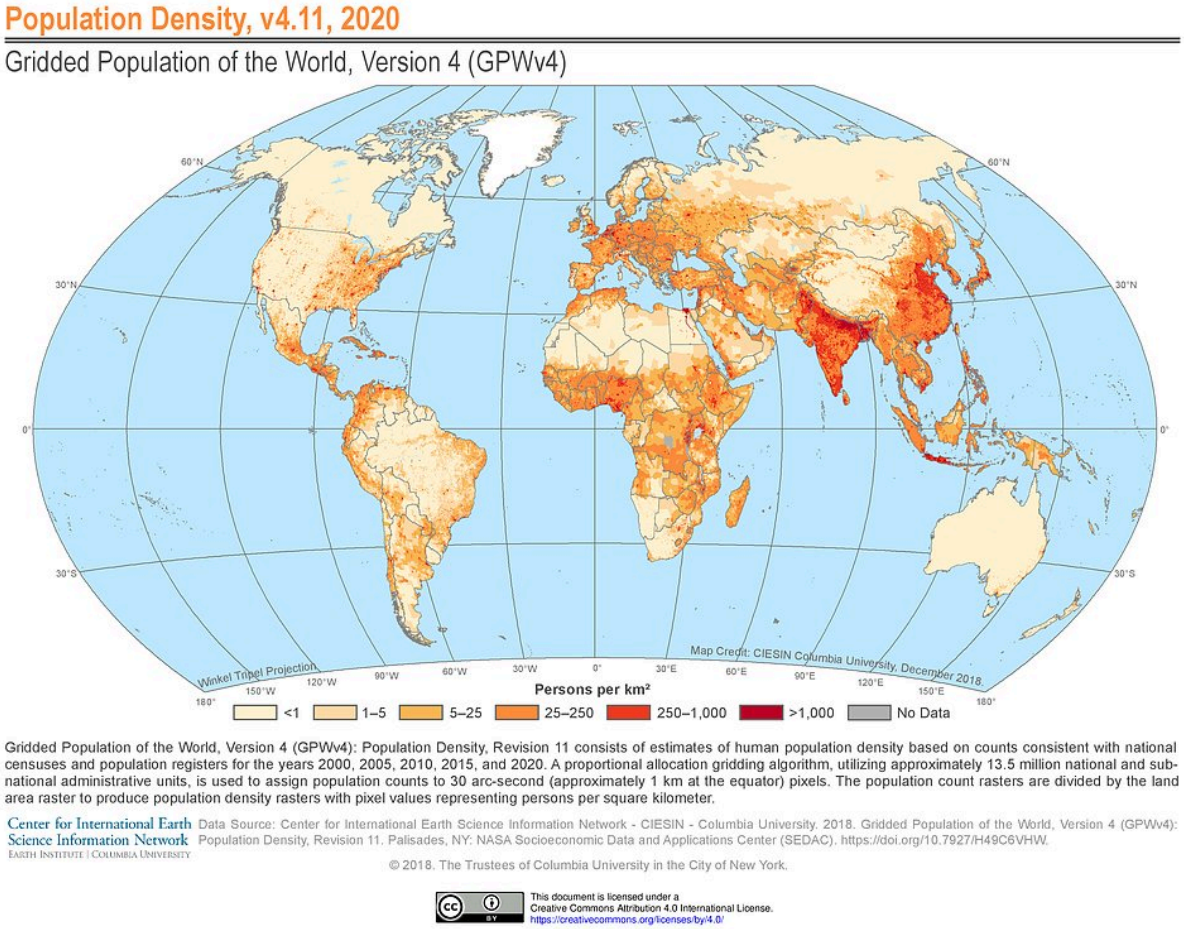


Figure 2.2: Map of Global Population Density, 2020 (© Center for International Earth Science Information Network, CC BY 4.0)

While arithmetic density is simple to calculate, its limitation is that it assumes that all land is the same. People can't live in the middle of a desert (for very long, anyway). So, arithmetic density only tells us part of the story. It might not really tell us how tightly packed people are really living in an area. Take Egypt, for example. Egypt is a fairly large country, and its arithmetic density is 99 people per square kilometer (as of 2020). The United States, by comparison, has an arithmetic density of 33 people per square kilometer, so you might conclude – just from looking at the arithmetic density – that Egypt is marginally more dense than the United States. The problem is that very little of Egypt consists of arable land. (Look back at the world at night picture for proof. Notice that the only lights in Egypt are along the Nile?) Most of Egypt is desert and the only arable region is right along the Nile river. So how can we take this difference into account?

Physiological density specifically examines the density of people relative to the amount of arable land, meaning land that is available for agriculture. It's quite a bit harder to calculate (how challenging would it be to determine how much land in a country is available for farming?) but

it paints a much more accurate picture of how densely people are actually living (see **Figure 2.3**). When we compare the physiological density of the United States and Egypt, we see that the United States has a physiological density of 199 people per square kilometer (using a 2016 estimate of arable land area and the population as of 2020), so not all of our land is available for agriculture but a fairly high percentage of it compared to other countries. Egypt's physiological density, however, is an astounding 3,535 and all but 5% of Egypt's population lives along the Nile River. Singapore has one of the highest population densities of any country with an arithmetic density of over 8,000 people per square kilometer and a physiological density of over 1 million people per square kilometer, with less than 0.8% of their land available for farming!

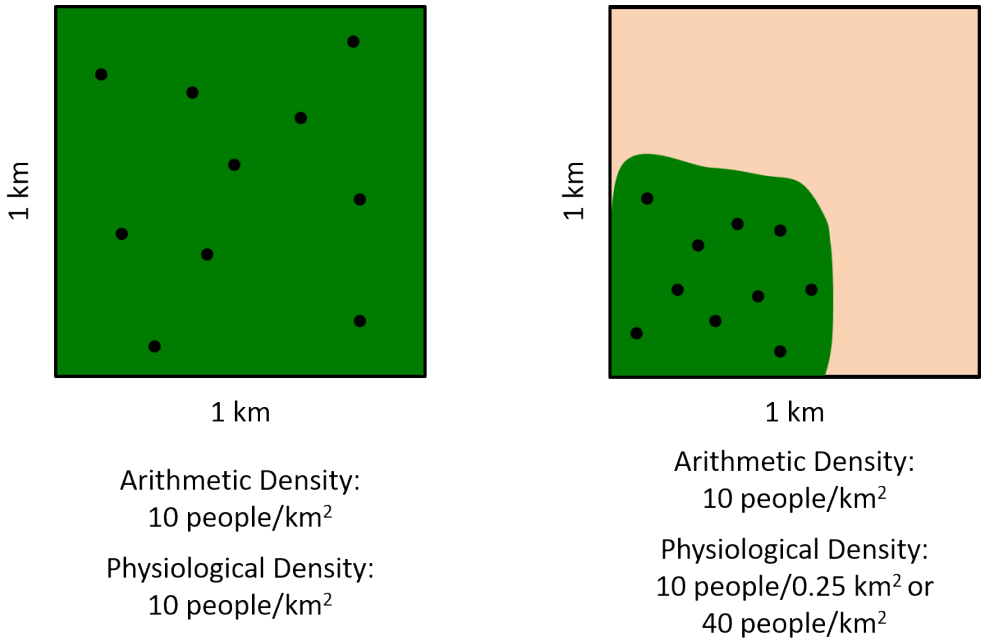


Figure 2.3: Arithmetic and Physiological Density (Figure by author)

Another measurement of density is agricultural density, which looks at the ratio of farmers to the amount of arable land. Where do you get most of your food from? Do you grow your own tomatoes, harvest your own corn, and get fresh eggs out of the chicken coop each morning? Perhaps you do, but more than likely, you get your food at a supermarket, which means someone else, a farmer, is harvesting that food for you. Agricultural density can help us understand the economic differences between two countries. Countries might have similar measures of arithmetic and physiological density, but yet have vastly different economic situations. In the United States, we have about 2 farmers for every square kilometer of arable land. Just two people farming an entire square kilometer of land. India, by comparison, has around 19 farmers per square kilometer of arable land. Agricultural density can be challenging to calculate because you need to find not only the number of farmers living in a country, which is not always easily available, as well as the amount of arable land, which again can be difficult to uncover. Still, in general you can assume that a country with a high agricultural density, meaning a high number of farmers per area, is more likely to be less developed, while

a country with a low agricultural density (fewer farmers per area) likely has more industrial farming practices and is more highly developed. Additionally, having a lower percentage of arable land means that countries with higher populations will put more pressure on that land to be productive.

2.2 Population Structure and Change

Human geography doesn't just tell a story of where we've been or where we are now, but where we're going. How will our population change in the future, and what effects will those changes have on our larger society and world? Geographers use three primary indicators to measure population change: the natural increase rate, the crude birth rate, and the crude death rate. The **natural increase rate** (or NIR) is the percentage by which a population grows in a year. It varies from Bulgaria, where the NIR is actually negative 0.7% (according to the Population Reference Bureau, which has robust population data for each country), meaning its population is declining at around 0.7 percent each year, to Angola where the NIR is 3.5% and the population has grown from around 23 million in 2010 to over 32.5 million in 2020. The current global rate of natural increase is 1.1%, which might not sound like a lot, but 1.1% of 7.8 billion people is an additional 85.8 million people each year! The peak global NIR was in 1963 at 2.2%. At the current global rate, our population is projected to be over 9.8 billion by mid-2050.

The **crude birth rate**, or CBR, refers to the total number of live births in a year generally for every 1,000 people. Thus a CBR of 20 typically means that 20 babies are born for every 1,000 people in a society. The **crude death rate**, or CDR, is the total number of deaths in a year for every 1,000 people. The natural increase rate is calculated simply by subtracting the CDR from the CBR, essentially subtracting the rate of deaths from the rate of births. Put simply, where more people are born in a country than die in that country each year, the population would increase and you'd have a positive natural increase rate. Where the reverse is true, and relatively few people are being born compared to the number of people who die in a country, you'd find a negative rate of natural increase.

Let's practice: India currently has a CBR of 20 births per 1,000 people and a CDR of 6 deaths per 1,000 people. So what is its NIR? Again, the NIR is calculated by subtracting the CDR from the CBR, so: 20 per 1,000 (CBR) minus 6 per 1,000 (CDR) equals 14 per 1,000. Keep in mind that the CBR and CDR is per 1,000, so to calculate the NIR as a percentage, you would simply divide 14 by 1,000, which would give you an NIR of 1.4%. What about Poland, where the CBR is 10 and CDR is 11? 10 – 11 = -1. Negative 1 divided by 1,000 is -0.001, or -0.1%.

Where we find the highest rates of natural increase are primarily in developing countries, whereas in parts of Eastern Europe, Russia, China, and Japan, the population is actually decreasing (see **Figure 2.4**). Note that the rate of natural increase does not include migration, so some countries might have a decline in population were it not for an influx of immigrants.

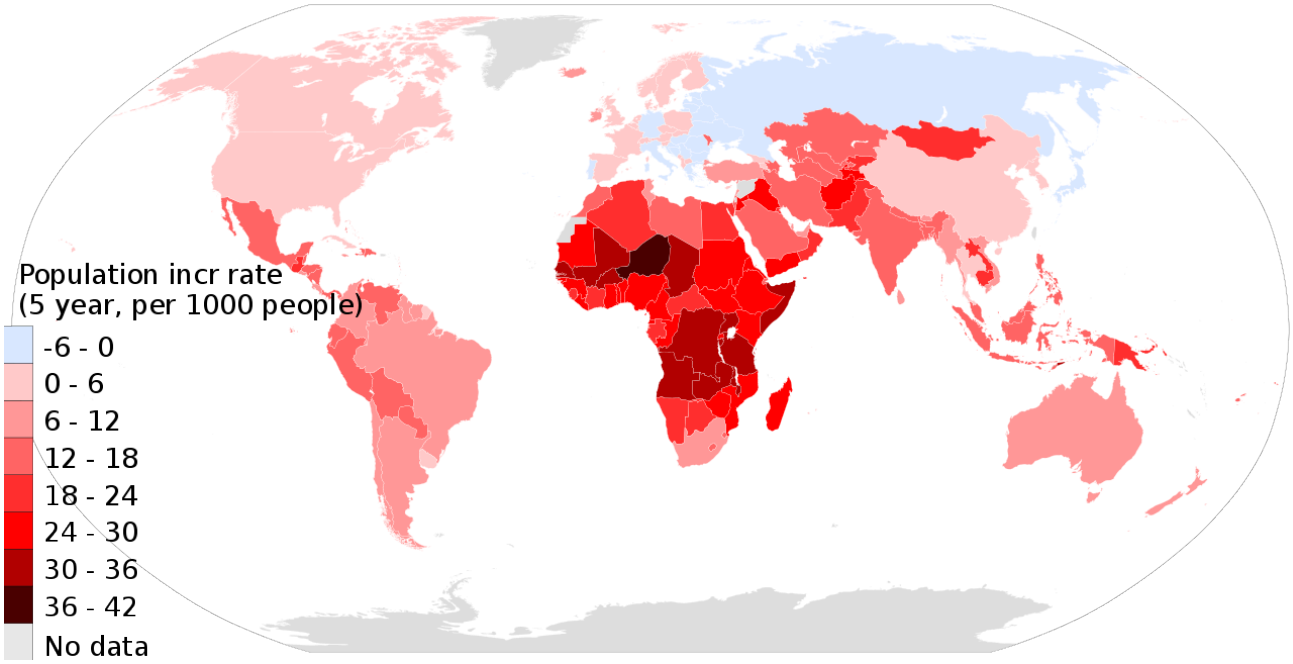


Figure 2.4: Population Increase Rate by Country, 2010-2015 (© Ms Sarah Welch, Wikimedia Commons, CC BY-SA 4.0)

Another key measure of a country's population is its **total fertility rate**, or TFR, which is the average number of children a woman will have throughout her childbearing years (defined as ages 15-49). The current global fertility rate is 2.3, meaning that most women on average will have 2.3 children. The TFR roughly equates to the average family size within a country. In the United States, our TFR is 1.7, so most families these days have one or two children. Do some families have no children, and other have far more? Of course, but on average families are generally fairly small. In Japan, the TFR is only 1.3, with most families only having one child, while in Nigeria, family sizes are generally much larger with a TFR of 5.3. How many children are needed to replace the current generation? If a couple has two children, they have essentially replaced themselves. If they have more than two children, their family tree will look much more like an actual tree, growing larger with each generation. This idea is known as the replacement rate, which is estimated at 2.1 children per woman and accounts for the fact that not all children will reach adulthood. If a country's TFR is greater than 2.1, each generation will be able to replace itself. A TFR less than 2.1 means that a country's population will decline. If you note that the global TFR is only slightly above the replacement rate, this means that the global population is relatively stable, increasing only gradually. However, as we've mentioned, the TFR varies greatly by country.

Sadly not all children reach adulthood, and infancy for every species including humans is fraught with danger. The **infant mortality rate**, or IMR, measures the annual number of deaths of infants under 1 year of age, compared with total live births. It is usually expressed as number of deaths among infants per 1,000 births. The IMR is affected by a variety of factors. Certainly it reflects a country's healthcare system. Countries with lower IMRs generally provide healthcare

for all its citizens and have high levels of maternal nutrition and care. IMR can vary within societies, however, particularly among ethnic and racial groups and by region or state. In the United States, for example, the IMR in 2017 was 5.8 deaths per 1,000 live births. (The United States ranks quite low overall in terms of IMR, according to the CIA's World Factbook, having a higher IMR than 55 other countries. Japan, by comparison, has an IMR of 2 deaths per 1,000 live births.) However, within the United States, this number varies significantly. In New Hampshire in 2017, for example, the IMR was 4.2. In Mississippi, it was 8.6 that same year. And among black babies born in Mississippi, the IMR was 11.6.

At the other end of the lifespan, broader mortality rates and life expectancies also vary by country. **Life expectancy** refers to the average number of years a newborn infant can expect to live. It is a highly complex calculation that looks at likelihood to survive at every age. The highest life expectancies are found in more developed countries, and again reflect societal issues such as access to healthcare. Japan consistently has one of the highest life expectancies at around 85 years. The life expectancy in Chad in 2017, by comparison, was only 50 years. In the United States, the life expectancy is around 80 years. Life expectancy has changed significantly over the course of human history. For Neanderthals, a high likelihood of accidents and a scarcity of food contributed to a life expectancy of just 30 years. During the late Middle Ages, plagues and famines hampered life expectancy increases contributing to an average lifespan of around 38 years. In the 1900s, improvements in healthcare and sanitation led to sustained increases in the life expectancy to around 70 years.

All of these statistics, births rates, death rates, life expectancy and impact how a population will grow and change. One helpful way of understanding how fast a country's population is increasing is known as doubling time. **Doubling time** refers to the amount of time a population takes to double in size and the formula can actually be applied to a wide range of phenomena from interest rates to the spread of illness. It can be roughly calculated by dividing 70 by the percentage growth rate. Thus, a country with a population growth rate of 1.1% will double in 63 years. A country with a growth rate of just 0.5% will double in 140 years.

These changes in population over time can be graphically presented using a population pyramid. **Population pyramids** display the percentage of a country's population for different age and gender groups. (Sometimes the figure lists actual population numbers rather than percentages.) The shape of population pyramids change as the CBR changes. Furthermore, every 5 years, each age cohort moves up, further changing the shape. Despite being called population *pyramids*, not all population pyramids actually have a pyramidal shape. Countries whose populations are growing very rapidly will have a population pyramid with a very wide base relative to its top, whereas countries with a decreasing population pyramid might look like an upside-down triangle. Let's look at some examples.

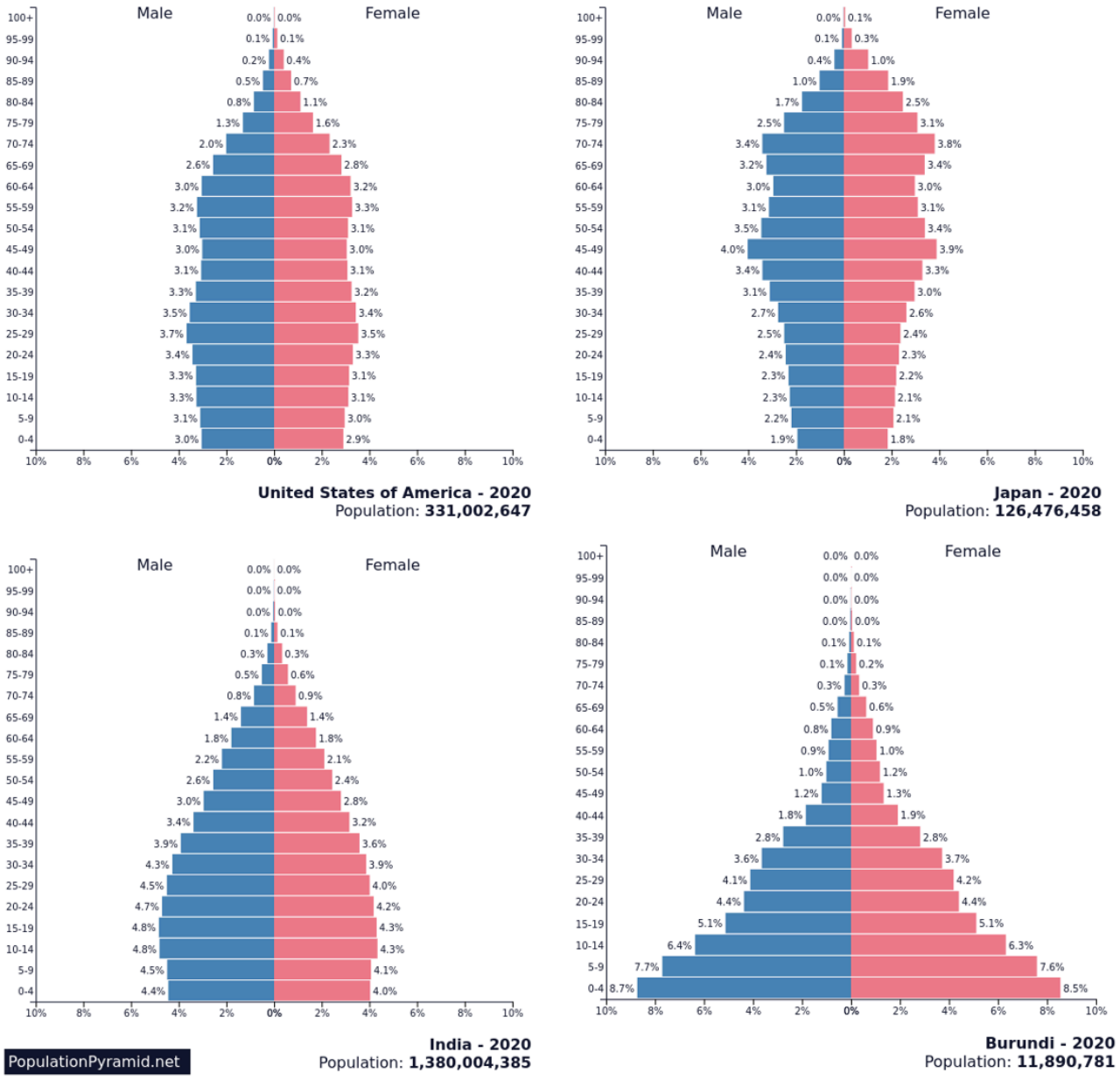


Figure 2.5: Population Pyramids of Selected Countries, 2020 (© populationpyramid.net, CC BY 3.0, Composite image)

Figure 2.5 displays several population pyramids and the shapes are all quite different. Which population is increasing at the fastest rate? Look at the shape of Burundi's pyramid – notice that the bottom of the pyramid is very wide compared to its top and that the bottom few cohorts (ages 0-4, 5-9, and 10-14) are each quite larger than the next. As these groups age and a new cohort is added on the bottom of the pyramid, what will it look like? It will likely continue to be wider and wider, and this indicates a growing population. What about Japan's population? Is it increasing, decreasing, or staying the same? Japan's pyramid shows a slight narrowing at

its base and this indicates that its population is declining. Population pyramids can also tell us what was happening in a country's population years ago. Imagine covering up (or actually cover it up if you have a piece of paper handy) the bottom of India's population pyramid, and only examining its top, ages 40 and up. What would you have said about how its population was changing 40 years ago? It was increasing quite rapidly. Then what happened? It looks like its population began increasingly more slowly and is now relatively stable.

Finally, keep in mind that a population pyramid reveals both the age structure of a population and its structure by gender. How might this be useful? Look at the percentage differences in gender in India among young children (ages 0 to 4). 4.4% of India's population consists of males age 0-4 and only 4.0% of its population the same age are female. In a given society, these numbers should be roughly even, though the youngest cohort will naturally be slightly skewed male since more boys are born than girls but boys are also more likely to die in childhood. Thus, these numbers should even out until the top cohorts, where they will tend to be skewed female since women generally have higher life expectancies than men. Where the gender ratios significantly differ, there might have been male deaths due to war (as is apparent in the historical population pyramids of countries like Germany) or, particularly when these differences are very apparent in younger cohorts, there might be significant gender discrimination in a society and preference for male children that can lead to selective abortions or infanticide. Population pyramids can convey a great deal of information about a population's current structure, its historical patterns, and likely changes in the future.

2.3 The Demographic Transition Model

As you might have noticed, often a country's birth rate, death rate, and population growth reflects its broader levels of development. Countries that are highly industrial and urbanized tend to have relatively low birth rates and low death rates, while countries that are more rural and agricultural tend to have larger families and relatively higher death rates. This change in the birth rate, death rate, and population growth over time can be charted, and we tend to find that most countries follow the same essential pattern. This chart is known as the **Demographic Transition Model**, or DTM, and it is a critically important model of how a country's population structure and growth changes over time (see **Figure 2.6**).

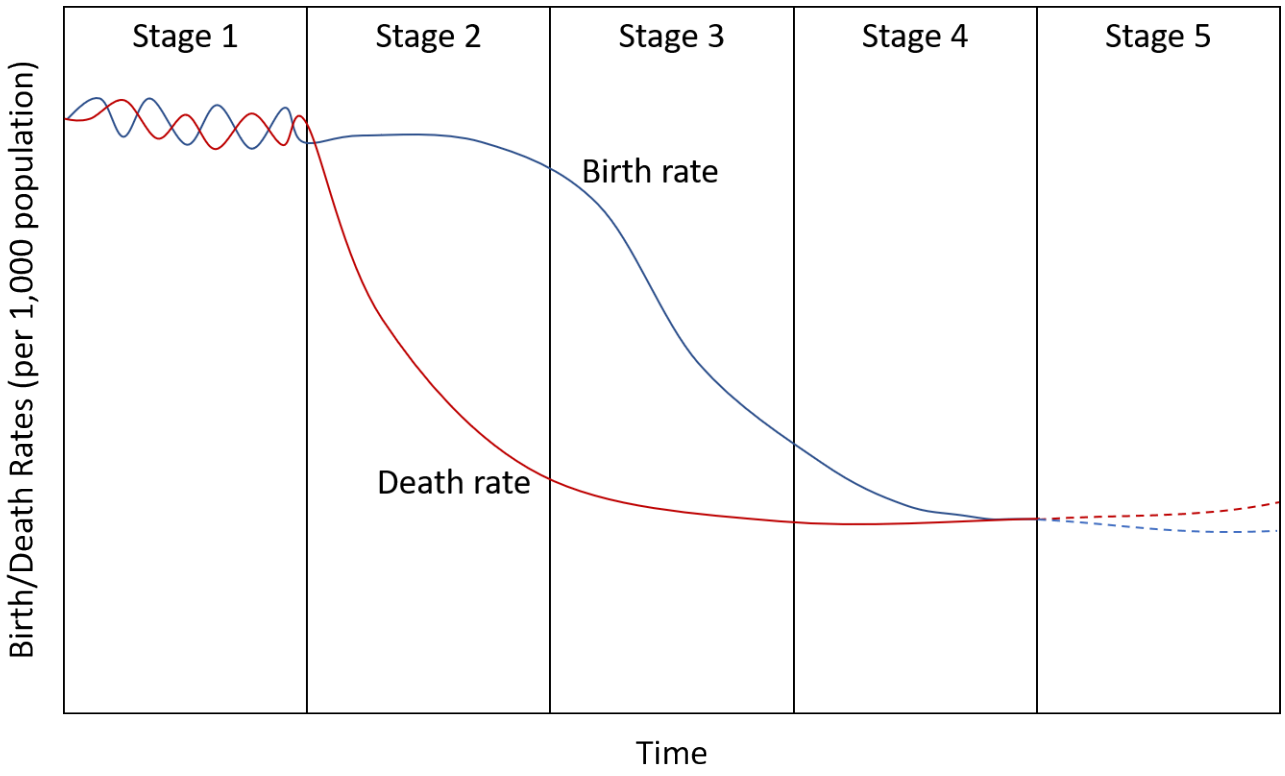


Figure 2.6: The Demographic Transition Model (Figure by author)

The Demographic Transition Model has five different stages, and though each country's DTM is unique, we find that the general model fits in most cases. Let's walk through the stages. Stage 1 of the DTM is characterized by a very high birth rate and a very high death rate. So what's happening to a country's overall population in this stage? Is it growing, decreasing, or staying the same? Think back to the natural increase rate: a country's population increases when the birth rate is higher than the death rate. In this case, as you can see in the figure, they're about the same, so the population will be relatively stable. Stage 1 would have been typical of feudal Europe, with very large families but also widespread diseases and high mortality. No country remains in stage 1 today.

In stage 2, notice that the birth rate remains high (with larger families still the cultural norm), but the death rate begins to rapidly decline. The plummeting death rate could be something as simple as understanding the importance of hand-washing or providing basic sanitation systems, or it could come as a result of a vaccine. Increases in the food supply could similarly reduce mortality and increase life expectancy, and these improvements in food security usually come about as a result of innovations in farming. Improvements in healthcare systems and education similarly contribute to a decrease in the death rate. Note that birth rates remain high in this stage, however. Why might this be? Stage 2 countries are primarily rural and agricultural. How many children did your great-grandparents or great-great-grandparents have? Are large families typical in more agricultural communities? In rural, less developed areas, having a large family is not only a cultural norm but is also helpful. More children mean more help around

the farm. More developed countries went through stage 2 around 200 years ago as a result of the Industrial Revolution. Many less developed countries passed through this stage 50 years ago because of the transfers of medical technology, such as vaccines. Some countries remain in stage 2 today, including many countries in Sub-Saharan Africa, Afghanistan, and Yemen. In stage 2 leading into stage 3, we typically see the most rapid increases in a country's population.

In stage 3, a country begins to become more industrialized. Birth rates fall due to a variety of factors. Access to contraception becomes more widespread. Education, particularly for women, improves, and with it comes an increase in the status of women and an increase in the number of women in the workforce. As a country urbanizes and jobs shift from agriculture, there is a reduction in the value of children's work. There is also an increase in the parental investment in the education of children. In this stage, people begin to *choose* to have fewer children, and the cultural values of having a large family begin to shift. Much of Latin America (Mexico, Chile, etc.) and Northern Africa remain in this stage. More developed countries went through this stage around 100 years ago.

During stage 4, the death rate remains low and the birth rate continues to lower, approaching the death rate. Stage 4 represents a highly urbanized, highly industrialized society. Here, families might live in crowded cities where having a large family might be challenging, or both parents might be working, with childcare costs similarly making a large family cost prohibitive. Cultural values have shifted and having small families has become the norm. If you're not already a parent, how many children would you like to have? In the United States, which is in stage 4, the common answer is two children, with some families having more and some less. If you'd ideally like to have one or two children, or no children (or if you'd prefer a larger family, imagine why people would choose to only have a small number of children), what factors influenced your decision? These factors are collectively shared within a society and contribute to larger fluctuations in the birth rate.

Years ago, some proposed that a stage 5 should be added to the DTM, and it certainly seems like a stage 5 is apparent when you examine the population changes in countries around the world. In this stage, there are a variety of changes that may occur. In some cases, as in Japan, the death rate remains low and life expectancy is quite high, but the birth rate has fallen below the replacement rate and below the death rate, and thus the country's population will decline. In other cases, as in Russia, the birth rate might actually increase a bit, but the death rate could increase. As a country builds wealth and economically advances, nutritional choices can become more difficult and there can be a rise in obesity-related illnesses or alcoholism. In addition, increases in urbanization and connectivity can contribute to a reemergence of infectious diseases, which could similarly increase the death rate. In either case, a country's population would decrease when its birth rate is below the death rate.

Closely related to the DTM is the **Epidemiological Transition Model**, sometimes simply referred to as epidemiological transition. This model explores the changes in disease patterns and causes of death corresponding with various stages of the demographic transition model. In stage 1, what were the leading causes of death? Malnutrition, infectious disease, and famine were all common, and thus this stage is known as "The Age of Pestilence and Famine" (certainly not an upbeat term.) stage 2 is referred to as "The Age of Receding Pandemics." Here, as we've explored, we see declines in the mortality rate and improved sanitation and healthcare, including the widespread use of vaccines. Stage 3 is "The Age of Degenerative and Man-Made

Diseases." In this stage, we see that as societies improve, there might be malnutrition coming as the result of getting the wrong types of nutrients. Obesity-related illnesses emerge. As people live longer, and are exposed to more environmental contaminants, we also see a rise in illnesses like cancer as well as age-related degenerative diseases. In stage 4, characterized as "Delayed Degenerative Diseases," improvements in medicine have often been able to delay age-related illnesses and improve mortality rates for various cancers increasing overall life expectancy. Finally, just as we are seeing the emergence of a stage 5 of the DTM, some have hypothesized that there is a stage 5 of the epidemiological transition model. In this stage, we might see the reemergence of infectious diseases or widespread pandemics due to an increase in global connectivity. The COVID-19 coronavirus pandemic certainly speaks to the challenges of our interconnected modern society. Furthermore, as existing diseases and illnesses are battled, there is sometimes a rise in strains that are resistant to our current antibiotics or treatments, and thus we may see diseases reemerge if current innovations and technology do not continue to improve.

2.4 Impacts of Population Change

As a country develops and its population shifts and changes, these changes can have a significant impact on a country's well-being. Why might that be? Imagine a country's population is increasing very rapidly. What challenges might it face? It might have to build more schools and hospitals, ensure that it is growing the economy to provide jobs for a growing workforce. It might have a higher resource use, or perhaps use resources in an unsustainable way to support a rapid increase in population. What about a country whose population is decreasing? A country with a larger top section of its population pyramid would have a rapidly aging population, and relatively fewer workers to fund social programs. This relationship is called the dependency ratio. The **dependency ratio** is the number of people who are too young or too old to work compared to the number of people in their productive years. Why would this ratio matter? Again, a large percentage of children requires a lot of schools, hospitals, and day-care centers. A large percentage of older people also requires increased social services like medicare and nursing homes. More than one-quarter of all government expenditures in the US, Canada, Japan, and much of Europe go to Social Security programs, health care, and other services for the elderly. The dependency ratio is reflected in a country's population pyramid, with a population pyramid that has a very wide base and/or a wide top relative to the middle sections indicating a high ratio of non-workers to workers within a society and thus a high dependency ratio.

More broadly, how will changes in our population and development impact our use of the earth's resources? When will our population be too great for Earth to handle? Will we have enough food to support human life? Thomas Malthus was an English economist living in the late 1700s and early 1800s who considered these essential questions. And he had a pretty grim answer. He published a paper in 1798 that claimed that our population was growing

much more rapidly than our supply of food. Essentially, he said our population was increasing *geometrically* (also called exponential growth) whereas food supply only increased *arithmetically* (See **Figure 2.7**).

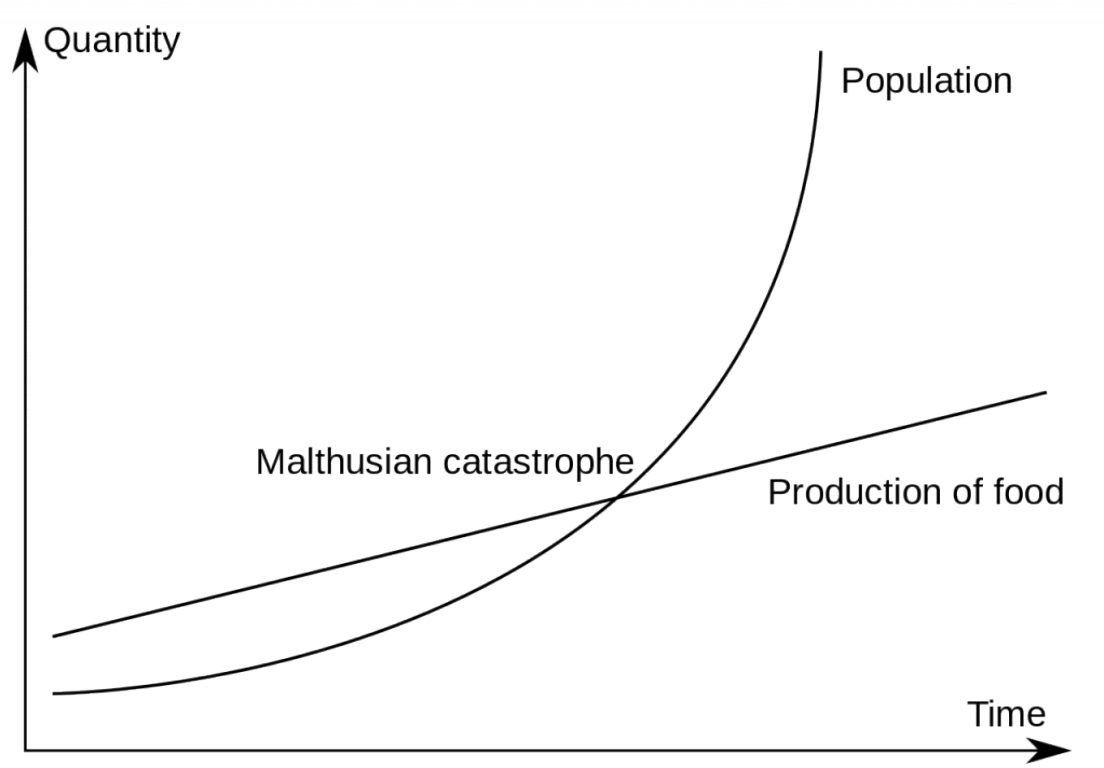


Figure 2.7: Malthusian Theory of Population (© Kravietz derivative work, translation of Jarry1250, Wikimedia Commons, CC BY-SA 3.0)

At the point where population outstripped food production would be a widespread famine, or a Malthusian catastrophe noted in the model. This obviously is not ideal, so what could alleviate this? Well, Malthus advocated either "moral restraint," calling for people (particularly women) to simply have less sex and thus fewer children. Alternatively, things like war, famine, or disease would wipe out large numbers of people, again reducing the population and the likelihood of a Malthusian catastrophe. In this way, Malthus saw large-scale population decreases not as evils to be avoided per se, but rather, as natural, "positive checks" as he called them, of our population that would lower the population relative to our food production.

In actuality, though, our population did not increase as drastically as Malthus predicted. And our food production has actually increased substantially relative to our population. So in a way, Malthus' basic premises were incorrect. Still, Neo-Malthusians, that is, supporters of Malthus, argue that the world uses a *variety* of resources, not just food. Thus, while our overall food supply has outpaced population growth, we're stripping the earth of other resources and are deteriorating the environment at an unsustainable rate. Furthermore, Malthus failed to anticipate the rapid population growth of relatively poor countries – so our population is growing in the very areas least equipped to handle it.

On the other hand, Malthus' critics say that larger populations could stimulate economic growth and help develop new technologies. Statistically, a large population would have more geniuses, and ideally one of them would solve all our problems. A fundamental problem with the Malthus model is that today, we have plenty of food for everyone. (So much so that we have problems with obesity in more developed countries, as we've explored, because we have way too much food.) But this food is allocated unevenly, with some countries having far too much, and others having far too little. It's not an easy problem to fix. Poverty and hunger are effects of injustice; if resources were shared equally, we could alleviate global hunger.

So what's the reality? Well, as the result of modern technologies such as genetically modified crops, we now have record-breaking crop yields year after year. And global population did not reach the level Malthus predicted (and furthermore, widespread contraceptive use has been able to address his concern about having fewer children.) Should we just dismiss Malthus, then? If we look broadly at the global distribution of wealth, we see severe inequalities. Global wealth has not kept pace with global population increase, or at least has been highly concentrated. The countries whose populations are growing the fastest today are some of the poorest. Why? Think back to the demographic transition model. So while many of the details of Malthus' theory have been proven wrong, the broader questions of what is sustainable and how do we use resources relative to our population are critically important.

Malthus' core theory hinged on the idea of *overpopulation*, and this occurs when a population exceeds the **carrying capacity** of its habitat. So often, "overpopulation," the sheer number of people, is the only factor considered. What's really the problem, however, according to many geographers, is *overconsumption*. Overconsumption takes *per capita consumption* into account. In other words, how many resources does each person in a society use on average and is this resource use sustainable?

So how does a country change its population? If a population is declining and its citizens are rapidly aging, how do you increase the fertility rate? Government incentives, such as tax breaks, to have more children are common in these cases. A country might promote having larger families as a point of national pride. Conversely, how would you decrease the fertility rate in a population that is rapidly increasing? Commonly, governments promote widespread contraceptive use or even sterilization programs. These solutions are relatively inexpensive, though they may come at odds with religious or social beliefs. A more long-term solution would be improve education and employment for women. When women are more highly educated and represent a larger proportion of the workforce, their position in society changes. They are empowered to make their own reproductive decisions. They may delay marrying or starting a family as a result of advancing their education and career. This would not only decrease the birth rate but would also contribute to a country's economic output. However, this solution is more complicated and has less immediate effects.

A more drastic solution in cases of rapid population growth would be to try and artificially skip a stage of the DTM, perhaps through a government mandate. In the case of China, for example, its population stood at about 1 billion in the 1970s and there was fear about rapid population growth. In 1979, the Chinese government implemented the one-child policy, essentially limiting most Chinese families to one child. There were widespread allegations of forced abortions and forced sterilizations as a result of this policy, and a cultural preference for male children led to selected abortions or female infanticide and a significant gender

imbalance. In some provinces, the ratio of men to women is 125 to 100. Consider what effects this has down the road for marriage, and particularly the marriage prospects for poor men in China.

In 2016, a two-child policy replaced the one-child policy in China, allowing all families to have two children (though most families cannot have more than two). Why did the policy change? Remember the replacement rate? If the fertility rate is below 2.1, a population will decline. If the government mandates a very low fertility rate, that country's population will decline rapidly. And what were the issues related to a declining population we discussed? An aging population puts more demands on a society to provide for its care, and a shrinking workforce will result in declining economic output as a country has fewer and fewer workers. Thus, the policy was changed to address these long-term concerns. However, some are critical that the one-child policy ever needed to be implemented to begin with. While the Chinese government has claimed that its policy was a huge success, looking at China's demographic transition model, its birth rate had already started to decline prior to 1979, and thus some argue that simply waiting, perhaps while improving job prospects and education for women and promoting smaller families, would have similarly avoided a catastrophic population increase without such a controversial government response and an economic slowdown.

2.5 Migration

Populations themselves grow and shift and change, but the people within these populations also shift and move over time. **Migration** refers to a permanent move to a new location. **Emigration** refers to migration *from* a location while **immigration** concerns migration *to* a location. Emigration and immigration are simply the reverse of each other. A person could *em*igrate from Poland and *im*migrate to the United States, as was the case for my grandfather when he was a teenager. The number of immigrants (people coming) minus the number of emigrants (people leaving) is the net migration, and a country can have net in-migration (more people coming) or net out-migration (more people leaving.)

Have you always lived in your current city or town? If not, why did you move there? Perhaps your family moved for work, or perhaps you moved there temporarily to attend school. Perhaps your family immigrated when you were young. Where do you hope to ultimately live? People move for a variety of reasons and both push and pull factors are involved in the decision. **Push factors** are those factors that push or compel people to leave their current location. **Pull factors**, on the other hand, are reasons why another location would be attractive. Economic push and pull factors are quite common. People are *pushed* out of one area by a lack of jobs and *pulled* into another because a company is hiring. Often, we find **chain migration**, which occurs much like links in a chain with migrants immigrating to a particular city where they know relatives have successfully settled, then perhaps to another city where they know friends, and perhaps still to another city. Migrants are likely to travel where they have a family connection to their home country. Why is this the case? Imagine how challenging it would be to move

to a new country without speaking the language and without a job. Chain migration provides stability and the chance to create roots in a new country.

As people migrate, sometimes they encounter what are called **intervening opportunities**, opportunities that arise between one's home and selected destination. For example, someone might intend to migrate from Guatemala to the United States, but could find work in Mexico along the border and end up settling there permanently instead. Intervening obstacles are the opposite in that they hinder the possibility of migration. Historically, most obstacles to long distance migration were environmental. Migrants from Europe to the United States, for example, had to cross a vast ocean. Today, many migrants face cultural obstacles, often the inability to speak the local language or prejudicial views toward immigrants.

Note that migration is not the same thing as mobility. Mobility concerns your general movement, which can be very restricted depending on where you live in the world. Furthermore, migration is not always voluntary. **Forced migration** refers to the involuntary movement of people from one place to another. Africans sold as slaves and transported to the Americas could be considered forced migrants. Forced migration does not necessarily mean that a person was physically removed from their home, however. People might be forced or choose to leave their home country in order to flee war, persecution, or other issues and are unable to return home safely. These migrants are known as **refugees**. As of 2020, there were 26 million refugees worldwide, according to the Office of the United Nations High Commissioner for Refugees, the highest level ever seen in human history. More broadly, almost 80 million people are considered to be forcibly displaced, including refugees and those seeking asylum, but also those who are internally displaced within a country.

2.6 Characteristics of Migrants

When we consider where people typically migrate to, we find that geography is important: most migrants relocate a short distance and remain within the same country. Think about your own migration story. Where have you moved to and from within your life? Where are you likely to migrate in the future? You may have moved to a different state or region of your home country, but international moves are generally less common. **Internal migration** refers to a permanent move within the same country. Internal migration can either be **interregional**, movement from one region to another, or **intraregional**, within one region. **International migration** refers to movement from one country to another, and again here geography is important, with most migrants traveling to countries that are relatively close by.

Where people are moving to and from actually relates to the demographic transition model. It's been theorized that people in stage 1 are unlikely to migrate, but have a high degree of mobility related to searching for food. In stage 2, people will typically migrate to countries in stages 3 and 4 because they offer greater economic opportunity. When we look at countries in stages 3 and 4, we mostly find internal migration, since people are often moving from rural areas to the cities, and then from the cities to the surrounding suburbs.

Considering the characteristics of migrants themselves, a century ago most migrants were typically male because they were migrating in search of work and men were simply more likely to be employed than women. Today, however, those dynamics have changed. Now, over half of all migrants are female. Children also make up a large number of international migrants. Considering Mexico, as well as other parts of Central America, many children are joining their parents as they migrate, and some make the journey on their own, leading to a recent rise in unaccompanied child migrants to the United States. We've seen large numbers of child migrants in other regions as well, particularly in areas where migrants are fleeing dangerous situations at home. The voyage itself can be dangerous, however, as evidenced by the death of three-year-old Alan Kurdi from Syria, whose body washed up on a beach in Turkey after he drowned when he and his family were trying to reach Turkey. Why would a parent from Guatemala send his daughter, alone, to migrate to the United States? Why would a Syrian family leave alongside their young children with just the clothes on their backs to take a dangerous voyage on a raft across the Mediterranean? Imagine, for a moment, how bad things would have to be at home for leaving and going on a potentially perilous journey to be the better option.

While historically, most challenges to migrants were environmental, today immigrants often find the most significant challenges are gaining permission to enter a country in the first place and dealing with the hostile attitudes of citizens once they have entered the new country. Within the United States, though the home countries of migrants has changed over times, prejudice against migrants, particularly against new groups of migrants, has been common.

The United States has experienced several waves of immigration throughout its history (see **Figure 2.8**). Typically, immigration to the United States is divided into different waves. During the first wave, most immigrants were English speakers from the British Isles as well as Africans who were forced to migrate as slaves. In the second wave, during the mid-1800s, immigration shifted with more migrants coming from Ireland and Germany. As the United States industrialized beginning in the late 1800s, immigration again shifted to include more migrants from Southern and Eastern Europe as well as Northern European countries like Norway and Sweden. A fourth wave of immigration began after 1965, with large numbers of migrants traveling to the United States from Latin America and Asia.

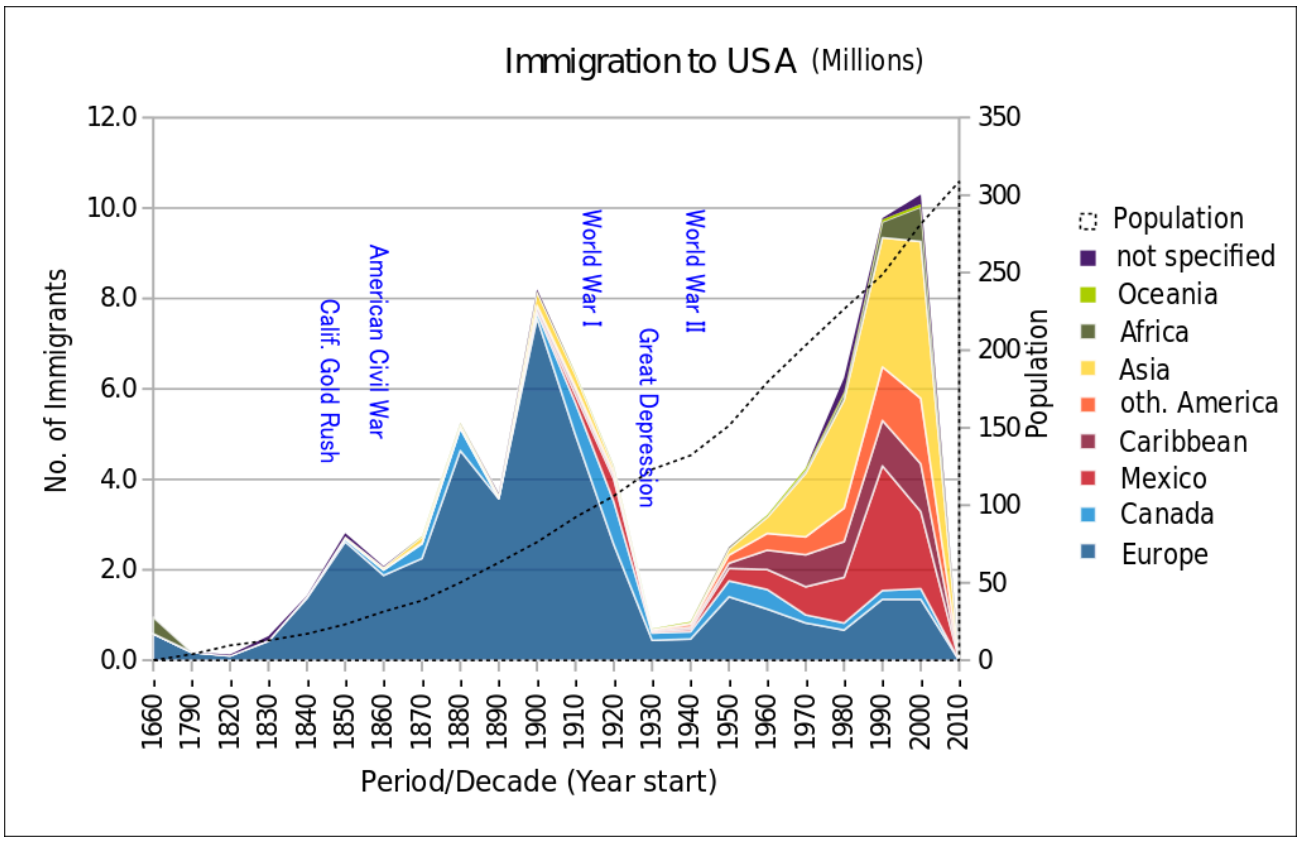


Figure 2.8: Immigration to the United States, 1660-2010 (© Masaqui, Wikimedia Commons, CC BY-SA 3.0)

As of 2019, the population of the United States included over 50 million immigrants, more than any other country in the world, though the percentage of immigrants as a share of the total population remains lower than other countries. Approximately 15.4% of the U.S. population is foreign-born compared to over 70 percent in some countries in Western Asia like Kuwait, Qatar, and the United Arab Emirates.

The home countries of migrants to the United States has changed over time but so too have immigration laws. Prior to 1965, the United States had a quota system, establishing limits to migration by home country with a preference for European countries. The 1965 Immigration and Nationality Act ended the quota system based on nationality and instead favored family reunification and skilled immigrants. Laws and attitudes against undocumented migrants have changed as well. The Deferred Action for Childhood Arrivals (or DACA) policy was announced in 2012 to address migrants who were brought to the United States without documentation as children, and in 2014 the policy was expanded to include some parents of U.S.-born children, though the policies have faced a number of political and legal challenges.

So how might we analyze and consider undocumented or illegal migration? As with most topics in human geography, undocumented migration offers us the chance to dig deeper. Do most undocumented migrants travel across the border to the United States in the dead of night? Actually, overstaying a visa is far more common than illegally crossing the border and over half of all undocumented migrants to the United States arrive by air rather than crossing

over land. Thus, while some support extensive walls along the borders and an increased spending on boarder patrols, this might not address how undocumented migration is actually occurring in the United States. Why would someone choose to overstay a visa rather than remain in this country through legal means, such as green cards or citizenship? Sometimes, it might be dangerous for a migrant to return home. Undocumented migration from Venezuela through overstaying a visa increased considerably from 2013 to 2017 as a result of political turmoil. In other cases, the wait times for a green card can be incredibly lengthy, as they are based on one's nationality, family connections, and employment preferences. A Mexican immigrant who has a sibling who is a U.S. citizen, for example, can expect to wait over 100 years for a green card based on the current backlog. An immigrant from India with an advanced degree could face a wait time of over 50 years. And most migrants must secure a green card for at least five years before they even begin the process to apply for citizenship. It is also important to consider who benefits from undocumented migrants. While migrants themselves can secure a better life both economically and politically within the United States, businesses can also profit by hiring undocumented workers, often paying them low wages and threatening to deport workers who speak out against dangerous working conditions or unfair labor practices. Americans themselves can benefit from migrant workers by securing cheaper goods and labor for jobs that others might not want, such as field workers on farms. Thus, undocumented migration is a complex issue that will require similarly complex solutions.

Again, in stages 3 and 4 what is more common than international migration is internal migration, moving around within a country. In general, in more developed countries, rural to urban migration remains strong, initially occurring as a result of the Industrial Revolution and continuing the present-day. In the United States, there have been several shifts in internal migration over time, with people typically moving from the east to the west following westward expansion and now, increasingly, to the south. The Great Migration refers to the movement of 6 million African Americans from southern U.S. states to northern states from 1916 to 1970 as a result of discrimination and segregation in the south as well as greater job opportunities in the north (both push factors and pull factors.)

Other countries have similar patterns of large-scale internal migration. In China, for example, around one-quarter of people lived in urban areas in 1990. By the end of 2015, over half of all people in China lived in urban areas. In some cases, internal migration is actively managed by the government. Indonesia, for example, maintains a transmigration program designed to resettle families from the more populous islands, like Javi and Bali, to less populated areas. At its peak during the late 1970s and early 1980s, the program moved nearly 2.5 million people. Critics of the program viewed the resettlement as infringing on the rights and lands of indigenous peoples living in the less populated areas and as a strategy for the Indonesian government to exert greater control.

For people in more developed countries, a move might be prompted by a great job offer or a chance to live in a city with great amenities, while for others, migration might be forced by the loss of a job or by ethnic persecution. Examining human population thus provides geographers the opportunity to ask deep and critical questions about our human experience. W*here* we live fundamentally affects *how* we live, the rights we have, the job opportunities we're afforded, how we're viewed by our neighbors and who we interact with.

3. Culture

Learning Objectives

- Discuss the features of folk and popular culture
- Explain the primary methods of diffusion
- Understand how to classify the world's languages
- Identify the major world religions
- Describe ethnicity and how it relates to culture

Imagine that someone asked you to name a song that's popular right now or maybe a character from a popular movie series or a logo from a common restaurant chain. Could you do it? What if you asked someone from a different area of the country to identify a popular regional dish, maybe scrapple if you live in Pennsylvania or gumbo if you're in Louisiana or perhaps bisi bele bhath in the state of Karnataka, India? Could someone not from your region identify the dish? With globalization, we are often inundated with references to popular culture. But even as global popular culture has spread, regional cultural variations and folk culture remains. This chapter explores culture, including how is spreads and changes as well as two important features of culture, language and religion.

3.1 The Cultural Landscape

So what is *culture*, anyway? When we talk about **culture**, we mean the social behaviors and beliefs as well as material forms found in human societies. Very often, when students are asked to give examples of culture, they respond with things like clothing, food, and so on. Culture is so much more than just the material, although that's often what we focus on. It's easy to examine material culture – we can touch it, study it, see patterns at a glance. If I were teaching in a traditional classroom setting, for instance, I might notice that most of my students are wearing jeans, a clear indicator of popular culture. But culture goes far beyond the visual. What elements of non-visual culture can you think of? What about music? Or religious beliefs? Or laws? What about social norms that govern particular situations? These are all certainly elements of culture but they often go overlooked.

As explored in the introduction, culture includes both popular culture and folk culture.

Popular culture refers to broad cultural features found dominant, heterogeneous societies while **folk culture** is practiced by smaller, homogeneous groups that are generally more rural and isolated. The scale of the territory covered by folk culture is generally much smaller, and because of that, it's often more sensitive to the local environment. With popular culture, however, the environment might be modified in accordance with *global* rather than *local* values. Furthermore, popular culture is generally a product of more developed countries and often popular cultural is synonymous with *Western* popular culture.

So where do these cultural features come from? A social custom originates at a hearth, a center of innovation. With many folk cultures, the hearth is anonymous – originating from unknown sources at unknown dates, or even through multiple hearths. In contrast with folk culture, popular culture generally arises in more developed areas. Often, the intention of folk music is to tell a story, convey information about daily activities, or pass the time while working. Take one of the folk songs of Tripura, a state in northeast India, for example:

> *During heavy rain in June-July when*
> *soil becomes blackish, all farmers are*
> *starting to plough the land in paddy field.*

This song is specific to a particular time, place, and agricultural practice. Even more modern folk music, such as the folk music of the Appalachian region, frequently features agricultural themes. Folk culture, because it arises in a particular, often isolated location, typically connects with a very specific cultural and geographic experience. Consider the lyrics of popular music, by contrast. Popular music, as clearly evidenced by the often vague and sometimes repetitive lyrics, is written by specific individuals, for the purpose of being *sold* to a large number of people and is often the product of more developed countries. Furthermore, popular culture is easily reproducible as a result of industrial technology and since it is generally a product of more developed, highly globalized countries, popular culture often spreads rapidly to other parts of the world in contrast with folk culture which tends to remain isolated or diffuses much more slowly.

When we examine our global cultural landscape, what cultural traits do we find? As discussed, we find music in both popular and folk forms. We also find differences in housing, with various styles of housing as well as building materials depending on the country, region, and time period constructed. Housing, like music, also takes folk and popular forms. As you travel around your city or town, look at the housing styles. Are some more traditional than others? Do some subdivisions have relatively standard and repetitive housing styles? These are commonly popular housing styles. Folk housing reflects locally-available building materials, cultural customs, and climate needs, perhaps featuring breezy courtyards in warm areas or pitched roofs where snow is more common. In New England, for example, the saltbox-style house was common in the colonial era (see **Figure 3.1**) and featured a steeply pitched roof with two stories in the front and one story in the rear.

Figure 3.1: Example of a Saltbox House, c. 1672, Wallingford, Connecticut (© Daderot, Wikimedia Commons, CC BY-SA 3.0)

Other folk housing styles in the United States include the I-House, found in the Middle Atlantic states, the Tidewater homes of the Atlantic coastal plain, and the shotgun houses of the south.

Today, housing styles are more reflective of the time period when they were built than local geography. For example, across the United States, ranch-style homes were popular from World War II until the mid-1970s and feature single stories and a long, low roof line (see **Figure 3.2**). Ranch homes can be found in a variety of locales, particularly in the southern United States. After the 1950s, many new homes in the United States can be described as having a neo-eclectic architectural style, borrowing elements of various historical styles such as Cape Cod, French Provincial, Tudor, or Colonial – and sometimes mixing several styles at the same time.

Figure 3.2: Ranch-style Home in Bakersfield, California (Mcheath, Wikimedia Commons, Public Domain)

Clothing and food, like housing, can either reflect the local environment and cultural values, as with folk culture, or be more of a product of global trends, as in the case of popular culture. For example, do you generally cook meals based on what produce is locally and seasonally available? Or is your menu based on a variety of globalized meals that are popular – perhaps pizza one night, tacos the next, and then a stir fry? When you get dressed in the morning, do you put on clothes made from locally available textile materials, or were your clothes produced in a distant country and reflect popular style trends more than distinct cultural values? Sometimes there is a fusion of folk and popular culture. Perhaps you wear a hijab, a veil worn by some Muslim women, and also jeans. Maybe you enjoy some Salvadoran pupusas and curtido one day with relatives, and then the next day, have a fast food hamburger.

Even sports reflect a mix of both folk and popular culture. Take ice hockey, for example – where and why might that sport have originated? And yet today, we have a professional ice hockey team in Florida, the Tampa Bay Lightning. Lacrosse is actually the oldest organized sport in North America and originated as a tribal game played by indigenous Native American and First Nations groups. Football, referred to as soccer (which is short for "Association Football") in the United States, is the most popular sport globally and likely arose in a number of different hearth areas as various kicking ball games were common in a wide array of cultures throughout human history. Modern popular football rules were devised in England as an attempt to standardize the various rules used by different English schools. American football

more closely followed the rules of rugby, allowing players to handle and throw the ball, and similarly became standardized with intercollegiate competitions.

With so many different cultural features, and such an array of folk and popular cultural traits, how do we view our globalized cultural landscape? For some, a person's values and beliefs are viewed as a product of a unique cultural tradition and should not be judged based on others' views or practices. This idea is known as **cultural relativism**. **Ethnocentrism**, on the other hand, holds that one's own culture can be used as a standard or a reference to understand or evaluate other cultural traditions. Just as we all likely have a mix of both folk and popular culture in our own lives, we likely at times can be both cultural relativists and ethnocentrists, sometimes understanding that cultural values are relative while at the same time, believing that certain values should be shared by all (though it might be helpful to remember that even these core values are a product of our own culture and upbringing.) What might be more helpful, perhaps, than labeling ourselves as one or the other would be to simply dig deeper – what values do you hold dear and why do you ascribe to these cultural ideals? How is your own cultural landscape unique and distinct, and what other cultural landscapes have you encountered? How might your life, and your beliefs about the world, be different if you'd been raised within a different cultural landscape?

3.2 Diffusion

A key principle for geographic study is the notion of spatial interaction, the flow of ideas, people, goods, or services from one place to another. This flow is dynamic, subject to change and evolve over time and is impacted by a variety of geographic factors to include physical and social features. So how does culture change and spread as a result of spatial interaction? Diffusion broadly refers to the spread of something to a wider area. There are two main types of diffusion: relocation and expansion. **Relocation diffusion** involves the physical movement of a person from one place to another, bringing their cultural ideas and traits with them. An immigrant from India moving to the United States and opening a restaurant serving dishes from her hometown would be an example of relocation diffusion. Relocation diffusion has occurred throughout human history as people move from one place to another. Folk culture primarily spreads through relocation diffusion.

Increasingly in today's world, culture spreads through processes of expansion diffusion, no longer requiring people to physically relocate to spread cultural ideas. With **expansion diffusion**, features spread from one place to another in a way that grows increasingly large but still remaining in its original location. There are a variety of ways this expansive process might work, to include contagious diffusion, hierarchical diffusion, and stimulus diffusion – the three types of expansion diffusion. With **contagious diffusion**, the diffusion of an idea or product is widespread throughout a population and the spread can be likened to a contagious virus (hence the name.) "Viral" videos are great examples of contagious diffusion: one person posts it, then their friends like it and repost, and then others like and repost, and it quickly gathers millions of

views. The original creator of the video never had to physically travel around and tell everyone about the video they'd made, it just spread from one person to another as people shared it.

With **hierarchical diffusion**, a cultural feature spreads from a person of authority or influence. A celebrity wearing a particular clothing brand might spur others to buy the same shirt. A highly followed social media celebrity might promote a certain product, inspiring others to go out and buy it. A ruler could decree that a particular religion is now the official faith in a country and numbers of adherents subsequently rise. All of these are examples of hierarchical diffusion.

Finally, stimulus diffusion is a bit different. With **stimulus diffusion**, it is the *idea* or principle that diffuses and stimulates new ideas rather than the original product. The original idea is changed or adapted by different cultural groups. There are many examples of stimulus diffusion throughout history. Pasta most likely originated in Asia, and yet when we think of Italian cuisine, we often think of quintessentially Italian pasta dishes rather than Italian versions of Chinese noodle dishes. Thus, the *idea* of noodles spread and was adapted by other cultures. Various products can be subject to stimulus diffusion, from personal computing technology to cream filled sandwich cookies. The original product might have inspired a later product which grew to be more even popular than the original.

As cultural features diffuse, the effects of and reactions to this diffusion vary depending on the local population. In some cultures, there is a blending of cultural features to form new traits known as **syncretism**. In other cases, a majority culture is fully dominant and members of minority cultures are expected to fully adopt the cultural features of the majority. This is known as **assimilation**. In still other cases, there is **acculturation**, where a majority cultural group exists and is dominant but minority groups still retain some level of their own cultural identity. Finally, there are societies that embrace **multiculturalism**, where individual cultural features are maintained and encouraged.

What barriers exist to cultural diffusion? Historically, physical barriers presented formidable obstacles. A wide river, expansive ocean, or tall mountain range would have prevented the spread of cultural features from one area to another. Today, most barriers are social. Perhaps a religious law prevents the spread of a popular movie to a certain area. Political barriers, language barriers, economic barriers, and so on all might hamper the spread of cultural features from one area to another. Conversely, these social features might spread a dominant cultural trait so well that local folk cultures are erased in the process, a phenomenon that has often occurred with the diffusion of language.

3.3 Language

There is a tremendous amount of diversity when we explore the world's languages, and the differences we find aren't just related to the sounds and structures of words. Our language is the lens through which we see and make sense of the world. Think about it for a moment – when we count in the English language using the Arabic numeral system (already a combination

of languages and cultures), we use a base-10 system. So, when we count, we say things like twenty-eight, twenty-nine, and then we roll over to a new word once we reach another ten numbers – in this case, thirty. But not all languages use a base 10 system. Tzotzil, a Maya language, uses a base-20 system. Why? Well, we have 20 fingers and toes. The Tzotzil number for twenty-one is *jun scha'vinik*, meaning the first digit on the second man. One of my favorite numbering systems is in the Sora language, spoken by an indigenous group in eastern India. They use a base-12 number system *and* a base-20 system, so the number 34 would be conceived of as twenty-twelve-two. And those are just differences in numbering! Think about how differently you'd look at the world if you had a distinct word for light blue (*mizu* in Japanese), no notion of time as a distinct, abstract idea (for example, the Amondawa language), or maybe no words for discrete numbers at all (as in Pirahã language.) Sometimes we think that our framework for seeing the world is universal, when in fact, it varies significantly from culture to culture and is expressed in the way we communicate to one another.

Languages are simply structured systems of communication where collections of sounds and/or letters have shared meaning. Note that a literary tradition is not a requirement for a language. Hundreds of languages are only transmitted orally, though a lack of a written language system makes these languages particularly challenging to study and document. There are around 6,500 different languages spoken in the world today. While they might all seem quite different, we can actually group them based on shared patterns of sounds and common grammatical structures, all pointing toward a shared, historical origin. Consider your own family tree: there is your family and perhaps your siblings, cousins or parents and they are connected to your grandparents who are connected to your great-grandparents and so on, all the way back to the first humans who ever lived. We are all connected, some more recently on humanity's family tree and some more distantly. Similarly, we can create a family tree of languages, connecting languages that are more closely related to languages that existed in the distant past.

Let's begin at the trunk of our language family tree. **Language families** include large groups of languages that were united by a common ancestral language before recorded history. There are numerous language families but the six with the most number of native speakers include: Indo-European (which includes English, the Romance languages, and Hindi, and comprises around 42% of the world's population), Sino-Tibetan (which includes Mandarin), Niger-Congo (which includes Swahili and is Africa's largest language family), Afro-Asiatic (which includes Arabic), Austronesian (which includes Javanese), and Trans-New Guinea (which includes over 400 distinct Papuan languages) (see **Figure 3.3**).

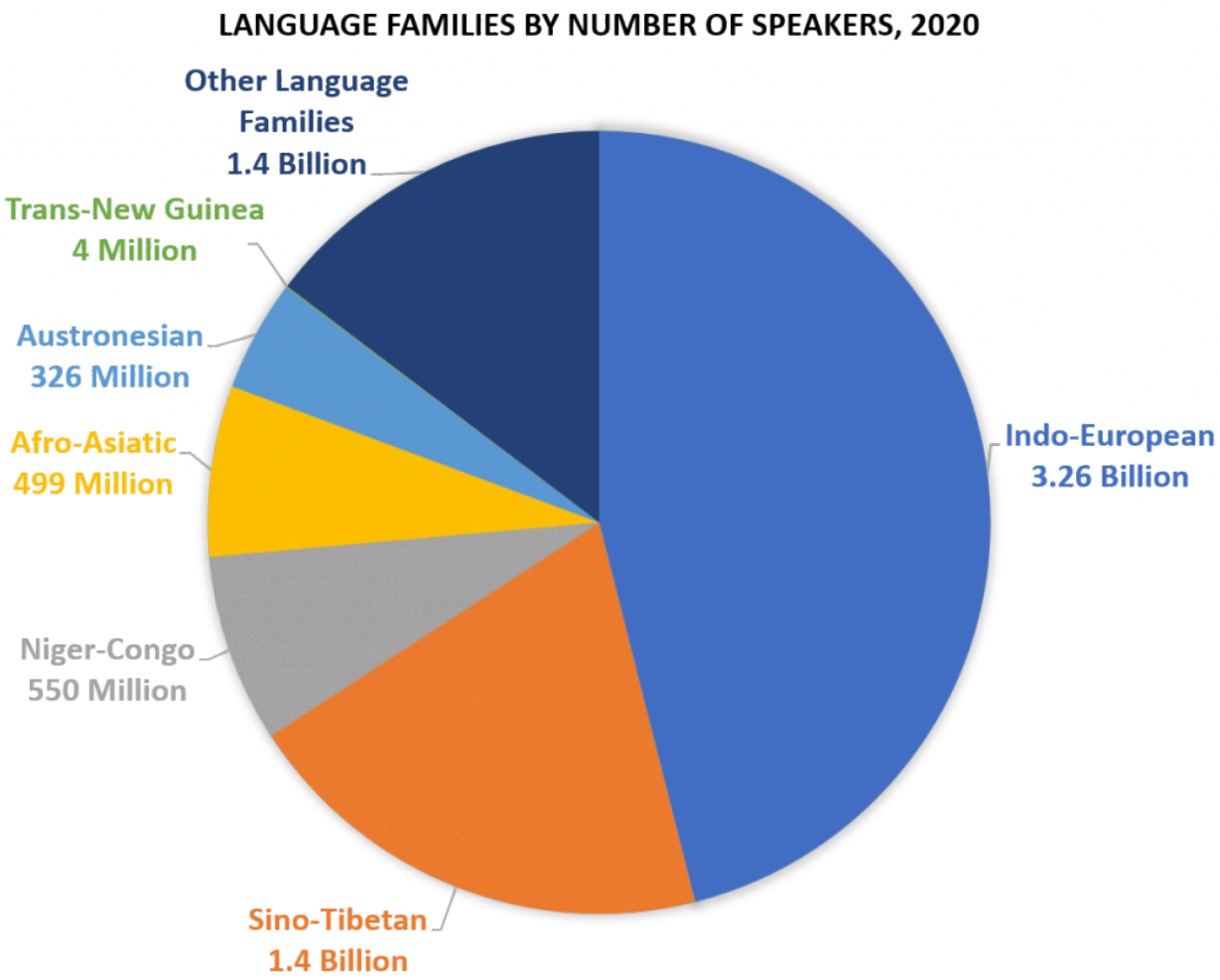


Figure 3.3: Six Major Language Families by Number of Speakers, 2020 (Data from Ethnologue, Figure by Author)

As we continue up our tree, we reach the language branches. A **language branch** is a collection of languages within a language family that are related through a common ancestral language that existed several thousands of years ago. For example, the Semitic language branch is a group of related languages within the Afro-Asiatic language family. Finally, a **language group** is a collection of languages that share a common origin in the relatively recent past. Within Indo-European language family, there is the Germanic language branch and then the West Germanic language group which includes the languages of English and German. There are numerous similarities between languages in a language group.

Even within languages, we can find differences. A **dialect** refers to a particular regional speech pattern found within a language. Generally, dialects are mutually intelligible, but there might be differences in spelling, vocabulary, grammar, and/or punctuation. The English language has numerous different dialects from Received Pronunciation, associated with higher class British boarding schools, to Scottish English to American English to Australian English. Within dialects, we often find numerous different accents. Accents and dialects are similar,

and often it is difficult to determine if a variation of a language is a distinct dialect or is an accent. In general, **accents** refer to differences in how people pronounce words while dialects refer to broader differences not only in pronunciation but also in vocabulary and grammar. Furthermore, as we zoom in to a particular region, sometimes we find dialects or accents within dialects, like a language fractal. Within American English, for example, we find a Southern dialect (sometimes colloquially referred to as a "southern accent") and if we zoom in even more, we find regional dialects or accents specific to certain places, such as Appalachian English. What languages do you speak? What is your dialect and accent?

Languages are always changing and evolving, as evident from comparing historical literature to modern writing. Sometimes languages begin to have fewer speakers and eventually become endangered or even extinct. Generally, languages disappear as a result of colonization, conquest, or the presence of a more dominant language in the region. Within the United States, for example, many American Indian children were sent to boarding schools during the late nineteenth through mid-twentieth centuries where they were forced to speak English, adopt American cultural customs, and were punished for speaking their native language. Sometimes, indigenous languages aren't actively discriminated against, but the presence of a more dominant language of trade and the lack of local languages used in schools leads to a decreasing number of speakers with each generation. The United Nations Educational, Scientific and Cultural Organization (UNESCO) maintains an online atlas of the world's endangered languages and, as of 2020, it lists 1,114 languages as either "severely" or "critically" endangered. Some of these languages only have a few speakers remaining. The Ainu language of Japan, for example, only has two remaining native speakers. Wukchumni, a language spoken by a Native American tribe, has just one remaining fluent speaker. When these languages die out, a unique piece of how humans see and understand the world dies with them. Furthermore, because language and culture are so closely intertwined, it represents a loss of a key marker of cultural identity.

Sometimes, languages can be revived, either reversing trends in the decline of a language or resurrecting a language that was previously extinct. Some researchers and advocates, for example, have worked closely with indigenous groups to ensure their language is documented, preserved, and encouraged. Perhaps the most successful example of a revived language is Modern Hebrew, which was effectively extinct and used only in religious ceremonies until the late nineteenth century. Today, around 7 million people speak Hebrew fluently. Reviving endangered languages is not without challenges, however, as an example in Wales demonstrates. In an effort to preserve the Welsh language, which has been quite successful, road signs in Wales are required to be bilingual. So, when a road sign went up in Swansea, officials sent an email asking for a translation and received what they assumed was the Welsh translation in reply and printed it on the sign. Unfortunately, the Welsh text of the sign read: "I am not in the office at the moment. Send any work to be translated."

3.4 Religion

As with languages, there is a wide array of religious belief and expression in our world today. Geographers distinguish between two types of religions: **ethnic religions**, which are belief systems primarily associated with a particular ethnic group and generally tied to a particular geographic area, and **universalizing religions**, which attempt to appeal to all people and operate on a global scale. Because of their global reach, universalizing religions typically seek to convert new believers, while this is less common among ethnic religions. The three largest universalizing religions (see **Figure 3.4**) are Christianity, Islam, and Buddhism. Ethnic religions include Hinduism, Judaism, and Shinto. That said, sometimes there is more overlap between these distinctions than you might initially expect. Many Christian churches around the world, for example, have highly ethnic components, such as the Greek Orthodox Church. Similarly, some ethnic religions accept conversion and do not limit membership to a particular ethnic group, such as in some branches of Judaism.

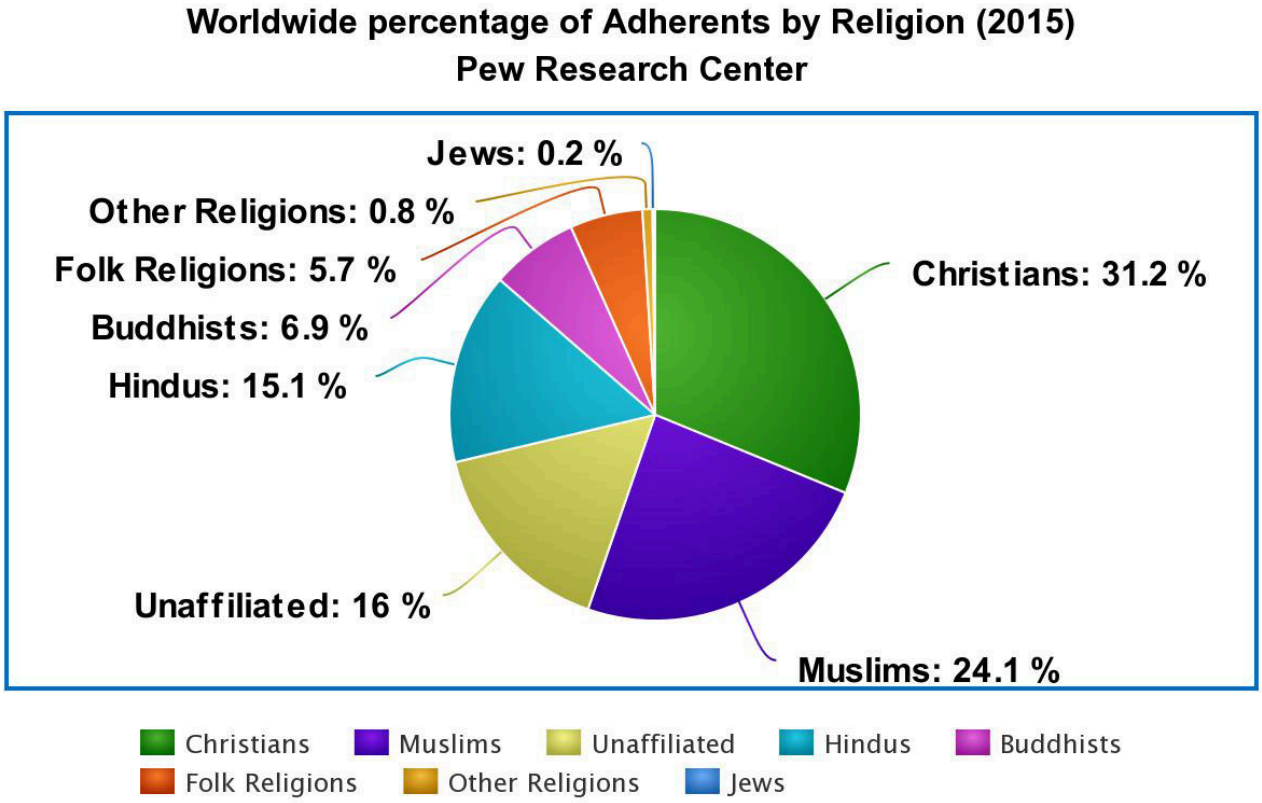


Figure 3.4: Percentage of Adherents of the Major World Religions, 2015 (© Serv181920, Wikimedia Commons, CC BY-SA 4.0)

Defining religion presents its own challenge. How would you define "religion"? If it's limited to a belief in a particular deity, then many large and well-known religions would be excluded,

such as many expressions of Buddhism. If it's a particular set of beliefs and practices, that definition might exclude religions like Hinduism which are more focused on individual religious expression and that have little or no over-arching dogma to which all believers ascribe. In truth, there is not one, all-encompassing definition of religion. A religion could perhaps be described as a system of beliefs, practices, worldviews, and/or ethics. Furthermore, an increasing number of people in the world are not religious, either **atheist**, meaning they do not believe in a God or gods, **agnostic**, meaning they believe you cannot know whether or not God exists, or simply **nontheistic**, believing it is unnecessary to have religious belief. And these categories themselves are not exclusive. One could be agnostic but find value in religious rituals. Or personally atheist but believe religious expression can be beneficial for people – or not. As we explore the world's religions, keep in mind that just as your religious belief or non-belief likely differs from the exact beliefs of your neighbor, so too is there a wide array of individual beliefs and practices even among the major world's belief systems.

Within the world's religions, there are various divisions, known as branches, denominations, and sects. A **branch** is a large division within a religion. The three largest universalizing religions have different branches and these branches have distinctive geographic distributions. A **denomination** is a subgroup of a religion within a branch that has a common tradition and typically has a single administrative body. Finally, a **sect** is a further division within a religion that characterizes a smaller group that has split from an established denomination.

Hinduism is one of the oldest of the major world religions, dating back at least 4,000 years. There are over 1 billion followers today, mostly in India and in places where there are large Indian populations. If we look at the actual beliefs of Hinduism more closely, we see that the theology is very broad, without the rigid doctrines we might find in other religions. For Hindus, it is up to the individual to decide the best way to worship God. Hinduism is **polytheistic**, meaning they believe in the existence of many gods. The three main deities are Brahma (the creator), Vishnu (the preserver of good and order), and Shiva (god of destruction and creation). Because Hinduism does not have a common creed, specific religious authority, or strict moral code, it is challenging to define and generalize Hindu belief and practice. In general, however, Hindu expression typically includes the belief in four key elements: karma, the notion that your deeds, good or bad, will return to you; reincarnation, the belief that you are the sum of numerous past existences; dharma, the laws and duties of being, which include restrains and observances; and worship, or your communion with the gods. Each Hindu is free to worship in their own way, perhaps experiencing the divine through yoga or through the study of Hindu sacred texts such as the Vedas. **Figure 3.5** displays the Sri Ranganathaswamy Temple in Tamil Nadu, India, one of the largest religious complexes in the world that attracts over 1 million visitors during its annual 21-day festival.

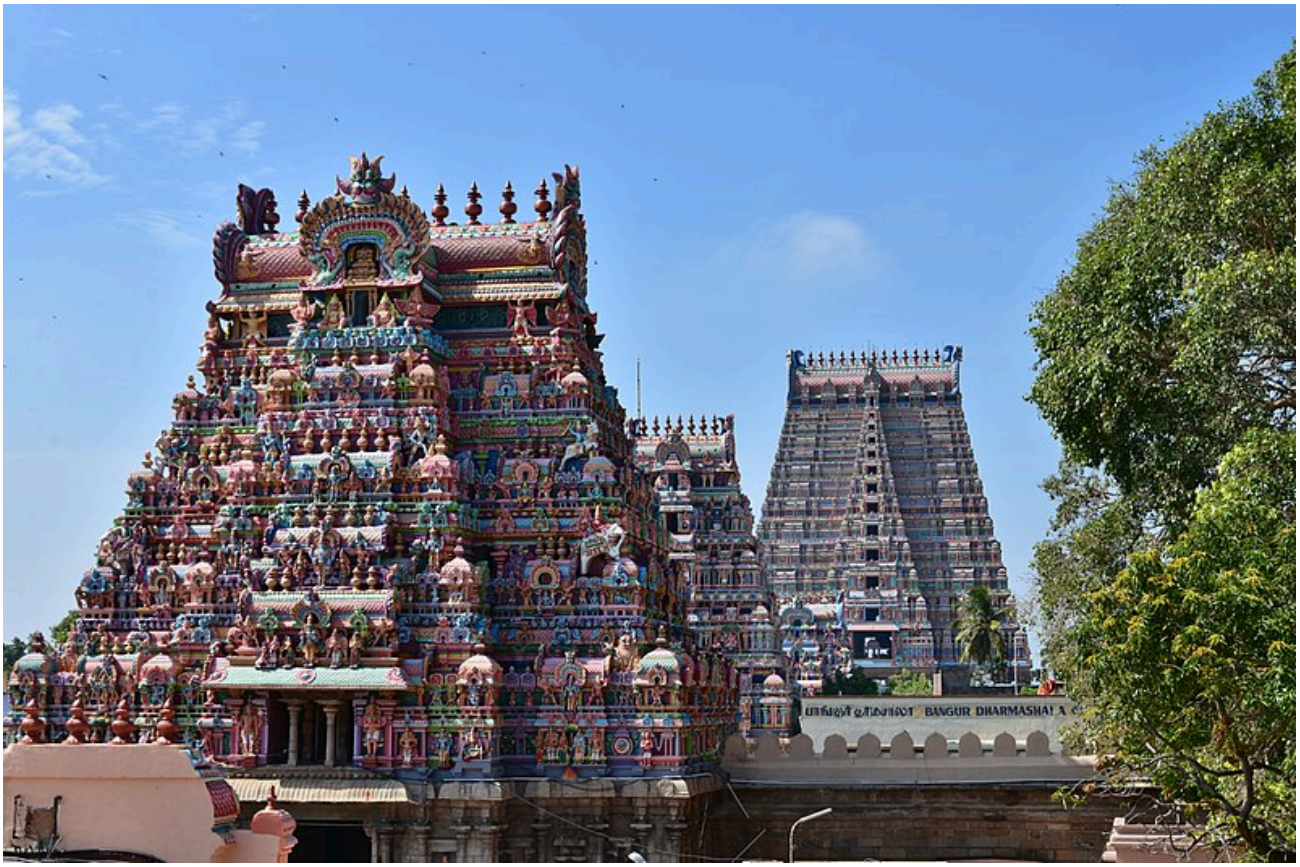


Figure 3.5: Sri Ranganathaswamy Temple, Tamil Nadu, India (© Richard Mortel, Flickr, CC BY 2.0)

Buddhism is the world's fourth-largest religion with over 520 million adherents and stemmed from Hinduism. Its founder, Siddhartha Gautama, was a Hindu who lived around 500-400 BCE and was born into an aristocratic family. While in his early years, he enjoyed a life of privilege, Siddhartha grew disenchanted with his life and the suffering he saw around him. He was ultimately searching for a way to end the cycle of death and rebirth, known as *samsara*. But how do you end this cycle? Siddhartha determined that there were four noble truths of our human existence: 1. Life is suffering. 2. The cause of suffering is desire. 3. There is a way to end suffering. 4. The way to end suffering is the eightfold path. These truths might seem pessimistic, but in many ways, they are realistic. Suffering is, indeed, universal, but for Siddhartha, suffering was a function of our denial of our true existence or our desire. Think about when you have suffered – were you upset over a lost love, sad that your pet died, or distressed over an injury or illness? For each of these cases, Siddhartha taught that by connecting our happiness with individuals, things, or our physical bodies, we ultimately suffer because these things are impermanent.

So how do you relieve suffering? By following the eightfold path, which includes: right view, right resolve, right speech, right conduct, right livelihood, right effort, right mindfulness, and right concentration. This path is intentionally vague, because in Buddhism, as in Hinduism, there is a multitude of possible paths. By following the eightfold path, one eventually enters

nirvana, a state of absolute desirelessness and peacefulness, and is liberated from the cycle of *samsara*. Siddhartha is often called "the Buddha," but this title really means one who has achieved enlightenment or "one who is awake" and could be applied to other enlightened beings as well.

Now let's turn to the Abrahamic faiths, so-called because they trace their origins to the patriarch Abraham. These religions include Judaism, Christianity, and Islam, as well as Bahá'í. According to religious texts, Abraham had two sons: one, Ishmael with his wife's servant Hagar; another, Isaac with his wife, Sarah. Muslims trace their ancestry through Ishmael, while Jews trace their lineage through Isaac.

Judaism is an ancient religion, remarkable in the fact that while many other quite similar religions existed at the time have since vanished, Judaism still exists today, despite continued persecution throughout history. Jewish religious practice in ancient times was centered around a temple in Jerusalem within the modern state of Israel. This temple was destroyed by the Babylonians in 586 BC, but was eventually rebuilt by King Herod. It, too, was destroyed in 70 C.E. by the Romans and was never reconstructed. Following the destruction of the second temple, much of the Jewish population was forced out of their homeland, creating what's known as a **diaspora** – a group of people who are living outside of their geographic homeland.

Judaism is a **monotheistic** religion, professing a belief in one God. Before Roman conquest, Jewish ritual practice was centered around temple worship. God was believed to have physically dwelled within the temple and thus the temple was the site of ritual sacrifices and the high priests who presided over them. Once the temple was destroyed, though, where was God? Judaism underwent an evolution and a shift in theology from the notion that God physically dwells in the temple to the idea that God is wherever Jews are. Thus, there was the creation of the synagogue (see **Figure 3.6**) and an emphasis on home rituals and observances. Priests no longer became important, but rather, rabbis who could interpret Jewish laws and commandments found in the Hebrew Bible. (Note that the Hebrew Bible is referred to as the "Old" Testament in Christianity – but it's only "old" if you think there's something new.) Today, Judaism has several branches including Orthodox, Conservative, Reform, and Reconstructionist.

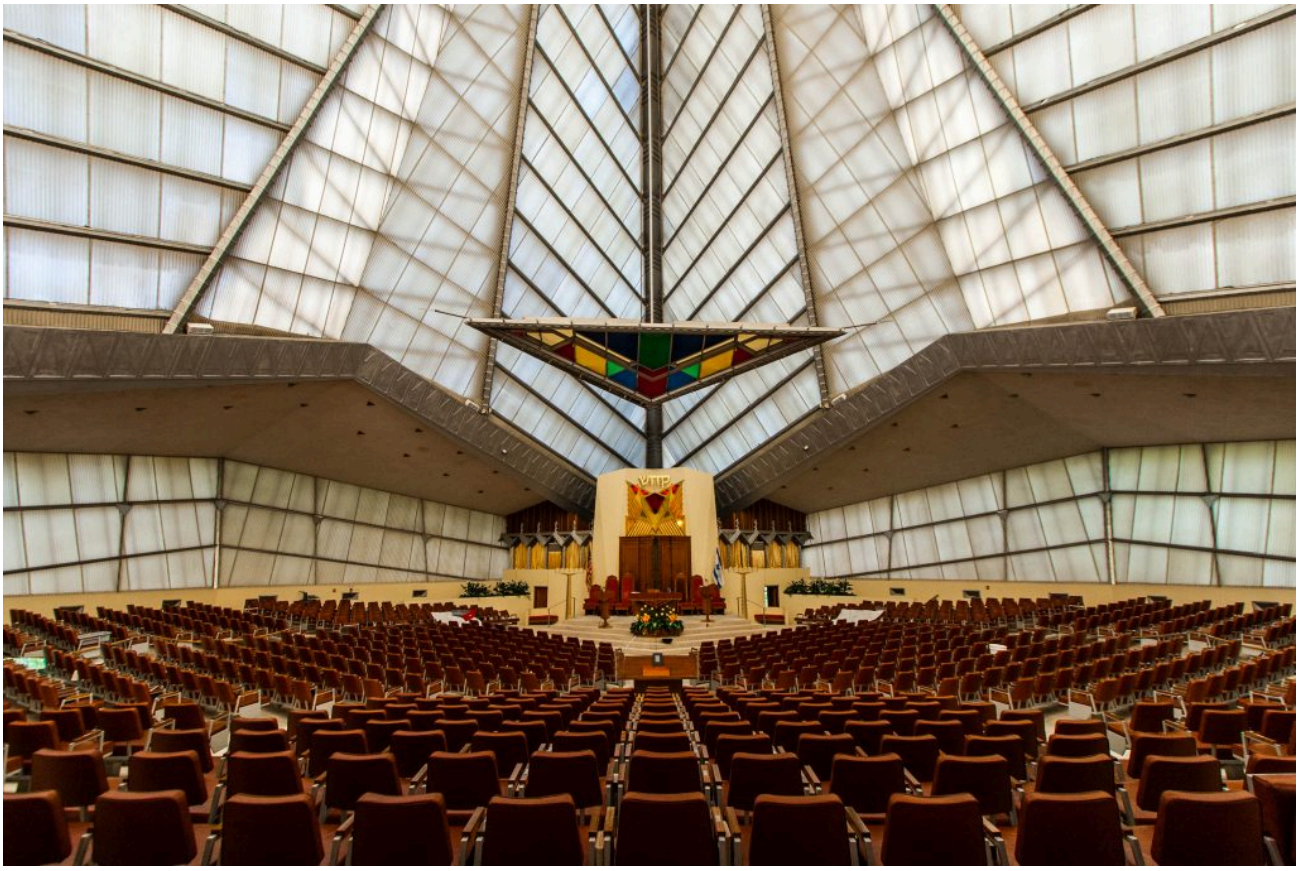


Figure 3.6: Interior of the Beth Sholom Synagogue in Elkins Park, Pennsylvania (© Jay Reed, Flickr, CC BY-SA 2.0)

Christianity historically began as a reformation of Judaism. Jesus, who was Jewish, is considered to be the "messiah" or "anointed one" by his followers. He was born in 4 BCE and was killed by the Romans most likely in either 30 or 33 CE, only a few decades before they destroyed the Second Temple in Jerusalem. The Romans were worried that he would incite a revolt and crucified him, a manner of death that was generally reserved for political prisoners. His death is discussed in the Biblical gospels as well as in other historical sources.

Today, there are over 2 billion Christians worldwide and Christian belief is quite varied, particularly with regards to Biblical interpretation. Some take a more literal interpretation of the Bible as the authoritative word of God, while others look at the Bible as more metaphorical, part of an evolving conversation with the divine. Christianity has three major branches: Roman Catholicism, Eastern Orthodoxy, and Protestantism. Roman Catholicism is the oldest branch of Christianity. Catholics believe that God conveys his grace to humanity through the seven sacraments: Baptism, Confirmation, Penance, Anointing of the Sick, Matrimony, Holy Orders, and most importantly, the Eucharist. Eastern Orthodoxy developed as a result of a split in 1054 CE known as The Great Schism. Russian Orthodox makes up 40% of this branch. The Protestant reformation began with Martin Luther on Oct. 31, 1517. Luther believed that individuals should

be able to directly communicate with God, without the need for a priest as an intercessor, and that grace was given through faith.

Islam is yet another of the Abrahamic faiths and is the second-largest religion in the world, behind Christianity, but is the fastest growing, primarily because it is found in places with high natural increase rates. Islam is a monotheistic religion whose adherents believe in one God, Allah, and believe that Muhammad is a prophet of God. Note that "Allah," the term for God used in Islam, simply means "the God" in Arabic, just as "Elohim" similarly does in Hebrew. While outsiders sometimes seem to view Allah is "some other God," certainly Muslims believe that Allah is the same God as the deity found in the Jewish and Christian traditions.

The word Islam comes from the root word SLM meaning "submission," and this core principle is essential to understanding Islam. Muslims believe that submission to Allah is key and every Muslim belief centers around this principle. Muhammad, who lived from 570 to 632 CE, was an orphan raised by relatives who would often spend time meditating and praying in the caves near his hometown of Mecca, in what is now the state of Saudi Arabia. During one of these prayer sessions, he is believed by Muslims to have received the first in a series of revelations. These revelations, believed to be recitations directly from Allah, are compiled in the Qur'an. Muhammad is thus seen as a prophet in Islam, alongside other prophets including Abraham (Ibrahim in Arabic), Noah (Nuh), Moses (Musa), and Jesus (Isa).

There are five core practices in Islam, known as the five pillars. These are: *shahada*, the statement of faith – "There is no god but Allah and Muhammad is the messenger of Allah;" *salat*, prayer five times a day; *zakat*, the giving of alms – 2.5% of all assets, not just income; *sawm*, a month of daytime fasting during the month of Ramadan – no food, drink, or sex during daylight; and *hajj*, one pilgrimage to Mecca (see **Figure 3.7**) for those who are able. Some students often mistakenly think that *jihad* is one of the five pillars, but it is not. Furthermore, *jihad* actually means a "holy struggle" and is generally seen as a metaphorical struggle with one's faith and doubts, rather than a physical struggle against other individuals.

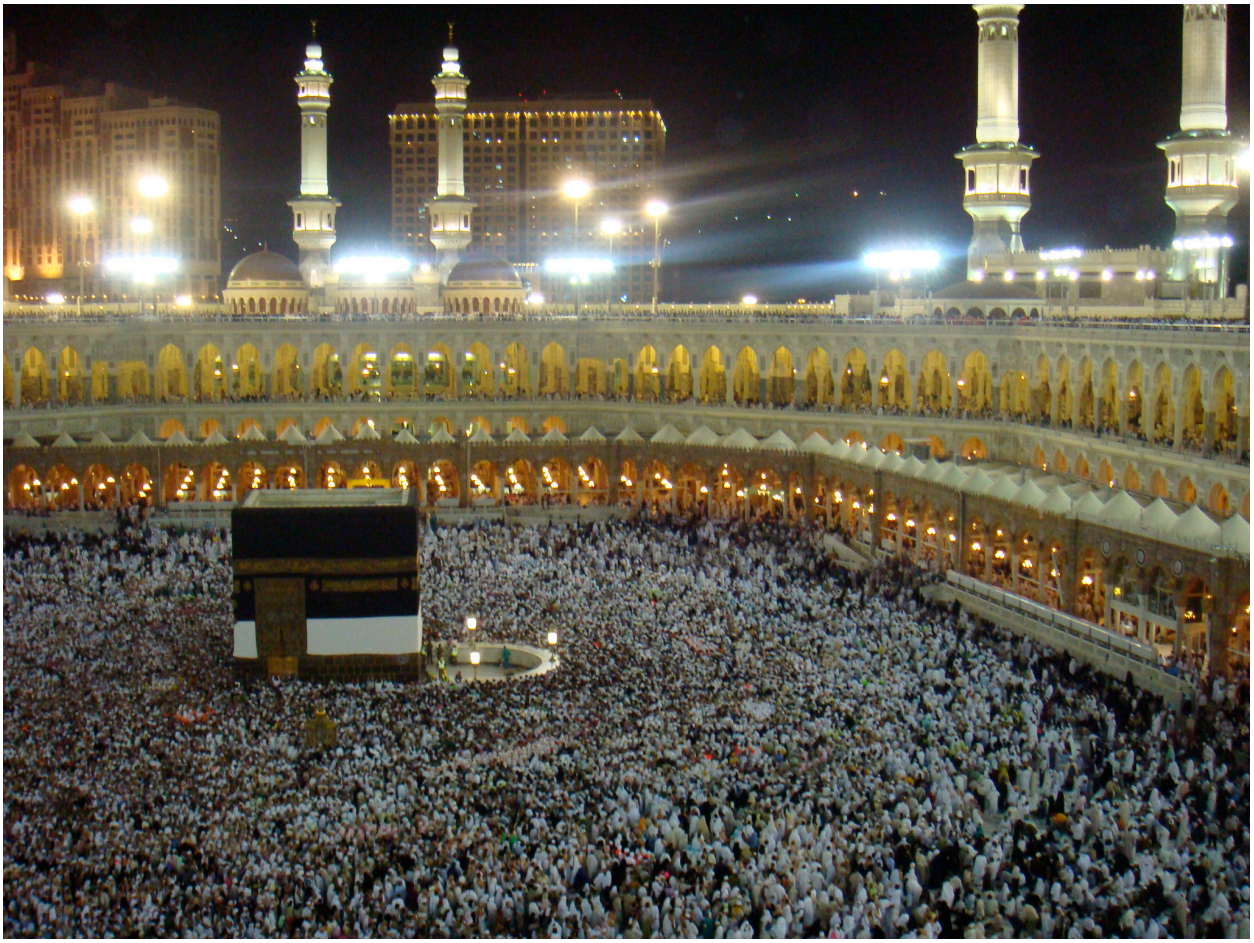


Figure 3.7: The Kaaba, Located in the Center of the the Masjid al-Haram in Mecca, Saudi Arabia (© Al Jazeera English, Flickr, CC BY-SA 2.0)

Today, there are over 1.9 billion followers of Islam. Though there are majority Muslim countries across parts of North Africa, Sub-Saharan Africa, and Southwest Asia, most Muslims actually live in South Asia, with Indonesia having the largest Muslim population in the world. Islam can be broadly divided into two main branches: *Sunni* (around 85% of adherents) and *Sh'ia* (around 15%) (see **Figure 3.8**). These groups split over who should be caliph, the leader of Islam, after the death of Muhammad, which was challenging as Muhammad had no male heir. The *Shi'a* believed that the successor should be a direct descendant of Muhammad, who they viewed as his son-in-law Ali (so *Shī'atu 'Alī* means "followers of Ali"), while the *Sunni* believed that the leader did not have to be hereditary, and were more interested in the leader's ability and charisma. Like Judaism and Christianity, individual belief and practices vary among Muslims. Some Muslim women believe in the wearing of head coverings, known as *hijab*, and modest dress, while others do not. Also as with other religions, there are also more **fundamentalist** groups within Islam who hold a strict, literal interpretation of religious scripture.

Figure 3.8: Map of Muslim areas in Africa, Europe, and Asia (Library of Congress, Geography and Map Division, Public Domain)

There are numerous other world religions as well. The Bahá'í Faith is essentially a synthesis of Judaism, Christianity, and Islam and believes in the unity of all people and the value in all religious expressions. Sikhism is a fusion of Hinduism and Islam based on the teachings of Guru Nanak, who lived from 1469-1539 CE. Within Japan, we find the ancient religion of Shinto, a polytheistic religion whose followers believe that a divine power inhabits all things, known as **animism**. Most people in Japan actually practice a combination of both Shinto and Buddhist beliefs. Animistic beliefs are also common across traditional African religions which are practiced by around 100 million people.

In addition, an increasing number of people in the world are considered to be among the so-called "religious nones," those who are unaffiliated with any belief system. Within the United States, around 12% of U.S. adults identified as "nothing in particular" in 2009 on a Pew Research survey. By 2018-2019, that figure had risen to 17%. Across Europe, while most people identify themselves as Christian, relatively few regularly attend church and here too there has been a rise of adults describing themselves as religiously unaffiliated.

3.5 Religious Diffusion and Conflict

Religious beliefs spread around the world through various processes of diffusion. **Missionaries** help transmit religious ideas through relocation diffusion. For Christianity, the spread of the

Roman Empire accompanied a mix of contagious diffusion, through daily contact among believers in towns and nonbelievers in the countryside, and hierarchical diffusion, occurring as a result of Roman leaders embracing Christianity and proclaiming it the official religion. For Buddhism, the emperor Asoka was predominantly responsible for its diffusion. He was the emperor of the Magadhan Empire around 250 CE. His son led a mission to modern-day Sri Lanka and converted all the subjects to Buddhism. As the merchant routes spread, so too did the Buddhist faith. Islam spread with the conquest of the Islamic Empire and continues to grow today as a result of voluntary conversion, migration, and proselytization.

As human geographers, we can explore the paths of religions as they grew and spread, but we can also examine the geography of religion on a more local scale by exploring sacred sites. Religious structures play a critical role in bringing people together and both reflect and reinforce underlying religious beliefs. These places often relate to a founder's life or to historical events in the religion's history. Each of the world's religions has sites that they consider to be holy, and in some areas, these holy sites are located in close proximity to the holy sites of other faiths.

Figure 3.9: The Western Wall in Jerusalem with the Dome of the Rock in the Background (© askii, Flickr, CC BY-SA 2.0)

At times, this has led to conflict. In Jerusalem, for example, the holiest site for the Jewish people, the remnants of the destroyed Second Temple, is located right next to one of the holiest sites for Muslims, the Dome of the Rock where Muhammad is believed to have ascended into heaven (see **Figure 3.9**). Christians, too, often make pilgrimages to Jerusalem to visit the

historical sites where Jesus walked and preached. This region has been the site of broader territorial conflicts for centuries. Following World War I, Britain had secured a mandate to administer the then-territory of Palestine. The Balfour declaration in 1917 by Great Britain stated that Britain supported the concept of a Jewish homeland and led to a mass of Jewish immigration to Palestine, and subsequently to rising conflicts between Jews and Arabs in the region. There had been continued calls for a Jewish homeland at least since the late 1800s, but these calls took renewed urgency following World War II and the murder of approximately six million Jews. In some countries, huge percentages of the Jewish population were killed, including 90% of the entire Jewish population of Poland and over three-quarters of the Jewish population of Slovakia. The United Nations ultimately settled on a plan to partition the territory of Palestine into an Arab state, a Jewish state, and U.N.-administered city of Jerusalem (see **Figure 3.10**). The surrounding Arab states immediately opposed this plan and armed clashes broke out. Ultimately, Israel declared independence in 1948 and subsequently gained additional territory, including the areas that were intended to be part of the Arab state, after a number of wars with surrounding countries.

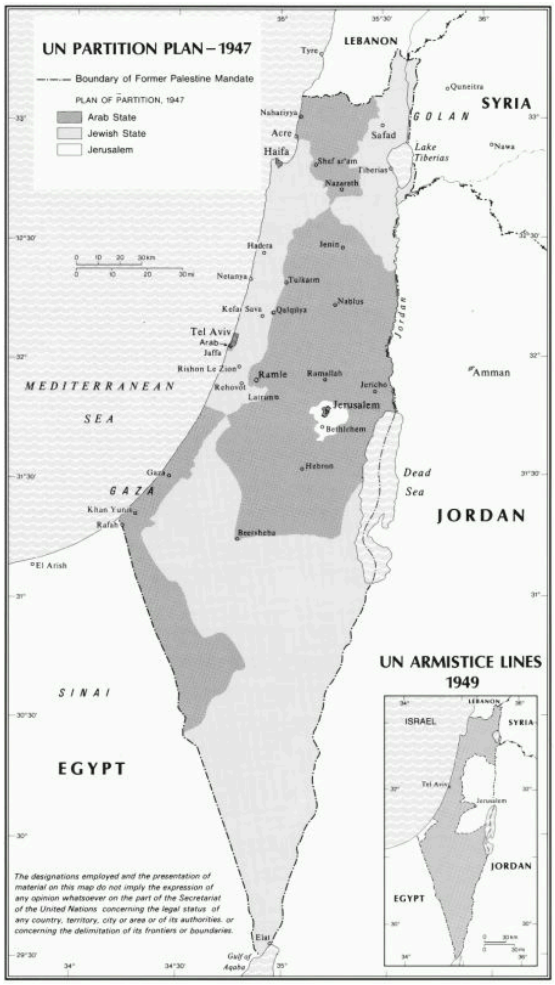


Figure 3.10: Map of the 1947 Proposed Boundaries by the United Nations (United Nations, Department of Public Information, Public Domain)

It might be useful to pause a moment and consider why the Jewish people would demand a homeland. If you are the minority everywhere, then there's really nowhere you'd be completely safe from persecution. If you're the minority everywhere, then the Holocaust could happen again. Furthermore, Jewish text states that this land was given to them by God, so Jews view this land as their divine right. On the other hand, can you see why Palestinians, and the surrounding Arab states would not support the partition? While you might support a Jewish homeland intellectually, it's hard to give up your land. And Palestinian Arabs have lived here for centuries. So, on the one hand, you have a group claiming the region because it's their historical homeland for hundreds of years and on the other, a group claiming it because it was their homeland years earlier and because they believe their religious texts decrees that it is their land. Furthermore, recall that both Judaism and Islam are both Abrahamic faiths and are quite similar, especially when you compare them to other religious traditions. Additionally, as is often the case with territorial conflict, this conflict stems from a combination of ethnic and religious factors.

Figure 3.11: Map of Israel (Wikimedia Commons, Public Domain)

In the current situation, there is the independent state of Israel and within that state, Palestinian-inhabited areas, though there is no official state or territory of Palestine (see **Figure**

3.11). Within the United Nations, Palestine is included as a "non-member observer state," though many have fought for Palestinian statehood. Complicating the situation further is that there are two Palestinian areas, one in the Gaza strip and the other in the West Bank. In the West Bank, we also find Israeli settlements. Both Palestinian areas are walled off from the rest of Israel and Palestinians who wish to cross must go through lengthy checkpoints, if they are allowed to cross at all. The Israeli government maintains that these walls and precautions are for the safety of Israeli citizens. Over half of the population of Gaza lives below the poverty line and residents of Gaza maintain that the Israeli blockade of the area has prevented needed goods and services from entering the area. In addition, the presence of Israeli settlements further complicate the peace process because it would be challenging to return to the U.N. partition plan with substantial numbers of Israelis living in what was intended to be an Arab state. Some, including the United Nations and the European Union, view these settlements as a violation of international law. The Israeli government, however, views these settlements as legal since they maintain to have legal claim to the entire territory.

Globally, we see religious tensions existing in many different places. A challenge we'll likely face is the rise of **secularism** (non-religion) alongside areas where conservative religion is flourishing. Rising secularism in North America and in most of Europe has sometimes been at-odds with the the deep religious views expressed by many in the developing world, the same areas that were once colonized and controlled by the West. There has also been a resurgence of religious fundamentalism, which some groups see as a way of keeping their particular culture distinct from an increasingly "Western," secular society. The Taliban, for example, has imposed very strict laws which scholars note are not in line with the Qur'an but Taliban adherents see as a method of maintaining their interpretation of Islam free from global influence.

3.6 Ethnic Identity

Ethnicity refers to a shared identity with a group of people who have a common history or cultural tradition, and ethnic identity can be a source of pride for many, a link to the experience of ancestors and to cultural traditions, such as food and music preferences. Ethnicity can be closely tied to folk culture, language, and religion. It is a natural human tendency to seek a shared sense of belonging, but there is also the unfortunate tendency to "other," to label a particular group of people as something wholly "different" from ourselves. It is this "othering" that leads to prejudices. For some, ethnic identity can be primarily a function of our distant ancestry. In the United States, for example, someone might identify as being "Italian," though this identification might only relate to the food they cook (or enjoy eating) and to where their relatives emigrated from. For others, ethnic identity can represent the core of who you are.

Ethnicity is distinct from **race**, which refers to the identity with a group of people who have a shared biological heritage. Is race socially constructed, or is there a biological basis for it – or is it a combination of both? Modern scholars view the distinct, racial categories often used today as socially constructed, meaning they have been created by society. This is apparent from

the labels we often use to define various races, such as "white" and "black" and how we make these distinctions. No one's skin tone is *really* white or black. Yours might be a rich chocolate color or a warm olive tone or ivory with a hint of pink. That said, there are inherited features such as skin color and hair texture that can dramatically impact how a person is perceived by the wider society. **Racism** refers to the belief that race corresponds with differences in both physical appearance and behavioral traits and the belief that one race is superior over another. This is not to say that the mere idea of race produces racism, but it is often the labeling of others and the practice of "othering" that is the first step in developing prejudices and racist views.

There can be some overlap between race and ethnicity with regard to culture. Someone might identify as "black" with regards to race and also the African American ethnicity, connecting to their African heritage. Someone else, however, might identify as "black" but their ancestors more recently came from the Caribbean and so they may not identify with an African ancestry. Furthermore, some people may identify as multiple races or ethnicities.

Ethnicity is also different from **nationality**, which refers to your attachment to a particular country, and is explored further in the Political Geography chapter. However, ethnicity and nationality can sometimes go hand in hand. When new countries are created, they are often separated on the basis of ethnicity – but you can rarely separate two ethnicities completely. When creating national boundaries, how do you decide which ethnicities (and their territories) to include in a new country, and how do you decide which to separate? If multiple ethnicities exist within a country, how do you decide which ethnic group should rule? What happens if you're a majority ethnic group that wants to rule, and the minority is resistant? In some cases, the majority ethnic group or the ruling ethnic group turns to **ethnic cleansing**, which is a process in which a more powerful ethnic group forcibly removes or kills a less powerful one in order to create an ethnically homogeneous region. Genocide, specifically referring to the intent to destroy a particular ethnic group, is a crime under international law. There have been numerous instances of ethnic cleansing throughout history including ethnic cleansing campaigns by the Nazi government, the Cambodian genocide in the 1970s, and the Rwandan genocide in the 1990s. More recently, the Myanmar government has been accused of ethnic cleansing related to their Rohingya population, an ethnic minority within Myanmar who are viewed by the government as illegal migrants and deny them citizenship. Around half of the 1 million Rohingya have fled to neighboring Bangladesh.

Our cultural practices and beliefs are highly personal – and yet they connect us to broader ethnic, religious, and linguistic communities. Furthermore, our cultural beliefs can significantly shape how we view and interact with others outside of our community. For some, this might mean embracing multiculturalism and enjoying sharing and learning from the cultures of others. For others, particularly those who are involved in territorial disputes or who have a historical grievances against another ethnic group, these cultural differences can have severe consequences. Ultimately, our culture helps shape who we are and transmits our values and ideals to the next generation.

4. Political Geography

Learning Objectives

- Explain the challenges of defining a state
- Analyze state boundaries and the various shapes of states
- Describe the various forms of government found in the world
- Identify the key modern political challenges
- Discuss the challenges of maintaining state unity

How many countries are there in the world? It's a question geographers are often asked, but it's not as easy to answer as you might think because the answer depends on who you ask (or, more accurately, which country you ask). First of all, the term "countries" is generally used to refer to sovereign states. There 193 sovereign states that are members of the United Nations – but another two states that are non-member observers: the Holy See (which oversees Vatican City) and Palestine. A number of states are recognized by some countries but not others, including Taiwan, Kosovo, and the Republic of Cyprus. Still other ethnic groups wish to create their own, independent states but do not currently have autonomous territorial control, to include the Kurds, an ethnic minority of around 30 million people in Iran, Iraq, Syria, and Turkey, and the Yoruba, numbering around 35 million people, spread across Nigeria, Benin, and Togo. So why is even deciding which regions and ethnic groups should be sovereign so difficult? What does sovereignty mean? And do state boundaries even matter anymore in a world that has become so increasingly globalized? This chapter investigates these questions through a discussion of political geography.

4.1 Understanding and Defining States

So to begin with, what is a "state" anyway? For geographers, the term **state** refers to an organized territory led by a government that has control over its domestic and foreign interests. **Sovereignty** broadly refers to the authority of a state to govern itself within a territory and levels of sovereignty can vary. A state might give up some of its sovereignty in order to form a partnership with another country. States might grant autonomy to particular regional areas within the state – but could similarly rescind that autonomy as well. Defining

states is further complicated in the United States because the U.S. calls its regional entities "states," such as Florida, New York, or Idaho, and Americans often refer to places like Germany, Angola, or Bolivia as "countries." In other parts of the world, these subnational entities are often referred to as territories or provinces.

In the 1940s, the world contained only 50 states. Now, as discussed, the United Nations has almost 200 member states. Understand, then, that the idea of a "state" is relatively new. Previously, we had various world empires that controlled large tracts of domestic territories as well as colonies abroad. In other areas, like Africa before colonization, you had kingdoms in some areas and in others, various tribal groups controlled different stretches of land and resources.

So how did the idea of states develop? States originated in Mesopotamia (see **Figure 4.1**) around the same time as agriculture. They began as **city-states**, which were sovereign cities that controlled the surrounding territory. Many of these city-states later evolved into larger empires. Why did people settle in the area of Mesopotamia? Do you notice any sources of water nearby? Remember, early cities did not have irrigation systems, and thus needed sources of freshwater in order to survive. The ancient city of Ur dates back to 3800 BCE and was located near the mouth of the Euphrates River. The city was the largest city in the world for some time, with a population of around 65,000 people, houses clustered in neighborhoods, and a street system.

Figure 4.1: Map of Mesopotamia (© Goran tek-en, Wikimedia Commons, CC BY-SA 4.0)

Other ancient states began to emerge. Egypt developed as an empire alongside the banks of the Nile. Ancient Greece also developed as city-states, spreading from its hearth by Alexander the Great to other areas including Northern Africa and South Asia. In Europe, the formation of the state began after the dissolution of the Roman Empire, which extended into such areas as Europe, North Africa, Southwest Asia, and Spain. Europe became fragmented because it was ruled by kings and nobles struggling for power. These fragmented areas were governed by local rulers. Some particularly powerful rulers would eventually come to lead large, multi-ethnic empires, such as the Austrian Empire, the Portuguese Empire, and the British Empire.

With the expansion of various empires, particularly in Europe, came the era of colonialism. A **colony** is a territory that is ruled by another state. The Colonial era began in the 1400s, and the United States, of course, began as a colony of Great Britain. Do any colonies still exist today? While many colonies have since gained independence, there is still a significant number of territories, colonies, and possessions around the world today. Chile controls Easter Island, for example. France controls the northern portion of the beautiful Saint Martin island (the Netherlands controls the South.) Greenland, though autonomous, is actually part of the Kingdom of Denmark. Britain controls a number of overseas territories including Grand Cayman and the Pitcairn Islands (see **Figure 4.2**). And what about the United States? The U.S. controls a number of territories including Puerto Rico, American Samoa, Guam, the Northern Mariana Islands, and the Virgin Islands. Do you notice any similarities in these territories? Consider their names and locations. The most populous remaining colony is Puerto Rico (which is technically a commonwealth). Its 4 million residents are US citizens, but do not participate in US general elections. The least populated is Pitcairn Island with 43 people, most of whom are descendants from mutineers from the HMS *Bounty*.

Figure 4.2: Map of British Overseas Territories (© Geord0, Wikimedia Commons, CC BY-SA 3.0)

Why did states engage in colonial activities? One simple way of remembering is the "3 G's": God, gold, and glory: missionaries established colonies to promote Christianity; colonies provided resources that helped the economy of imperial states; and states considered the number of colonies to be an indicator of relative power. But why do colonies persist today? If you notice maps of territories, you'll find that most territories in the world today are islands. In some cases, colonies are of strategic military importance, as is the case with Guam, which is home to a number of large military installations and has a strategic location in the Pacific. In other cases, the reasons are primarily economic – either benefitting the colonizing country, the colony itself, or both. French Guiana, for example, on the Atlantic coast of South America is a territory of France and, as such, is part of the European Union. It is also home to the Guiana Space Center which is a major launch site for the European Union and provides a considerable amount of economic development and jobs for the territory.

As more powerful states emerged, sometimes a region was caught in between these more powerful states. These are known as **shatter belts** and these states often experience greater instability and fragmentation as a result of their strategic position. Many of the states of Eastern Europe might be considered part of a shatter belt since they are pinned between Russia and

Western Europe, who have historically been at-odds. Mongolia, similarly, might be considered part of a shatter belt region since it is positioned between Russia and China.

Many of the states we commonly know today are actually relatively young. Some only fairly recently achieved independence, which is the case for a number of former colonies like Kenya (declared independence from the United Kingdom in 1963) and Morocco (achieved independence from France in 1956). Other states were fragmented into various city-states or smaller territories and later unified. Italy, for example, was home to a number of different states including the Kingdom of Naples, the Duchy of Savoy, and the Republic of Venice before it was unified into a single state in the late 1800s.

As states developed, some boundaries were relatively homogeneous in terms of their cultural, ethnic, and linguistic composition. These are known as **nation-states**. We've already learned what a *state* is, and how complex the notion of a "state" really is, but what is a nation? A **nation** refers to a group of people who have a homogeneous cultural and ethnic identity. A nation-state is thus an independent state that is also culturally and ethnically homogeneous. A number of nation-states still exist in the world today. Poland, for example, is almost entirely populated by ethnic Poles (around 98 percent.) Japan similarly is majority ethnically Japanese (over 98 percent as well), but is also home to the indigenous Ainu and Ryukyuan people. These states can thus be considered nation-states.

Increasingly, though, states have become multi-ethnic, home to a variety of ethnic and cultural identities. The United States, for example, is home to people of many different ethnicities and nationalities. An American might be the descendent of Polish, Italian, and Czech immigrants (like me!), for example, or have Native American ancestry or be descended from Africans who were forcibly brought to the American colonies as slaves. In fact, many countries that we might think are nation-states are actually multi-ethnic, including India, Russia, and China. And, as mentioned, even states with a homogeneous ethnic identity are still home to other minority ethnic groups, even if they are quite small.

Do all nations have states? Consider smaller ethnic groups that may not be the majority in any territory. Or ethnic groups within larger multi-ethnic states that do not have their own sovereignty. There are a number of nations that are not self-governing and these are referred to as **stateless nations**, or ethnic groups who do not possess their own state and are the minority in every state it occupies. Some stateless nations are quite large, such as the Kurds mentioned earlier. In addition, there might be several stateless nations within a state. Spain, for example, is home to both the Basque and Catalan ethnic groups, among others, who have pushed for greater autonomy and independence. In other cases, some ethnic groups that were previously considered stateless nations later broke away from a larger, multi-ethnic state and became a nation-state, as in the case of many of the nations that comprised the former state of Yugoslavia. This desire for autonomy and sovereignty is a key distinction between the concept of a stateless nation and simply an ethnic group found within a state.

The question of whether or not ethnic groups should have control over their own territory is known as **self-determination**. The question of self-determination can be tricky. In some cases, the boundaries of a former empire coincide fairly well with the modern ethnic landscape and state boundaries are appropriate. In other cases, an empire might have included minority ethnic groups and their homelands. Sometimes, these groups have been able to achieve

independence. In other cases, they remain part of another state and may argue that they have a right to self-determination.

In still other areas, a state might be independent but still subject to foreign involvement or influence. **Neocolonialism**, unlike colonialism, is a form of control using economic influence or indirect political control rather than direct military or political authority. With neocolonialism, foreign *companies* rather than countries control an area's resources either through buying land directly or through investment in the region. Proponents of neocolonialism and foreign investment see these activities as helping to bring economic development to impoverished regions. Critics, however, point out that trade deals are often skewed to the benefit of wealthier countries, with poorer countries only receiving a small fraction of what their raw materials are worth. Furthermore, it can be difficult to break free from neocolonialism. If the people in a colony want to break free from foreign control, they could declare independence. But how would you declare independence from a company? Or renegotiate trade deals that disadvantage poorer countries? Thus the notion of "independence" is much more complex than it might initially appear.

4.2 Political Boundaries

If you look at a world map, you'll notice that the boundaries between states, as well as the size and shape of states, varies widely. Chile, for example, is really long and thin while Uruguay is shaped a bit like an egg. Much of the boundary between the United States and Canada is a straight line, while the boundary between France and Spain is all squiggly. Why is there so much variety?

Figure 4.2: The Border between the United States and Mexico Dividing Imperial Beach, California from Tijuana, Mexico (© Tony Webster, Flickr, CC BY 2.0)

In addition, how much the boundaries matter is also highly variable. In some areas, the boundary between states is very much a well-defined border, as **Figure 4.2** displays. In other cases, the boundary is much more porous and might be as easy as crossing to the other side of the street (see **Figure 4.3**). In still other cases, the boundaries between states are still contested. Western Sahara, for example, is a disputed territory that is partially controlled by the Sahrawi Arab Democratic Republic and partially administered, and claimed, by Morocco. There is still a dispute over the Kashmir region, which is claimed by both India and Pakistan, as well as partially by China. Thus, when you look at the boundaries on a map, sometimes the solid lines we see mask underlying conflicts and debates.

Figure 4.3: International Border between Netherlands and Belgium (© User:Jérôme, Wikimedia Commons, CC BY-SA 3.0)

Geographers refer to a number of different types of boundaries between states. Broadly, boundaries can be characterized as either physical, that is, corresponding with features on the natural landscape, or cultural, connected with characteristics of the human landscape. Physical boundaries might follow the curve of a river, for example, or drawn along a mountain chain, as is the case for the boundary between Nepal and China. This can present some challenges, however. Do you draw the line from the tops of the mountains or along the valley? If a boundary crosses a body of water, how do you ensure its protection if two countries share it but disagree on how it should be managed?

Cultural boundaries are often created on the basis of ethnic, linguistic, and/or religious identity. Lithuania, for example, is almost entirely comprised of the Lithuanian ethnic group. Here, too, there can be challenges though, since virtually no country is exclusively one ethnic group, and ethnic groups often overlap across international borders. Furthermore, some countries may appear to be ethnically homogeneous, but this modern homogeneity might mask ethnic cleansing that has occurred.

We can also characterize boundaries based on how they were developed and how they have changed over time. **Antecedent boundaries** were created before the modern human landscape developed. Many physical boundaries, like mountains or large rivers, are also antecedent

boundaries because they divided indigenous groups from one another and presented formidable obstacles. In some cases, boundaries develop over time as an area develops, and these are known as **subsequent boundaries**. Wars, for example, might cause a territory to shift control from one country to another. **Consequent boundaries** are similar in that they developed later but were specifically drawn in order to separate groups based on cultural features such as ethnic, linguistic, or religious differences. The boundary between India and Pakistan, for example, is a consequent boundary created to divide the predominantly Hindu state of India from the predominantly Muslim state of Pakistan. **Superimposed boundaries** are exactly what they sound like – these were boundaries superimposed on the landscape by colonizers or conquering forces that often ignored underlying cultural differences or resource distributions. Much of the boundaries in Sub-Sahara Africa were superimposed, created by European powers and the United States at the Berlin Conference of 1884. In other cases, there might be the remnants of a boundary that no longer exists. The Berlin Wall, for example, used to divide West Berlin from the surrounding area of East Germany. These are known as **relic boundaries**. Finally, **geometric boundaries** are perhaps the easiest to identify – these are drawn using straight lines, such as lines of latitude or longitude. Much of the border between Algeria and Mali, for example, is geometric and runs in a straight line from the northwest to the southeast.

Figure 4.4: Map of North Africa and Southwest Asia (CIA World Factbook, Public Domain)

While these terms can help us begin to uncover how and why borders were created between states, note that as with the other terms we've learned like "state" or "sovereign," the reality is much more complex – and interesting – than it might appear. Furthermore, these terms are highly dynamic and often overlap. For example, the border between Algeria and Mali that was just mentioned could be characterized as geometric. But it also coincides with the Sahara, so it is a physical boundary. It was developed by France, which conquered and colonized Algeria in the mid-1800s, so it is superimposed. Thus, as with all concepts in Human Geography, it is important to dig deeper and recognize the complexity of our human landscape.

Just as the boundaries between states vary, the size and shapes of states vary as well and

we can characterize states as one of five basic shapes. **Compact states** are states where the distance from the center to any point along the boundary is almost the same and these states are highly efficient to govern and to develop infrastructure. Why might this be? In a compact state, everything is, well, *compact*. This means that if the capital is located near the center of the state, it will be able to easily connect with the surrounding regions. Similarly, it would be easier to build infrastructure such as roads and telecommunications without having to connect fringe regions. Cambodia is an example of a compact state (see **Figure 4.5**). What other compact states can you identify on a world map?

Figure 4.5: Map of Cambodia (CIA World Factbook, Public Domain)

Elongated states are quite different. These states are very long and narrow. This can make infrastructure, particularly transportation, difficult. Furthermore, areas that are significant distances from the capital can be isolated which can present challenges. Chile is perhaps the most common example of an elongated state (see **Figure 4.6**), but there are others such as Norway and the Gambia.

Figure 4.6: Map of Chile (CIA World Factbook, Public Domain)

Another type of state is known as **prorupted** (or **protruded**). Prorupted states generally have a fairly compact main territory, but then have a long extension protruding from it. What challenges might this pose? As with a compact state, the main territory might have the possibility for efficient government control and infrastructure development. But as with elongated states, there might be challenges accessing or controlling the fringe areas along the protrusion. Why would this state shape even exist? Well, consider why the protrusion would be created. Perhaps it exists to connect the main territory to distant resource, like water. Or, a protrusion might naturally develop along a peninsula. Namibia is a good example of a prorupted state. Its Caprivi Strip connects the main territory of Namibia to the Zambezi River and was superimposed by Germany when Namibia was a German colony in order to give them access to the river.

Figure 4.6: Map of Namibia (CIA World Factbook, Public Domain)

Fragmented states are just that – they are fragmented into multiple parts. Sometimes, water divides the territory, as in the case of many island states like the Philippines and Fiji. In other cases, land in other states might divide noncontiguous pieces of territory. This is the case for Russia (Kaliningrad, located on the Baltic Sea between Lithuania and Poland, is separated from the rest of the state of Russia) and Angola (the Cabinda Province is separated by the Democratic Republic of the Congo) (see **Figure 4.7**). The United States is fragmented for both reasons – with Hawaii separated by water and Alaska separated by Canada.

Figure 4.7: Map of Angola (CIA World Factbook, Public Domain)

Finally, we have **perforated states**. These are states that completely surround another state. As you can imagine, these types of states are uncommon. Perforated states are often confusing for students, so note that the perforated state is *not* the state within another state (like Lesotho, which is a compact state.) Rather, perforated states are those that surround another state. One way to remember might be to consider that if I asked you for a *perforated* sheet of paper, you'd give me a piece of paper with three holes punched on the side, right? You wouldn't just give me a pile of punched-out holes. South Africa is a good example of perforated state (see **Figure 4.8**) as it completely surrounds the state of Lesotho and almost completely surrounds the state of Eswatini (commonly known in English as Swaziland.)

Figure 4.8: Map of South Africa (CIA World Factbook, Public Domain)

As with characterizing boundaries, defining the shape of states can sometimes be challenging. How long and narrow must an elongated state be to actually be characterized as "elongated"? What if it's really small – is it compact or elongated then? How large must a protrusion be to be characterized as a prorupted state? Understand that these terms have less to do with precisely defining states in their exact category and are more about understanding that the shape of states has an impact and that we can use these general shapes to help understand what those impacts might be.

We also have boundaries *within* states. These are known as **internal boundaries**. These might divide larger states into administrative districts, as with the United States or Canada. Or, they might be used to provide autonomy (or relative autonomy) to sub-regions, as with the case of Scotland, which has limited self-government within the United Kingdom.

Finally, it might be relatively easy to determine where state boundaries are on land, but how far out does a state's boundary go when we consider maritime borders? The United Nations Convention on the Law of the Sea (UNCLOS) established the boundary zones for international

waterways (see **Figure 4.9**). Essentially, any water body *within* a country is considered internal waters. Extending out 12 nautical miles from a country's landmass is considered territorial waters. Here, states are free to set laws, regulate use, and use any resource. Vessels traveling in this zone are given the right of innocent passage, meaning that if it is passing innocently through this zone (i.e. not trying to attack or representing a threat to state security), it is allowed to pass through. Extending out an additional 12 nautical miles from the territorial waters is the contiguous zone. Here, a state has *some* control, but only over customs, taxation, immigration, and pollution laws in order to protect its territorial waters. Finally, extending out 200 nautical miles from the edge of the state's landmass is known as the exclusive economic zone (or EEZ). Here, a state has a right to any natural resources. Beyond the EEZ is considered "international waters," sometimes called the "high seas.," where no one state has control but there have been a number of global agreements covering a variety of activities such as the dumping of waste.

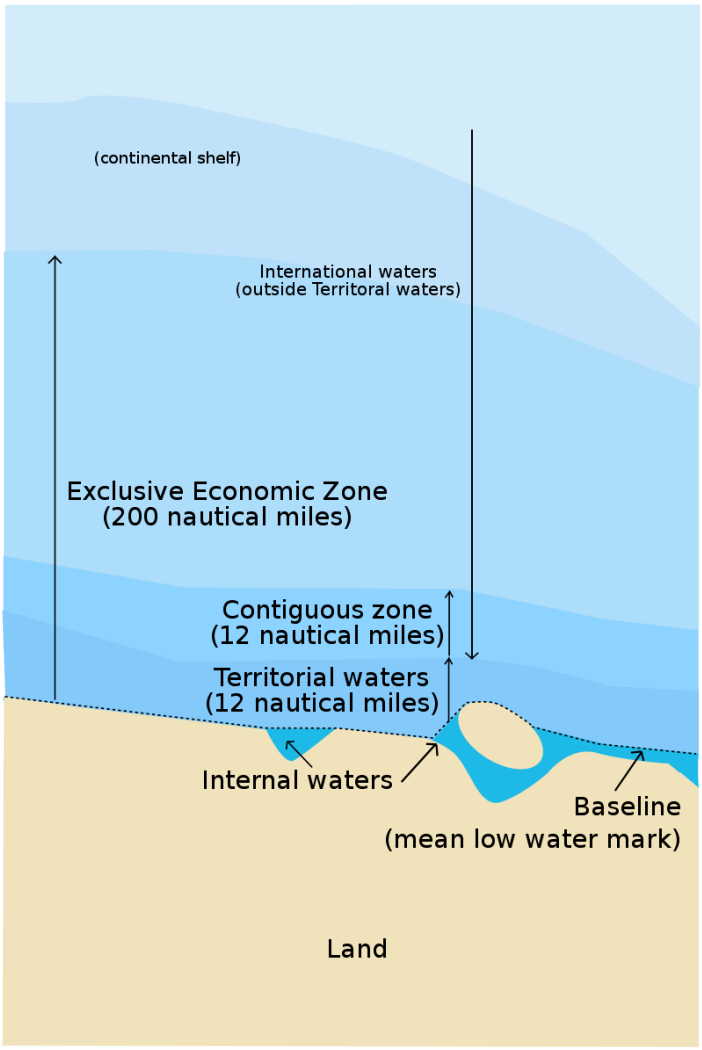


Figure 4.9: Maritime State Boundaries (© historicair, Wikimedia Commons, CC BY-SA 3.0)

The series of agreements over the jurisdiction of our world's waterways set off a scramble for control of the world's oceans, because if a country claimed control over even a miniscule island, that island could offer control of a 200 nautical mile radius around it and, perhaps more importantly, whatever resources were found in or beneath the waters such as oil. This is another critical reason why so many of the colonies still present in the world today are islands, and why colonizers are so hesitant to relinquish control.

4.3 Forms of Government

There are a variety of governmental systems found in the world today. We can first explore how the territories within a state are arranged and how much autonomy they might have. Broadly, we can divide the world into unitary states and federal states (see **Figure 4.10**). A **unitary state** system works best when you have a strong national unity, and they're common in Europe and across Africa. Unitary states might have local administrative divisions, but they're only given whatever power the central government decides to allocate them. In some cases, like Rwanda, Ghana, and Kenya, one ethnic group came to dominate the region, leading to a unitary state status.

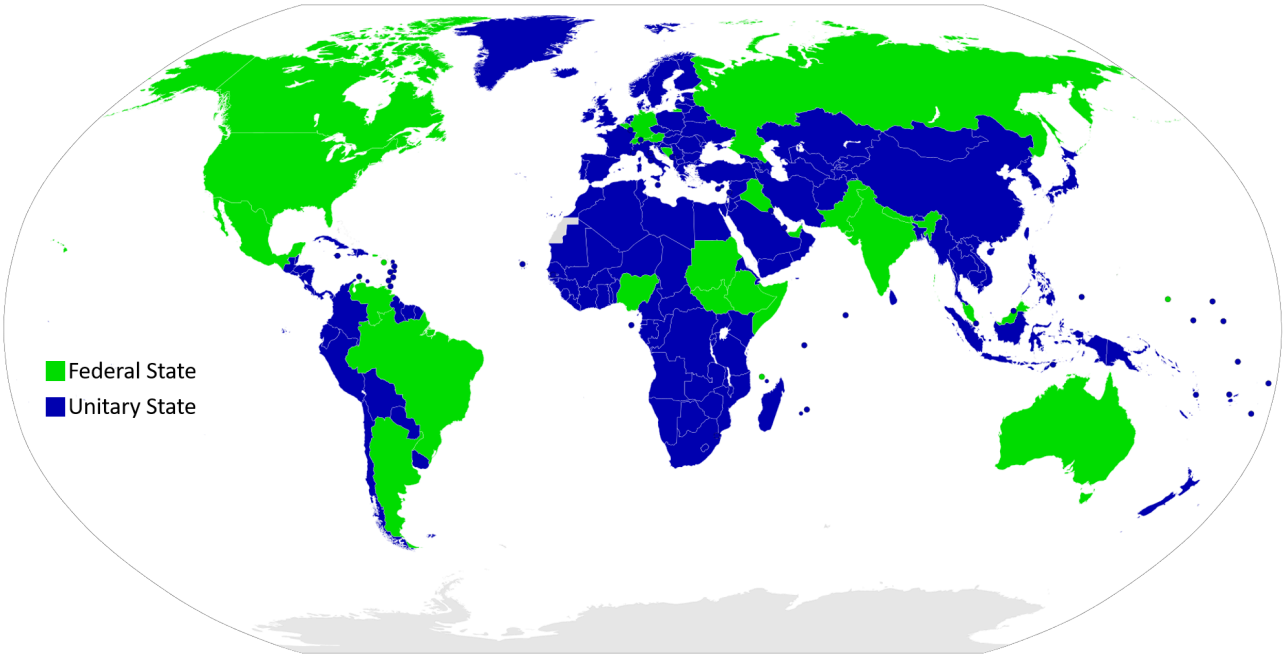


Figure 4.10: Map of Federal and Unitary States Worldwide (© Lokal_Profil, Wikimedia Commons, CC BY-SA 2.5, Derivative work – Key added)

Federal states, on the other hand, allocate power to units of local government within a country, such as territories, provinces, or states (referring to subnational entities). The United

States is a federal state, which is common for large countries. Often, the capital is too far to adequately control the entire state. Most of the world's largest states are federal, including Russia, Canada, Brazil, and India. Size isn't the only factor, though. We must also take cultural and governmental factors into account. Belgium, for example, is federal, but quite small – why? The country is home to two fairly well-defined linguistic communities: the Dutch-speaking Flemish community and a French-speaking community known as Walloons. Thus, a federal structure allows each group to coexist with greater political autonomy. China, on the other hand, is a very large country but is unitary. Why is this the case? Their central government maintains a great deal of control. There been a strong global trend toward a federal government structure. France, for example, previously had a strong, unitary government. In recent years, the government has granted additional powers to regional and local governments. In Poland, there was a switch to the federal system with the collapse of communism.

In some states, a central government offers increased autonomy or delegates additional powers to a sub-national entity. This is known as **devolution**. Devolution is not the same thing as federalism, since these powers are granted by the central government and could be reversed or changed. Devolution can be a strategy to prevent a region within a country from declaring complete independence. In 2014, for example, Scotland narrowly voted to remain with the United Kingdom on an independence referendum, but the outcome of the vote led to some increased autonomy from the United Kingdom.

In addition to how the territories within a state are administered, we can also look at the various styles of government leadership found within countries. Some states are **autocracies**, where government rule is concentrated in the hands of one person. Other states are **democracies**, where people have the authority to choose their government leaders. While it might be tempting to simplify the various forms of government into the categories of "autocracies" or "democracies," there are actually far more forms of government leadership. In an **oligarchy**, the power rests within a small group of people. Even within democratic governments, we find a wide variety of expressions from voters directly electing their leaders to the guise of elections but with pre-ordained outcomes determined by a few elite individuals.

The internal boundaries of states can impact and reflect the balance of power within a country. Often, states are divided into different voting districts to elect local or state leaders. Electoral geography is a branch of political geography that specifically examines electoral politics. Of particular interest to electoral geographers is a practice known as **gerrymandering**. Gerrymandering is a tactic used to create voting districts in a way that benefits a particular political party. Essentially, as **Figure 4.11** displays, if one party is in power and has the ability to draw electoral districts, they can draw them in a way that ensures they stay in power. Similarly, even with the same underlying population patterns, another party could draw districts in a way that ensures they maintain power.

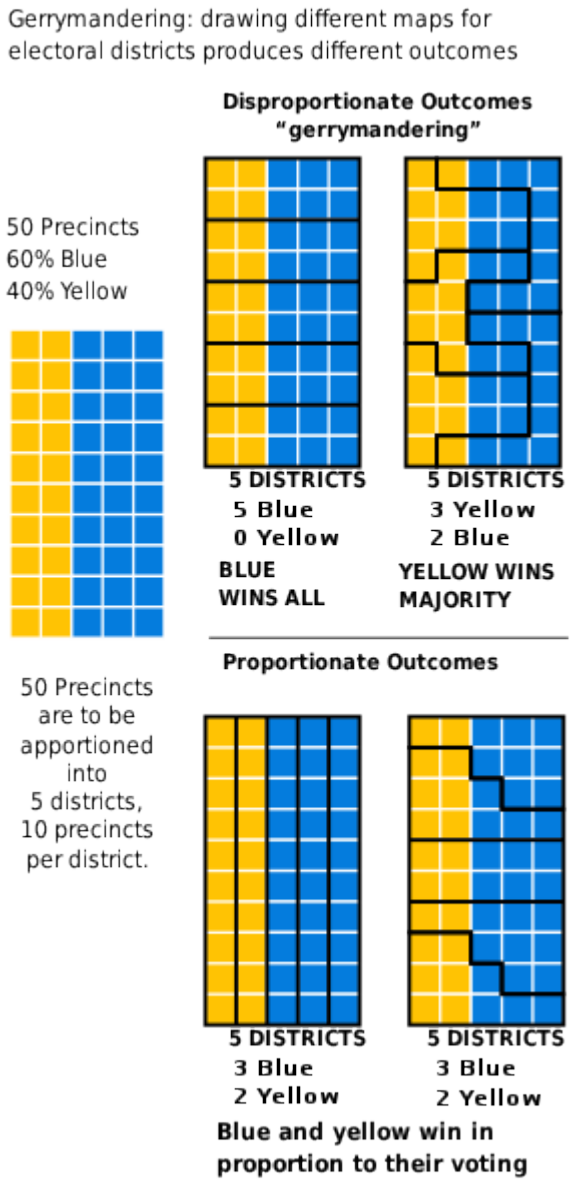


Figure 4.11: Different Ways to Allocate Voting Districts (© M.boli, Derivative work from original, Wikimedia Commons, CC BY-SA 4.0)

Within the United States, gerrymandering has been repeatedly used by both political parties to increase their power. Some states, like Iowa (see **Figure 4.12**), use a nonpartisan redistricting process that effectively eliminates gerrymandering. Their maps, by Iowa law, cannot take partisan factors into account when creating districts.

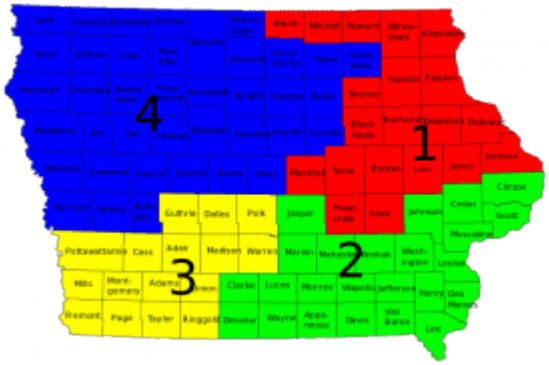


Figure 4.12: Iowa, United States Congressional Districts (© Philosopher, Wikimedia Commons, CC BY-SA 3.0)

Other states, like Michigan, have utilized computer software to create gerrymandered districts that effectively keep one political party in power (see **Figure 4.13**). In the 2016 Congressional election in Michigan, for example, Republicans beat Democrats by only 1 percent in total votes – but won 9 of 14 seats. A grassroots campaign to end gerrymandering in Michigan was ultimately successful and an independent redistricting commission will redraw the state's electoral districts in the future.

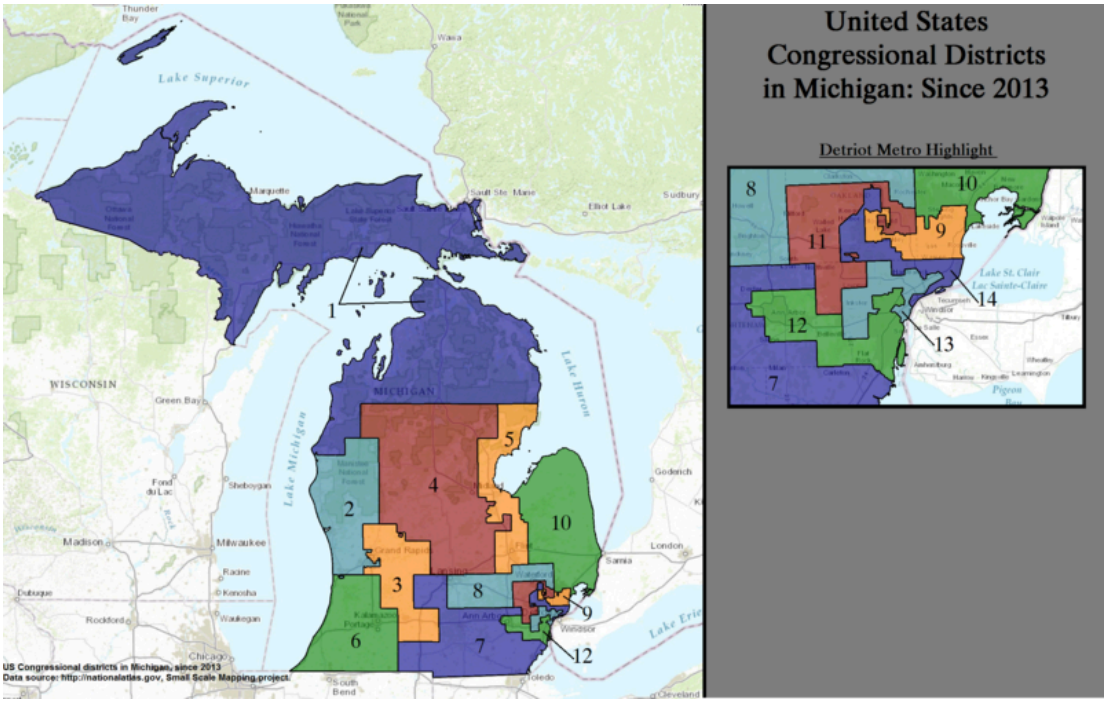


Figure 4.13: Electoral Districts in Michigan since 2013 (US Department of the Interior, Public Domain)

4.4 Political Challenges

Today's states face a number of challenges, both international and domestic. As mentioned, a state might have struggles within its internal boundaries: perhaps a region wants more autonomy or a multi-ethnic state might struggle to create an acceptable balance of power for all parties. States might be in conflict with other states and this could lead to regional or global conflicts. Historically, balances of powers emerged between large empires and later states. The Soviet Union and the United States, for example, shared a balance of power for some time after World War II. To maintain this balance of power, both countries engaged in an arms race to ensure that neither country would have a military advantage. These countries still have a tense relationship.

But what of other groups who are not in this balance of power, and have relatively little global influence? Sometimes these groups turn to terrorist activity in order to meet their demands. **Terrorism** can be carried out by both individuals and organizations and broadly refers to the use of violence to achieve political goals. The terrorist attacks on 9/11 in the United States resulted in nearly 3,000 deaths. Al-Qaeda, a militant Islamist organization founded by Osama bin Laden, claimed responsibility for the attacks resulting in the U.S. declaring a "War on Terror." The terrorist organization known as ISIS (the Islamic State in Iraq and Syria) then formed when the U.S. invaded Iraq. Members of ISIS are Sunni Muslims who were unemployed and felt marginalized as a result of political changes after the U.S. deposed Iraqi leader Saddam Hussein (who was also Sunni) and enabled the majority Shi'a to rule. While the U.S. has declared victory over ISIS, researchers caution that the recipe for the emergence of ISIS, such a lack of infrastructure and a feeling of political disenfranchisement, is still very much a concern in the region and could lead to the reemergence of ISIS or the creation of a new terrorist organization.

Terrorism isn't just limited to threats from outside individuals and organizations, however. On April 19, 1995, Timothy McVeigh, an American domestic terrorist, bombed the federal building in Oklahoma City killing 168 people. He was motivated by the federal government's handling of the Waco Siege in 1993 and the Ruby Ridge incident in 1992. His attack was timed to coincide with the second anniversary of the Waco Siege. Domestic terrorism has been on the rise in the United States for some time, fueled by social media and the Internet that has enabled radical ideas to be widely shared. In Ireland, "the Troubles," referring to a 30-year conflict from the 1960s to 1998 between Unionists (primarily Protestants who wanted Northern Ireland to remain with the United Kingdom) and Irish nationalists (who were mostly Catholic and wanted Northern Ireland to leave the United Kingdom) led to the deaths of 3,500 people. Countries in North Africa and Southwest Asia have experienced the highest number of deaths from terrorism for the past decade (see **Figure 4.14**).

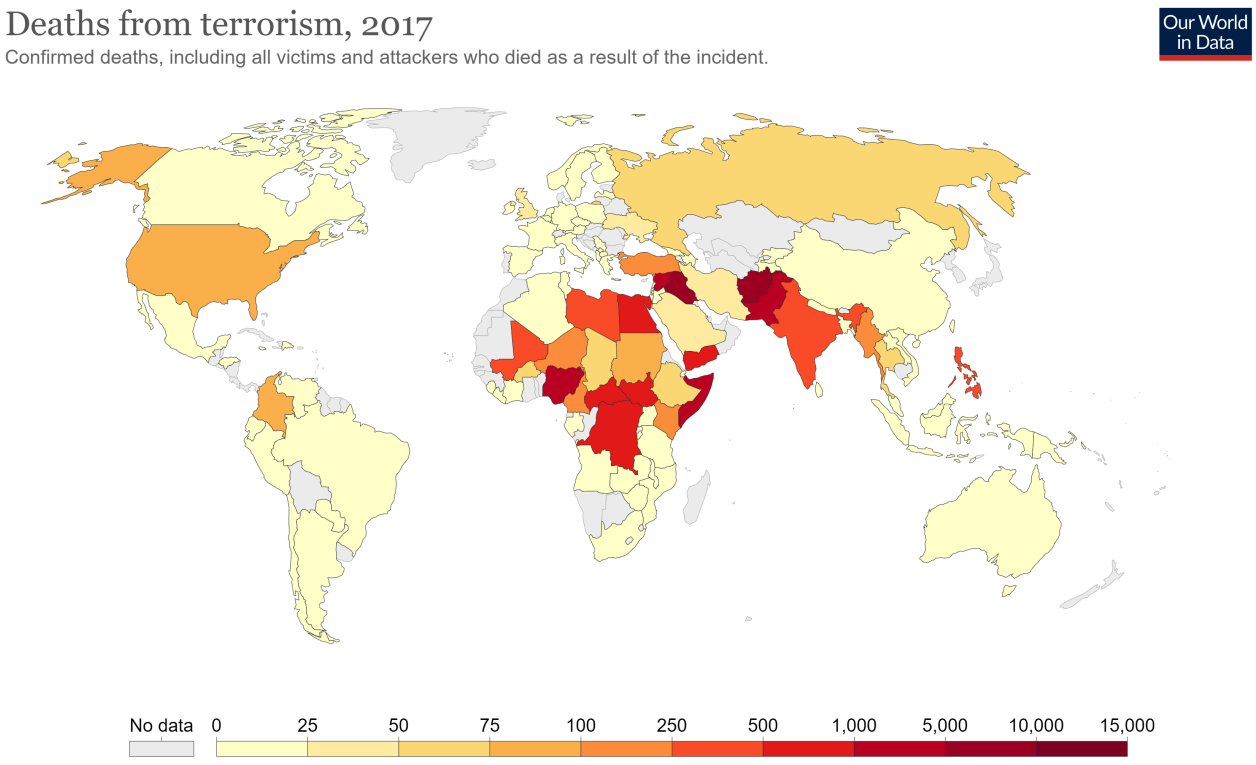


Figure 4.14: Map of Global Deaths from Terrorism, 2017 (© Our World in Data, Global Terrorism Database, CC BY 4.0)

Why do we classify particular groups as terrorists or extremists? And how might this classification differ depending on our geographic location and background? Could a government be seen as engaging in terrorism? States might support terrorism, either covertly or overtly, through assisting terrorist activities against an adversary. This assistance might be in the form of monetary funding, providing supplies such as weapons, or offering sanctuary to individuals suspected as terrorism. Often, who we label as "terrorists" depends on how we interpret their actions. In addition, how we deal with the root causes of terrorism can significantly impact its reach and spread. Addressing underlying concerns (such as infrastructure needs, employment and education opportunities, and political representation) can help lessen the ability of terrorist groups and ideologies to gain new adherents.

Another political challenge states face is related to their own sovereignty. Sometimes this occurs as a result of armed conflicts or invasions by neighboring states. In other cases, though, a state might wish to trade some of its autonomy in order to create more regional cooperation. These political entities comprised of a number of different member states are known as **supranational organizations**, meaning that their organizational influence and control extends beyond the boundaries of a single state. Why would a state want to join such an

organization and have less autonomy over their own decision-making? Sometimes, joining a regional or international organization can help states collectively develop and stabilize. ASEAN, the Association of Southeast Asian Nations, was formed with the goal of accelerating economic growth and providing political and military integration among its member states and indeed the average economic growth of member states was considerably higher than non-member states during the decades after its founding. It can also be to a state's advantage to join a supranational organization that will ensure that all states play by the same rules. Among other functions of the United Nations supranational organization is establishing collective global security and its Security Council can refer cases where rules have been violated, such as instances of war crimes or genocide, to the International Criminal Court.

The European Union (EU) was formed after World War II coalescing out of a number of regional organizations including Benelux, established in 1944 and comprised of the neighboring states of Belgium, the Netherlands, and Luxembourg, which sought greater political and economic cooperation between its member states, and the European Economic Community, which was created in 1957 and aimed to create a common market for its members. Today, the European Union has 27 member states, 19 of which use the euro, the official currency of the EU. The United Kingdom withdrew from the European Union in 2020, the only state to do so since its founding. (This withdrawal is commonly referred to as "Brexit," a combination of the terms "Britain" and "exit.") Those supporting the UK's withdraw from the European Union argued that the the EU was a threat to the country's sovereignty, since the UK was bound by trade agreements and immigration policies. Those wishing the UK to remain with the EU, on the other hand, believed the benefits of EU membership outweighed the costs and that being part of the EU made the UK economy stronger. Complicating this vote is that the United Kingdom, as mentioned, is a multi-ethnic state, and certain nations within the UK opposed the state leaving the EU. The majority of voters in Scotland and Northern Ireland voted to remain with the European Union.

As supranational organizations have grown, both in the number of member states and in their global reach and scope, citizens in member countries will likely continue to grapple with weighing the benefits of joining and remaining a part of these groups against areas where they believe their national autonomy is being compromised. Similarly, as states exert their global influence and seek their own economic development, this may lead to conflict when other states and/or ethnic groups feel their own rights have been infringed.

4.5 Maintaining Unity

With all of the many changes and challenges facing our world, how can a state possibly maintain unity? **Centripetal forces** are those that serve to unify a state and bring people together. Can you think of any examples of centripetal forces? In the United States, examples of these might be the Pledge of Allegiance which is recited in schools across the country each day. When a country is attacked by an outside foe, citizens often come together to defeat a common enemy,

another example of a centripetal force. National symbols, national anthems, state holidays celebrating a country's heritage, all could be ways to unify people within a country. Shared cultural features can also bring people together within a country, such as sharing a common language or ethnic identity. Centripetal forces are sometimes equated with nationalism.

On the other hand, **centrifugal forces** are those that push people apart. (Think of a centrifuge, as in biology or chemistry.) If centripetal forces include things like shared cultural features, what would centrifugal forces be? Ethnic differences may serve as centrifugal forces, particularly if one ethnicity sees themselves as superior or has most of the political power. Sometimes, centrifugal forces can be geographic, such as a formidable physical barrier such as a mountain range or a distant, poorly-connected piece of territory. If centrifugal forces cannot be overcome, a state may break up into a smaller independent units, which may be hostile toward one another, a process known as **balkanization**, named after the Balkan peninsula region of Europe. Yugoslavia was a former state that came into existence after World War I and was comprised of a number of distinct ethnic and religious groups. The dictator Josip Broz Tito led the country for some time and attempted to unify it, but ethnic tensions grew after his death in 1980 and a series of violent ethnic conflicts erupted, leading to the deaths of over 100,000 people and displacing far more. By the early 1990s, republics within Yugoslavia began declaring their independence. Today, seven states comprise former Yugoslavia (see **Figure 4.15**), including the newest state, Kosovo, which declared independence from Serbia in 2008.

Figure 4.15: Map of the Former Yugoslavia, as of 2007 (United Nations, Public Domain)

One danger of establishing and maintaining political unity is that if cultural features are used as centripetal forces, this can be difficult to maintain as the cultural landscape changes. If the ideal citizen is seen as someone who looks or speaks or believes a certain way, what happens when there are minority groups who may not share that identity, or when migrants settle in an area? Nationalism, when taken to the extreme, is known as **fascism**, where a dictator rules and espouses a form of ultranationalism. As the world has become more interconnected and globalized, certain groups within states may feel like their state's cultural identity is changing, and their individual roles in society may be changing, so movements promoting ultranationalism may be appealing, though this can ultimately serve to threaten national unity and may lead to conflict.

Maintaining political unity may be a balance, then, between crafting a state identity that doesn't exclude certain groups but at the same time, finding enough ideals that citizens hold in common to develop a shared sense of national pride and belonging. While some may view the current landscape of the United States as highly divisive, Americans in fact agree on a great deal, as a 2020 survey conducted for Harvard University's Carr Center for Human Rights and Institute of Politics illustrates. In that survey, over two-thirds of respondents agreed with the statement: "Americans have more in common with each other than many people think" and over 90% of respondents in each category of political affiliation (Democrat, Republican, and Independent) agreed that Americans have an essential right to clean air and water, a quality education, and the protection of personal data. It can be more difficult to promote unity around these kinds of ideals compared to establishing a national religion or a national language, but then again, these values may be able to better withstand the test of time.

5. Agriculture

Learning Objectives

- Describe how agricultural originated and diffused
- Identify the various types of rural development patterns
- Compare the major forms of subsistence and commercial agriculture
- Discuss the key innovations in agriculture
- Analyze the impacts of modern agriculture

Think about what you eat on a given day. Does it look much like a plant or animal? Do you generally eat the same things for breakfast, lunch, and dinner, or do you have a wide variety of dishes that you consume in a given week? Does what you eat connect with your own cultural, ethnic, and/or religious heritage? How did you acquire the food you eat? Did you shop at a supermarket, drive through a local restaurant, or make it yourself? And who grew the food you're eating and where was it produced? Perhaps it was grown in your own backyard garden! In many developed countries, we're often quite removed from where our food comes from and we don't often stop and think about how it gets on our plates. Much of our food doesn't even *look* like a plant or an animal, and this makes it even harder to discern what we're actually eating. Furthermore, what we eat has changed considerably over the span of human history, and continues to change as we look to the future. In this chapter, we're exploring agriculture, the various food systems of the world and how food is grown.

5.1 Origins and Diffusion of Agriculture

Before we dive into our modern food system, let's go back in time. How did agriculture begin? "Cultivate" actually means "to care for" and this is the root of the term "agriculture." **Agriculture** refers to the science, art, and practice of cultivating plants and livestock. So what was life like for us before we began deliberately cultivating plants and raising livestock? Until around 12,000 years ago, we were all hunters and gatherers. Hunters and gatherers lived in small groups – generally less than 50 people. Why? Because if they lived in larger groups, they would quickly consume all food within walking distance. We hunted for animals, fished, and gathered a variety

of plants like berries, nuts, fruits, and roots. Our search for food could take a short time, or much of the day, depending on environmental conditions.

It's generally assumed that men were primarily hunters and women were primarily gatherers, but research actually shows that gender roles in ancient societies were not strictly defined. Furthermore, the ecological knowledge of plants and the nutrients they provided were critically important to hunter-gatherer diets and gave women an important role in ancient societies.

Hunter-gatherer societies were fairly isolated from one another. Groups might intermarry, or have disputes over hunting zones, but in general the large tracts of land required to sustain bands of hunter-gatherers meant there was relatively little interaction between groups and violent conflicts over territory were rare since groups could simply shift their territory as needed. For 90 percent of human history, this was how we obtained our food, and a few hunter-gatherer societies still exist in the world today, though their numbers have declined dramatically. Some members of the Hazda groups of eastern Africa, for example, still practice hunting and gathering (see **Figure 5.1**).

Figure 5.1: Members of the Hadza Tribe Practing Bowhunting (© Idobi, Wikimedia Commons, CC BY-SA 3.0)

So how did we shift from hunting and gathering to staying in one place and growing the plants and animals ourselves? Agriculture developed independently in several different parts of the world and likely for a variety of different reasons. As some groups gathered food, they likely dropped a few nuts or berries along the way. They might have observed that, over time, these sprouted new growth. They might learn to add more water, or to help create more fertile

soil, and you can see how this process could have evolved over time. Other groups might have been more intentional, perhaps driven by population pressures or climate changes, and may have thought, "I wonder what would happen if I stuck this seed in the ground…" Similarly, the domestication of animals likely occurred for a variety of reasons. For instance, people might have kept livestock for religious sacrifice. Or, we might have kept pets who ate our food scraps. From these hearth areas, agricultural practices later spread. These innovations are referred to as the **Agricultural Revolution**.

How did plants and animals actually become domesticated, shifting from the wild varieties we once found to the varieties we're more commonly familiar with in the world today? We selected the seeds from the plants that grew the best, perhaps were the hardiest or produced the most yield. We also bred the animals that were the most docile or maybe the easiest to train. Think about cows today. Have you ever noticed they're pretty laid-back? This is because, for generations, we first kept close to us and then bred those cows who were calm and docile. We did the same with dogs and cats.

There are two types of cultivation, vegetative planting and seed agriculture, and you might have tried these out in your own backyard or balcony gardens. **Seed agriculture** refers to the reproduction of plants by using seeds. Many plants like tomatoes and apples can be reproduced by planting the seeds that are found in the fruits. **Vegetative planting**, on the other hand, reproduces plants by using a fragment of the parent plant. Potatoes, for example, are grown using vegetative planting. You could cut up a potato, ensuring that each piece has an "eye" where a new stem could grow, and plant the pieces. New potato plants would sprout from each piece you planted. (Pretty neat, really.) The advantage of vegetative planting is that the new plants are essentially clones of the original plant. So, if you had a really tasty batch of potatoes, the new ones you planted would be genetically the same and should also taste great. With seed agriculture, seeds are generated through sexual fertilization and you control the parents of the plant, so it's more like breeding in that you can introduce favorable traits. Maybe you have one variety of tomato that grows really well, and another that's really sweet. You could cross pollinate the plants and viola – you've created a new tasty and hardy variety.

There are a number of hearth areas for vegetative planting and seed agriculture. Southeast Asia is a likely location for one of the first instances of vegetative planting. We see a lot of tree and root crops here, like taro, yam, and bananas, that would be suitable for vegetative planting. Additionally, the dog, pig, and chicken, were all likely domesticated in this region, as well. We also might have had a vegetative planting hearth in West Africa, around Ghana and the Cote D'Ivoire, with the planting of palm trees and yams. In South America, we see evidence of the cultivation of sweet potato, among other crops.

The location of seed hearths is a bit different, likely due to the natural environmental conditions and resources found in these locations. There are three main hearths in the Eastern Hemisphere: Western India, where crops like wheat were cultivated; China, where rice was first domesticated; and Ethiopia, where millet, sorghum, and teff, a cereal crop, were grown. As seed cultivation diffused to Southwest Asia, we saw the first domestication of herd animals, like cattle, sheep, and goats. Often, animals were used to plow the land, which was then used for planting, and part of the harvest was used as animal feed. We see two main areas of seed innovation in the Western Hemisphere, Mexico and Peru, each of which occurred

independently. In Southern Mexico, we see the origin of squash and maize. In Peru, we find evidence of the domestication of cotton, squash, and beans.

Thus, beginning around 12,000 years ago, we began to shift from first planting wild varieties of crops we harvested to gradually domesticating and cultivating these plants and animals. This shift from hunting and gathering to more settled agriculture had a profound shift on how we lived. We no longer had to be relatively nomadic and could begin staying in one place for long periods of time. We could also support larger populations since we had a more reliable, and regular, source of nutrients. Put simply, our modern society today would not exist were it not for the development of agriculture.

5.2 Rural Development Patterns

The practice of agriculture has continued to shape our land use patterns. Generally, farming takes place in rural areas. Rural settlements could be clustered (also called nucleated), where a cluster of homes are surrounded by fields, or dispersed, a form of settlement often found in North America where rural homes and farms are spread out and relatively isolated from one another; or linear, often arranged along a body of water (see **Figure 5.2**). Similarly, how rural land is divided is highly dependent on local geography. A **long lot** system is often used with linear settlements in order to give everyone access to a resource such as a river. The land is divided into long, narrow lots. French settlers established such a system in many areas they colonized, and thus remnants of the long lots system can be found in many parts of Canada and Louisiana. In other areas, rural land was divided into metes and bounds. **Metes** refer to specific distances between two points as well as an orientation and direction while **bounds** are more general, referring to local landmarks or physical geographic features. Metes and bounds was often used in England, and in areas colonized by the United Kingdom, and a parcel divided using a metes and bounds system might be described as "From the corner of the creek and the stone bridge, 200 rods (an old English unit of measurement) to the northwest to the large boulder…" and so on.

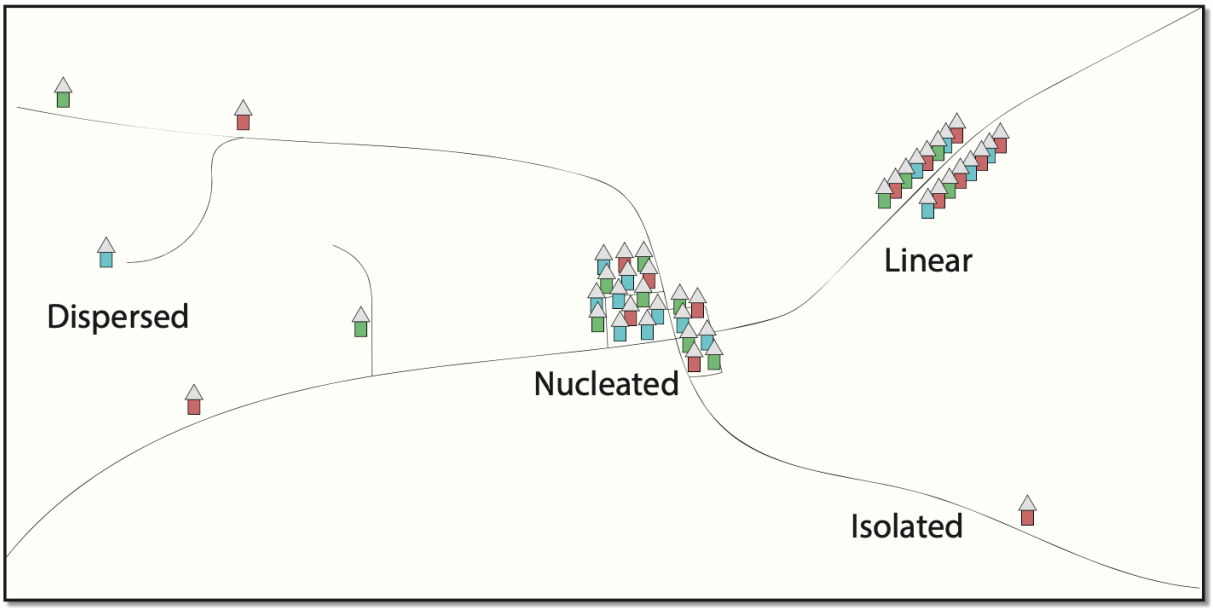


Figure 5.2: Rural Settlement Patterns (© Corey Parson, Social Science LibreTexts, CC BY-SA 4.0)

Perhaps not surprisingly, this relatively inexact form of parceling land has been replaced in most locales, but some areas continue to use this surveying system. The United States primarily uses the Public Land Survey System, which uses base lines and principal meridians to survey an area. A section of land is divided into townships, squares that are 36 square miles each north and south of the baseline. Ranges are used to measure the distance east or west of the principal meridian in units of 6 miles. A location surveyed with the township and range system might be described as "township 16 north, range 12 east."

Historically, the actual crops grown on farmlands were directly related to the distance from the city center and the cost of land. Foods that spoiled quickly, for example, needed to be located near an urban center while crops that could store well and travel longer distances could occupy large tracts of farmland farther away where land was less expensive. The Von Thünen Model, first created by economist Johann Heinrich von Thünen in the early 1800s, describes the locations where these various agricultural products were produced in relation to the distance from the city center (see **Figure 5.3**). Dairying and horticultural production (including more perishable fruits and vegetables) were produced relatively close to the city, while fenced-in crops ("enclosed field"), three-field systems (where a crop like wheat or rye is planted in one field, another field has peas or lentils, and another field is left fallow), and grazing animals could all occupy land farther away.

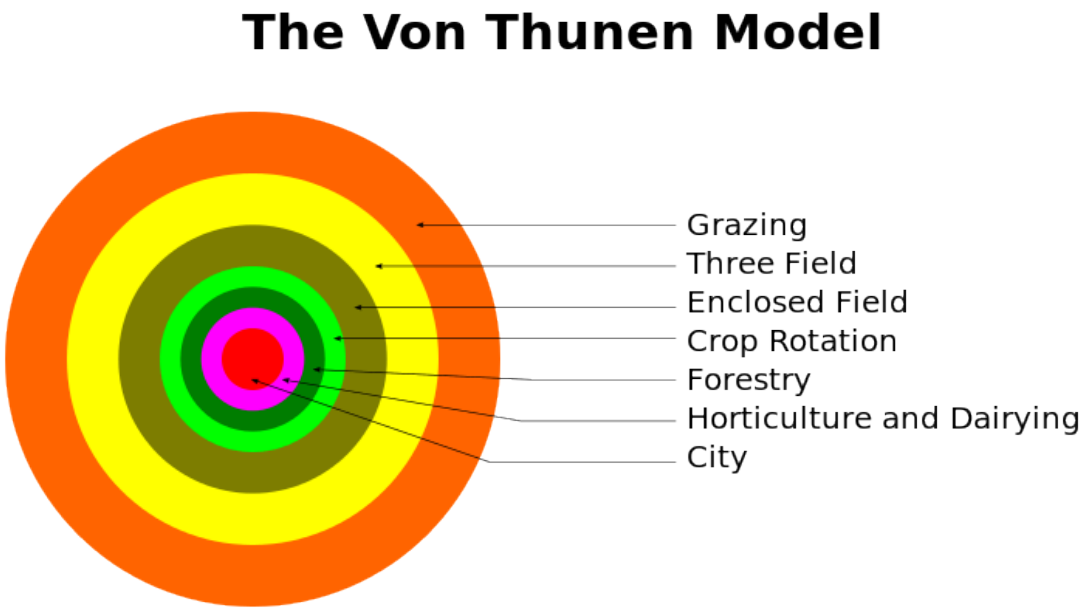


Figure 5.3: The Von Thünen Model (© Ytx21cn, Wikimedia Commons, CC0 1.0)

While modern transportation, food processing, and refrigeration technology might have altered the neat rings of the original model, we still find this general model applicable on a broader scale. Globally, perishable products are still often produced close to the city center. Dairy farms, for example, still tend to be located near big cities in close proximity to bottling and processing plants for milk. Wheat farms are still located fairly long distances from major U.S. cities where land is more affordable – though bread factories are located near the cities themselves. Similarly, export crops are often those that travel long distances the easiest and are produced in less developed countries and shipped to more developed countries.

5.3 Forms of Agriculture

Given the wide variety of environmental conditions and native plants and animals found in the world today, it should be no surprise that there's a wide variety of ways agriculture is practiced as well. If I were to ask you, "Where was the food you had for lunch grown?" you might answer a bit hesitantly, "On a farm....?" But what kind of a farm? And what happened to it after it was harvested? We've come a long way from our early days of growing crops and now relatively few of us are actually farmers, so many people know very little about how food is grown and produced.

One basic distinction can be made between subsistence agriculture and commercial agriculture. **Subsistence agriculture** is the growing of crops in order to *subsist*, meaning the

crops are used to feed the farmer and the farmer's family with relatively little left over for sale or trade. **Commercial agriculture**, on the other hand, is the growing of crops primarily for sale off the farm.

How can you differentiate between these two forms? There are a few guiding questions you could use to help distinguish between subsistence and commercial agriculture. First, what is the purpose of farming? Are you producing food for your own consumption or food for others? In commercial agriculture, it's rarely sold directly to the consumer, but rather to food-processing companies. What percentage of the labor force is comprised of farmers? In countries where commercial agriculture is practiced, a relatively small number of farmers are able to produce large quantities of food. In subsistence agricultural areas, on the other hand, a high percentage of people are farmers. What machinery is used to grow and harvest the crops? In subsistence agriculture, farmers generally use hand tools and animal power. With commercial agriculture, the emphasis on high yields applies to the mechanisms used to farm as well and very often automated equipment – like tractors, pickers, etc. – are utilized. What is the size of the farm? Again, subsistence farmers are primarily producing food for themselves, so there is no need for sprawling plantations. Within the United States, the *number* of farms has decreased over time while the *acreage* of these farms have grown and this is common where commercial agriculture is practiced. Finally, what is the relationship of farming to other businesses? With commercial farming, food production is closely tied to agribusiness since a farm's crops are not often sold directly to consumers.

Within subsistence and commercial agriculture, the actual practice of farming can take on many different forms and you might find several different types of agriculture practiced in the same country. There are four main types of agriculture practiced in less developed countries: pastoral nomadism, shifting cultivation, and intensive subsistence agriculture, which are all forms of subsistence agriculture, and plantation farming, which is a form of commercial agriculture.

Nomadic pastoralism is the herding of domesticated animals in search of fresh pastures for the animals to graze. Contrary to what you might think, herd animals are generally not slaughtered, but are instead more commonly used for their milk. Once dead, their skins and hair can be used for clothing and tents. Animals might be chosen based on its environmental adaptations, like the camel, or on the prestige of an animal. Other herded livestock include cows, goats, llamas, and even reindeer. Also note that while these groups are nomadic, they are not random wanderers. Rather, they follow migration patterns that have developed over thousands of years.

Figure 5.4: Camel Herding in Rajasthan, India (© Arindam Mitra, Flickr, CC BY 2.0)

Today, there are between 30 and 40 million nomadic pastoralists, but there used to be far more. Why is that? Well, consider how much land is required for nomadic pastoralism. Furthermore, consider how the modern political geographic landscape has made nomadic pastoralism challenging with international borders and the divvying of land into privately owned parcels. Nomadic pastoralism is often practiced in less fertile environments where other forms of agriculture may be limited. The Raika people of the state of Rajasthan, India (see **Figure 5.4**) are semi-nomadic and have been herding camels for hundreds of years, but now, as with many nomadic pastoralists, their way of life is under threat. They no longer have access to the lands they've traditionally used for grazing and fences often block their paths.

Shifting cultivation is a form of subsistence agriculture where people shift (hence the name) cultivating one plot of land temporarily and move to another piece of land for a period of time. Each field is used for crops for a few years and then left fallow for a relatively long period. Eventually, farmers return to the plot of land, which is now overgrown with vegetation. Some farmers who practice shifting cultivation then cut and burn the vegetation (known as slash and burn) in order to create a cleared patch of fertile soil known as swidden (see **Figure 5.5**). This burning of vegetation actually infuses nutrients into the soil. Other farmers simply clear the vegetation by cutting.

Figure 5.5: A *Patch of Swidden in Arunachal Pradesh, India (© Rohit Naniwadekar, Wikimedia Commons, CC BY-SA 4.0)*

With shifting cultivation, a patch of land is generally only used for 2 to 3 years and then left fallow for anywhere from 6 to 20 years. While shifting cultivation can look quite destructive, as it has historically been practiced, it is actually more ecologically sustainable than it might appear. Soils can only support crops for so long before they run out of nutrients. With commercial forms of agriculture, fertilizers are often used to infuse more nutrients into the soil. With shifting cultivation, the land needs no external inputs and is left to recover naturally on its own. One challenge to shifting cultivation, though, is that it is more ecologically sensitive when it is practiced on a small scale. Larger groups need to burn larger tracts of land, which could be more detrimental to the environment. Another challenge is the sheer amount of land needed to support shifting cultivation. With this form of agriculture, you need three to four times the amount of land as you would with commercial farming, since each plot of land is only cultivated for a short period of time. While this might not have been a challenge for early humans, who had relatively small populations and large areas of land to roam, it is much more challenging in today's society. It has also made groups practicing shifting cultivation more vulnerable to

takeover or to the parceling of their land, since land that may look unused may actually be lying fallow. Around 250 million people practice shifting cultivation today.

As areas grew and developed, less and less land was available for farming and farmers who once had large areas of land to cultivate and harvest were left with smaller and more challenging tracts. Often this led to more intensive subsistence agriculture. **Intensive subsistence agriculture** is a form of subsistence agriculture where farmers cultivate a small area of land using additional effort. This form of agriculture is often found in areas where agricultural density, the ratio of farmers to arable land, is quite high. Because the density is so high, farmers have to be able to produce a tremendous amount of food from a very small parcel of land. And as mentioned, this land may be less desirable if an area has limited land available and a high population. So, how do you grow crops like rice, which must be grown on flat land, on the side of a steep hill? You could build terraces, essentially creating flat "stairs" along the side of the mountain that are suitable for growing crops (see **Figure 5.6**).

Figure 5.6: Rice Terraces in Longsheng County, China (© severin.stalder, Wikimedia Commons, CC BY-SA 3.0)

Plantation agriculture, where large farms specialize in the production of one or two crops, is found in less developed regions. Why is that? When areas were colonized, the focus was generally on exporting resources. A plantation is essentially a very efficient way to produce large amounts of food for export. But why would they only grow one or two crops? Imagine you're playing a farming video game and you're trying to earn a lot of coins (or bells or cash,

etc.) How would you arrange your farm? If you have a piece of land and a variety of crops, they might have different growing patterns and watering needs. Some might be able to be harvested daily while others could take a week to be ready. If you wanted to maximize your profits, and minimize the time spent playing the game (because you might have other things to do), you could just plant *one* type of crop. That way, they would all need the same amount of water, grow at the same rate, and harvest at the same time. Plantation style agriculture follows the same essential principle – minimizing time and cost while maximizing efficiency and profit by growing just one or two crops. Plantations are usually located in sparsely populated areas since they utilize large areas of land, so owners must import workers or laborers. In the Americas, slave labor was generally used on plantations. While the use of plantations in the United States declined after slavery was abolished, "monocultures" are now the norm – and a **monoculture**, where a single crop is cultivated, is essentially a modern version of a plantation. Even in areas that are no longer colonies, plantation agriculture is still commonly practiced with crops sold and exported to more developed areas. Chiquita Brands International, for example, an American company which was called the United Fruit Company until 1984, owns a tremendous amount of land in Central America operating sprawling plantations that produce fruits like bananas for export (see **Figure 5.7**).

Figure 5.7: Chiquita Banana Planation in Costa Rica (© KraYa, Wikimedia Commons, CC BY-SA 4.0)

In more developed countries, we find several forms of commercial agriculture including mixed farming, where crops are cultivated alongside the rearing of livestock and crop rotation is often practiced; specialized horticulture, to include the cultivation of fruits and nuts;

commercial grain farming, where grains like wheat are grown primarily for human consumption; dairy farming; and livestock ranching. Where these types of farms are found is highly dependent upon local geography and resources. Grain farming, for example, is found extensively across the central United States, where ample tracts of large, flat land and seasonal rains support crop growth. Livestock ranching is found in regions that might not have enough fertile soil or irrigation to support other forms of agriculture, such as in Australia's Northern Territory.

More broadly, we can characterize a number of forms of commercial farming as industrial farming, meaning that food is not only produced primarily for sale off the farm, but is also produced using a highly mechanized process. One commercial farm might grow a variety of crops alongside several species of livestock who are allowed to graze and these products are sold at local farmer's markets and to restaurants. Another commercial farm might produce only chickens in sprawling chicken houses where flocks of tens of thousands per house spend their entire lives indoors.

5.4 Agricultural Innovations

We've come a long way from our early days as farmers – so long in fact that most people in more developed countries no longer need to grow food and a relatively small amount of farmers are able to feed a considerable amount of people. How is this possible? The **Second Agricultural Revolution** accompanied the Industrial Revolution and allowed farmers to harness new technological innovations to increase productivity. Some of these innovations related to mechanization, helping farmers to produce and harvest more food with fewer people, but others were more related to the science of farming. Crop rotation, for example, was one of the most important innovations during this time. By rotating crops, farmers could restore nutrients in the soil and improve its fertility. One four crop rotation in particular – wheat, turnips, barley, and clover – came to dominate during this time period as it eliminated the need to keep a field fallow and allowed year-round grazing of livestock. The selective breeding of livestock was another innovation during this time period, and cattle began to be bred specifically for beef (whereas previously farmers primarily kept cows for dairy uses.) New fertilizers were also discovered and came into wide usage, again increasing plant yields. While this period of change is often termed the "Second Agricultural Revolution," it was really more of an extended process of a series of broad changes rather than a short-termed period of intense innovation.

These innovations coincided with the Industrial Revolution but also helped fuel and sustain it. Fewer farmers were needed at the same time increasing numbers of industrial jobs were developing in urban areas. Without the surplus of food created through the Second Agricultural Revolution, there would not have been the large urban populations that developed during the Industrial Revolution. Around this same time, food processing techniques developed and mechanized as well, such as the canning of food on an industrial scale.

The next major revolution in agriculture came in the 1950s and 1960s. This is known as

the **Green Revolution** and refers to the innovations that resulted from the use of new technologies that significantly increased global agricultural production. As with the Second Agricultural Revolution, the Green Revolution is more than just a single innovation or new technique. Rather, the Green Revolution had a number of significant technological innovations aimed to increase yield. One key innovation was the development of high yield varieties of wheat, creating new hybrid varieties capable of absorbing more fertilizer. Fertilizers themselves changed dramatically during this time with the creation of chemical fertilizers, such as nitrogen fertilizer which is derived primarily from natural gas. Irrigation systems and the use of pesticides also served to increase crop yields during this time.

The increases in production that resulted from the Green Revolution are credited with increasing the global food supply and potentially averting famine. The innovations of the Green Revolution led to other challenges, however. One is that the increase in mechanization and chemicals marked by the Green Revolution made farming considerably more expensive. Smaller farmers often went into debt and farms began to consolidate and get larger. In addition, while the Green Revolution allowed land to be more fertile, this increase fertility was only achieved through chemical fertilizers, which are energy-intensive to produce and environmentally detrimental. It also encouraged the expansion of farmland in areas which were previously unproductive – a benefit to farmers who might not have otherwise been able to grow crops, but a potential threat to local biodiversity as land was cleared to create farms. The hybrid varieties of seeds, while high yielding, were sometimes less nutritious than more traditional varieties.

5.5 Modern Global Agriculture

The way we farm today in both less developed and more developed countries is a direct result of the Green Revolution. The practice of applying scientific innovations and mechanization to the cultivation of plants and animals is characteristic of the modern way we produce food. Even our meat production has become highly mechanized, with most meat worldwide coming from livestock reared on concentrated animal feeding operations (CAFOs) (see **Figure 5.8**). While these types of concentrated feedlots seek to maximize profits by creating a highly efficient production process, having animals so tightly concentrated has significant environmental impacts, from the fuel and water used to bring in animal feed to the large amounts of waste produced to the increased spread of disease due to living together in such close quarters.

Figure 5.8: Cattle Feedlot in Southern Idaho (© Greg Goebel, Flickr, CC BY-SA 2.0)

The development of hybridized seeds during the Green Revolution has continued, with further innovations in genetic modification allowing scientists to tweak the DNA of plants, making them less susceptible to diseases, more resistant to spoilage, and more resistant to chemical herbicides. This increased use of genetically modified crops (also known as GMOs for genetically modified organisms) have come to dominate modern farming and have led to substantially higher crop yields. As with some of the innovations during the Green Revolution, however, these higher yields have come at a cost, both in terms of the high costs of the GMO seeds themselves which are patented, but also the environmental impact of using additional fertilizers and pesticides.

These changes, particularly the industrialization of agriculture, have also reduced the varieties of crops that are grown. For example, there are over 1,000 different varieties of bananas in the world today, but most of us eat only one. The United Fruit Company (now Chiquita), for example, began growing a single variety of banana in all of its farms in order to simplify and standardize production. These bananas were genetically identical, reproduced through vegetative planting, which ensured that it was exactly the same regardless of the locale. A disease began to wipe out the banana crop in the late 1800s, and so United Fruit Company turned to another variety, the Cavendish banana, which is the essentially the only variety found in stores in Europe and North America today. Unfortunately, the disease that wiped out the previous banana crop has evolved to be deadly to the Cavendish variety as well and is expected to similarly wipe out the entire species in the future. This is the risk of relying on a single variety of crop, essentially putting all your eggs (or bananas, in this case) in one basket.

In addition, despite the Green Revolution's impact on increasing the global food supply, we continue to have issues with malnutrition across the globe. Malnourishment broadly refers to a diet that does not supply a healthy amount of nutrients. Many often think of undernourishment when they consider malnourishment, which is when someone does not consume enough calories, protein, or specific nutrients, and certainly undernourishment is a very real concern for many people in the world. Globally, over 10% of the population, or around 821 million people, are considered undernourished. In the United States alone, 35.2 million people lived in food-insecure households in 2019 according to the USDA. *Over*nutrition is also a concern, however. Around 13% of adults in the world are obese, and one in five children and adolescents are considered overweight. Obesity was linked to 4.7 million deaths worldwide in 2017 and rates have increased in recent decades. In many cases, poverty is at the root of malnutrition in all of its forms. We find the highest rates of undernourishment and the highest obesity rates in low and middle income countries as well as in poorer communities within high income countries. Put simply, poverty limits a person's ability to access a an adequate supply of healthy foods. Even within the United States, many low income areas are considered to be food deserts (see **Figure 5.9**), where residents have limited access to affordable, nutritious foods, particularly fresh fruits and vegetables.

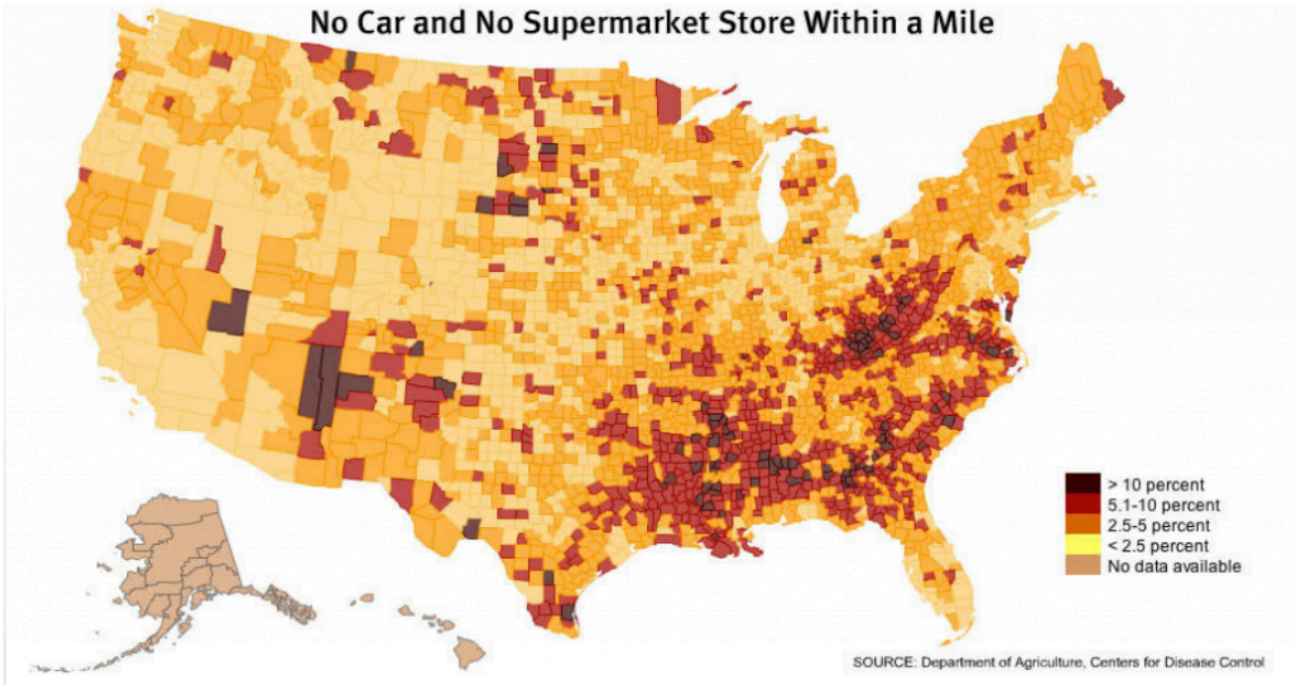


Figure 5.9: Map of Food Deserts in the United States (United States Department of Agriculture, Public Domain)

Modern global agriculture is broadly characterized by consolidation. Certainly the growing of foods has been consolidated, shifting from many smaller farms to a few very large farms. The grocery store industry, too, has consolidated, with the number of individual stores declining and companies often merging or acquiring smaller stores. Even the very foods we eat have

also consolidated, though it's not often apparent from the rows and rows of seemingly endless varieties of foods in the modern supermarket. In reality, the vast majority of the processed food we eat is derived from a very small number of crops. Corn, for example, is in almost every product in a supermarket. High fructose corn syrup sweetens everything from ketchup to soda to processed breads. Maltodextrin, a food thickener often created from corn, is used in infant formula and some snacks. And the list of corn-derived products goes on. Soy, too, has come to dominate much of our diet, with soy additives in a variety of processed food products.

The production of these foods has also consolidated. As mentioned, commercial agriculture is marked by the production of food primarily for sale off the farm. Increasingly, these foods are not sold directly to the consumer but rather to an intermediary company. **Agribusinesses** refer to companies connected with the production of food. It is a combination of the terms "agriculture" and "business," so these are essentially businesses related to agricultural production. Companies that produce farm machinery are considered agribusinesses, as are seed and chemical manufacturers and food processing companies. These large, multinational corporations dominate the various sectors where they operate. Four large companies control 75-90% of the global grain trade, for example. Six companies control 75% of the agrochemical market. And similarly food processing companies have often merged or bought smaller companies. Have you eaten a PepsiCo product lately? It's one of the largest food, snack, and beverage companies in the world, second only to Nestlé, and even if you don't drink Pepsi soft drinks, you might not have realized you were eating a product they manufactured. They own everything from Quaker Oats to Gatorade to Tropicana. So walking through the grocery store, what seems like an endless array of products and companies and varieties is really a relatively small number of crops and their derivatives processed by a handful of large companies.

So what is the modern human to do? Curl up and cry with a bag of Cheetos? (Which is owned by Frito-Lay, a subsidiary of PepsiCo.) It can be difficult to know how to make the right food choices, both for ourselves and the environment, in such a complex, and often obscured, system. There are a number of sustainable solutions to our various agricultural challenges. One set of solutions relates to the practice of farming itself. Sustainable agriculture refers to farming in ways that are able to meet the needs of people today without compromising future generations. There are a wide array of sustainable farming practices, from soil management techniques like no-till farming (which helps prevent erosion and retains soil moisture) to practicing crop rotation to planting cover crops. Many of these practices are reminiscent of our early ways we farmed, considering the larger ecosystem rather than just a single crop.

Many women worldwide work in agriculture, including a majority of women who are economically active in less developed countries and around 43 percent of the agricultural labor force in developing countries. However, gender inequality in agriculture persists, particularly with regards to access to resources like land, financial services, and education. In fact, the Food and Agricultural Organization of the United Nations estimates that if women had access to the same resources as men, it would ultimately reduce the number of hungry people in the world by 100 to 150 million. Women have also increasingly turned to sustainable farming techniques and a number of global partnership programs have been created to both increase access to resources for women farmers and encourage sustainable agricultural practices.

Consumers, too, can help shape a more sustainable agricultural system. Across the United States, the number of farmers markets has increased, providing a direct link between

consumers and those who grow their food. And farmers markets are not just for the wealthy – in fact, contrary to what you might expect, farmers market prices are generally competitive with regular supermarket prices and many local markets accept Supplemental Nutrition Assistance Program (SNAP) benefits (previously known as "food stamps.") Consumers can also be mindful of food waste. Astoundingly, around 1/3 of all food produced worldwide is never eaten. There are a variety of reasons why so much food is wasted, including farmers discarding imperfect foods (that would have tasted fine but did not meet the visual standards of consumers in more developed countries), uneaten foods that are discarded at home, and foods that are discarded close to their "best buy" (even though this is a voluntary system of labeling that reflects only the quality of the food, as determined by the manufacturer, and not safety.) Many non-perishable foods are still perfectly fine even a year or more past the "best buy" date and there are numerous guides online to help consumers know how long these dates can be extended. The very foods we choose to buy sends a message to food producers and manufacturers about what we value. So, when we buy something from a small company that practices sustainable agriculture or shop locally or buy organic, we are essentially voting with our dollar and shaping the future of agriculture.

6. Urbanization

Learning Objectives

- Describe how cities originated and developed
- Explain how modern cities impact their surrounding areas
- Analyze the internal structure of cities
- Identify the key features of urban infrastructure
- Discuss the challenges facing modern cities

If you could live anywhere, where would you live? Would you rather live in a rural area, alongside farms and rolling fields, or in a city, bustling with activity? What advantages does each of these locations have, and why do you think people ultimately choose to live where they do? This chapter explores urbanization, from the origin and development of the earliest cities to the modern challenges facing urban areas today. We'll also explore patterns found within urban areas as well as the rise of the suburbs.

6.1 The Origin, Development, and Distribution of Cities

So before there were cities, where did people used to live? When we were hunters and gatherers, we mostly lived nomadic or semi-nomadic lifestyles in relatively small groups, with access to reliable food sources a limiting factor on the size of our population. As we began to practice settled agriculture, we were able to sustain larger populations and bigger villages started to emerge. It's unclear exactly why cities began to form. Certainly, the practice of settled agriculture was necessary, but cities themselves may have developed as centers of trade, ritual centers related to religious practices, or central locations to store surplus agriculture products. The earliest known city was Çatalhöyük, established in 7100 BCE and located in modern-day Turkey. It was home to around 5,000 to 7,000 people. Other cities emerged, including Uruk in ancient Sumer (modern-day Iraq) with 40,000 people; Memphis, the ancient capital of Lower Egypt, home to around 30,000; and Yin, China, a massive capital city that housed somewhere between 50,000 and 150,000 people. Rome would be the first city to reach 1 million people during the second century CE. Where cities developed was highly dependent on local

geography. Access to resources, and water, were critical, and we see that even today, only around 10% of the world lives more than 10 km (6.2 miles) from a body of fresh water.

Where cities emerged and grew was related to the site and situation of particular locations. Site factors were those related to the actual location of a city that made it favorable for people to settle there and for the city to grow and develop further. Things like access to freshwater, arable soil, proximity to a coastline or harbor, natural protective fortifications like cliffs that enabled the city to more easily defend itself from intruders – all of these site factors contributed to where a city might emerge. Situation factors, on the other hand, related to where a city was located in relation to other places. Maybe a city was located in the relative center of a larger region of farmers, or a city might be located closer to its friendly neighbors – or in a relatively remote area to be protected from hostile neighbors. Select a few ancient or long-standing cities and look at maps of where they are located. Where are the nearby rivers? What is the terrain like? What other cities or developments are located nearby?

As cities grew and developed, more and more people moved from rural areas to be closer to the cities. **Urbanization** refers to this process of the population shifting from rural areas to urban ones. In 1800, only around 3 percent of the world lived in urban areas, but over the past 200 years, urbanization has accelerated rapidly (see **Figure 6.1**). What was driving this change? Consider the broader societal changes that were occurring beginning in the mid-1800s. As industries developed, these jobs were primarily located in cities. Coupled with this, the agrarian revolution meant that fewer farmers were needed in rural areas. Thus, more and more people moved to the city to find work. Urbanization continues today mostly driven by economic factors. In some cases, the city provides an economic pull through the promise of increased job opportunities and higher wages. In other cases, economic downturns and limited opportunities in rural areas essentially push residents to leave. In still other situations, people may move to cities to have access to more services and amenities. Globally, 55% of the world's population now live in urban areas and that is expected to increase to 68% by 2050, according to the United Nations.

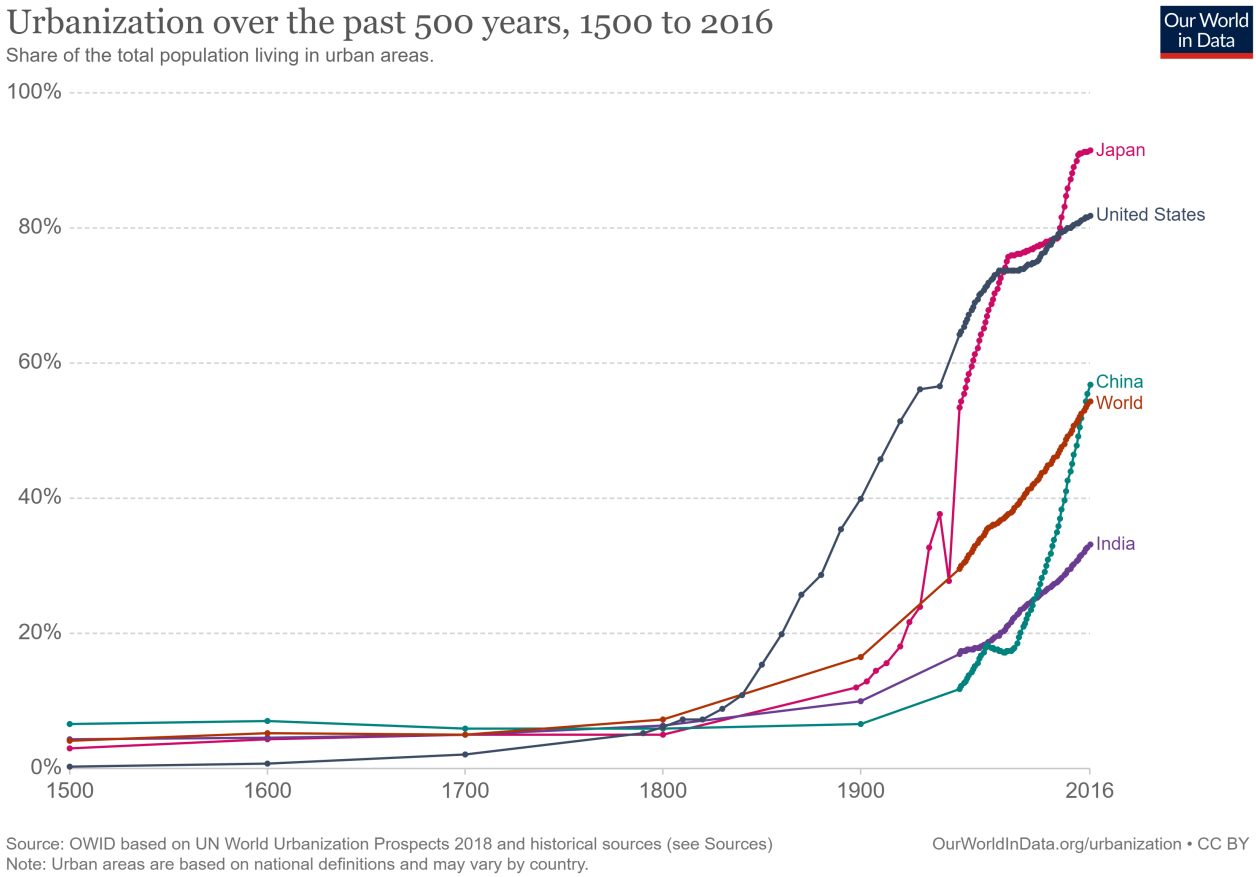


Figure 6.1: Urbanization Over the Past 500 Years (© Our World in Data, CC BY)

Geographers often refer to the center of an urban area as the **central business district**, or CBD. In some cities, this might be called the "downtown" area. Here, we find a dense cluster of consumer, business, and public services. Transportation networks are also typically centered around the CBD. Think about your hometown. Where might its central business district be located, and what kinds of businesses are located there? How have the CBDs near you changed over time? Since many businesses seek to locate in the CBD, and land is relatively scarce, real estate prices are typically high. In some cases, this leads developers to build up – creating skyscrapers that maximize the number of tenants with a limited footprint on the ground.

There are a number of principles that govern where cities are located. **Central place theory** helps explain the spatial distribution of cities across the landscape and their relationship with smaller settlements. Geographer Walter Christaller developed this concept in the 1930s and the basic principles still hold true today. Imagine a flat, homogeneous landscape. Then, imagine that all of the people in that landscape are evenly distributed, and resources are evenly spread out as well. Also imagine that all of the consumers have the same income level and shopping habits. (This is getting less and less realistic, but it's just a model so stay with it.) Naturally, businesses would tend to locate in a central area to have maximum access to consumers, right? Even when cities were first developing, we saw these central places begin to emerge. As the

central place within the region gets bigger, it tends to offer more goods and services and become more specialized. These large settlements also tend to be located farther from other large settlements. We can visualize central place theory using a pattern of hexagons, since they can nestle without gaps and the edges are roughly equidistant (see **Figure 6.2**). In such a landscape, there lots of small villages (sometimes called lower order places) that offer a few basic goods and services, several towns (or intermediate order places) where you'll find more options for goods and services, and relatively few cities (or higher order places) where you'll find lots of specialized goods and services – things like major higher educational institutions, international airports, large financial centers, and so on. Think of a big city near where you live. What goods and services does it offer? Are there smaller towns and even smaller villages that surround it? Even though the model might not fit exactly, it's a good way to visualize how cities and smaller settlements are distributed.

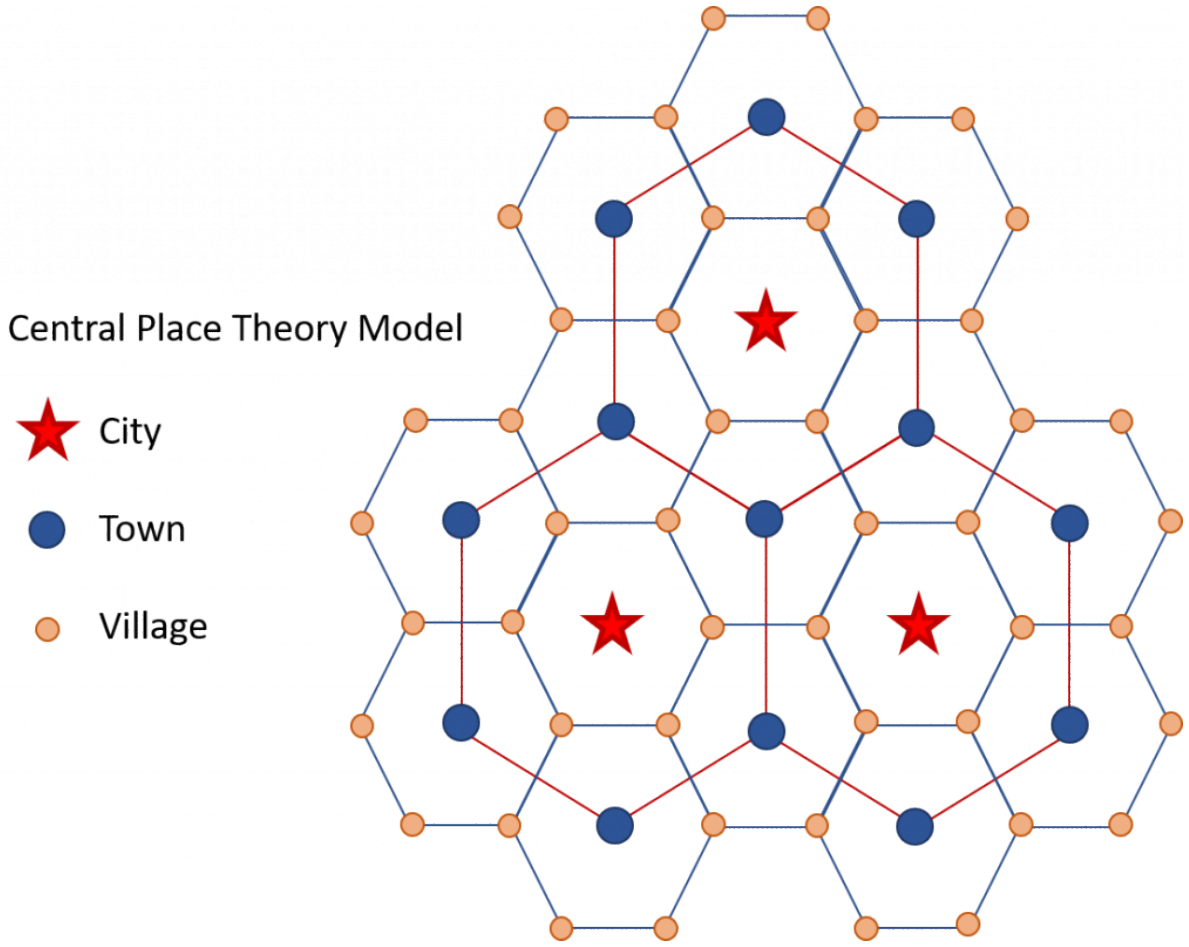


Figure 6.2: Model of Central Place Theory (Figure by Author)

The notion that there is generally a hierarchy of cities in terms of their sizes (in terms of population, not geographic size) within a country can also be explained by the rank-size rule. The **rank-size rule** is less of a "rule" and more a way of analyzing how the population of cities within a country is distributed. If a country follows the rank-size rule, then the population of

the nth largest settlement will have $1/n$ of the population of the largest city in that country. In other words, the 3rd most populous city in a country would have a population that is 1/3 that of the largest city. Berlin, for example, has a population of around 3.5 million. The second largest city, Hamburg, has about 1/2 the population with 1.8 million residents. Frankfurt, the 5th largest city, has a population around 1/5 that of Berlin with over 730,000 people. Does the rank-size rule hold true in every case? No, and in fact, there are numerous exceptions even within the same country. Munich, for example, is the third largest city in Germany but its population is 1.45 million where it would be hypothesized to be only around 1.2 million if it followed the rank-size rule. The rank-size rule can be a helpful baseline to explore and compare the distribution of cities within a country and to see which areas follow the pattern and where (and why) there are exceptions.

Some countries have a largest city that is far more populous than the next largest city. These are known as **primate cities**. A primate city is the largest city in a country that is more than twice as populous as the next largest city *and* is emblematic of the national culture. Not all countries have primate cities. One mental exercise to consider whether or not a country has a primate city is to try and think of the largest city within a country, and then try and think of the next largest city. For example, what's the most populous city in Greece? Athens, right? You probably thought of that relatively quickly. What's the second largest city? Having a harder time? It's Thessaloniki, with a population just under half of Athens. If you can easily think of the largest city in a country but have a hard time thinking of the second largest city, you could just need to brush up on your geography, but it's more likely that it's because the country has a primate city. Mexico City, Paris, Cairo, Bangkok, and Jakarta are all considered primate cities.

Do all countries have a primate city? Berlin, as mentioned, is the most populous city in Germany, with a population almost double that of the second largest city of Hamburg. But Munich has increasingly become Germany's cultural center, so Berlin is generally not considered to be a primate city. Shanghai is China's most populous city, with over 26 million residents, but Beijing has over 21 million. China has a number of very large cities, in fact, and does not follow the rank-size rule. The United States similarly does not have a primate city, since the entire New York City area is quite populous, but the population of the greater Los Angeles area is more than half the size.

Why do some countries have primate cities and others do not? In some cases, primate cities have emerged as a result of colonization. If an area was colonized, typically the colonial power dominated a single city in the region, perhaps one that was centrally located or had strategic importance, such as a port city. Most of the development and infrastructure was singularly focused on that city, and so even after colonialism ended and the country gained independence, that city retained its primacy. Lagos, for example, was annexed as a colony of Britain in 1861 and once Britain gained control of all of Nigeria, it became the colony's capital. Transportation and communication infrastructure was centered on the port city. Even though Nigeria is now independent and the capital city was moved to Abuja, Lagos has a population of over 8 million people – almost three times as much as the second-largest city of Kano – and is a major financial center and seaport. In other cases, as industrialization occurred, and urbanization followed, industries may have been concentrated in only one or two areas within a country and a primate city emerged as a result of masses of people moving from the rural areas to the central city to find work. Still other cases represent a combination of factors, with a historic city

perhaps gaining prominence during colonization and then continuing its primacy as a result of industrialization and globalization.

6.2 Cities in the Modern World

Today's cities are highly globalized and interconnected, and they've continued to grow in size. From the time cities first developed to the first city reaching 1 million residents took around 7,200 years. It would take less than 2,000 more years for the first city, New York City, to reach 10 million residents, and now over 30 cities have a population greater than 10 million. These very populous cities are known as **megacities**, typically defined as cities with a population over 10 million people. Megacities resulted from the process of urbanization and much of the growth of megacities is in developing countries (see **Figure 6.3**). Asia, for example, is expected to be home to 30 megacities alone by 2025, and Africa is projected to have 14 within the next 30 years. Why are megacities growing in these regions? As mentioned earlier, the combination of limited economic opportunities in rural areas coupled with economic growth in urban areas has fueled a rural exodus. But, this rapid urbanization has brought about considerable challenges, as we'll explore in a moment.

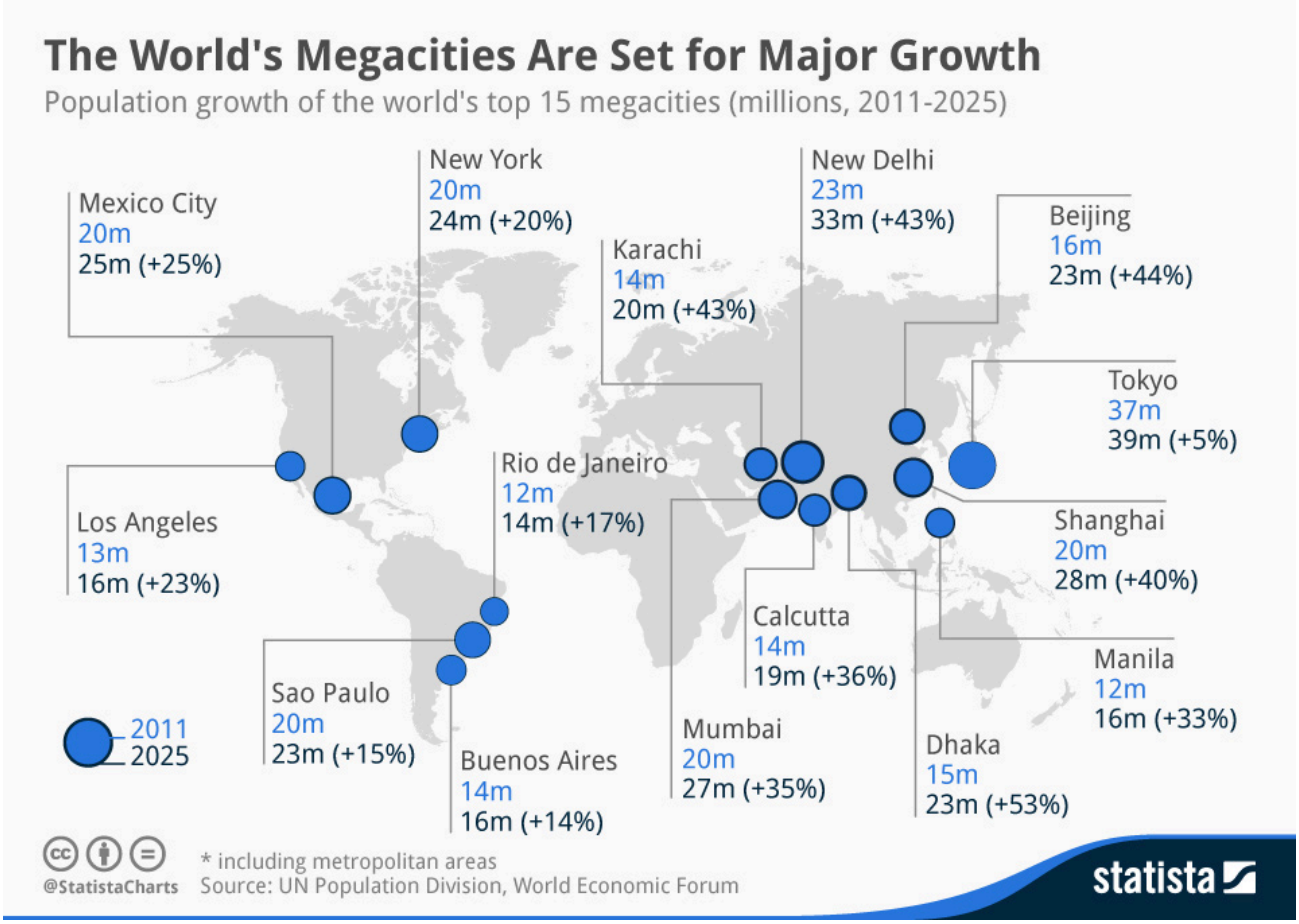


Figure 6.3: Map of World Megacities and Projected Growth (© StatistaCharts, CC BY-ND)

As cities have grown, they've also become a bit more difficult to define. If I asked you, "What is a city?" what would you say? Perhaps a built up area. Or an area with lots of businesses. Maybe you'd say it's the CBD. But exactly how big is big enough to be called a city? How many businesses is enough, and what if businesses are located *near* the city but not *in* the city? And how much of the area around the CBD does the city include? There are lots of different ways of defining a city and many of these definitions overlap. Have you ever seen a road sign stating "Now leaving" a certain city, and thought to yourself, "I'm pretty sure I'm still in that city…"? These city limit signs refer to the defined boundaries of a city. Within the United States, this is the boundary where the local government has control (including taxation, regulation, and services.) Outside of the city limits are typically unincorporated areas, which might be administered as part of a county or state.

But the legal and administrative boundaries of a city don't often correspond exactly to where people actually live and work. Very often, people live just outside the city boundary but may commute for work. Businesses similarly may locate near a city to take advantage of its proximity to markets and workers but not be located within the exact city limits. Thus, it is often more helpful to think about "urban areas" rather than the strict boundaries of a city. An **urban area** includes a central city and the developed region surrounding it. The United States Census

specifically defines an urbanized area a region with a population of 50,000 or more people, and an urban cluster referring to an location outside of an urban area that is home to 2,500 to 50,000 people.

Even urban areas, though, don't capture the entirety of a city's impact on the surrounding region. Workers may live outside of an urban area, but still be close enough to commute to the city for work. Thus, the U.S. Census created a specific designation known as a **Metropolitan Statistical Area**, or MSA, to more precisely capture the boundaries of a city and its impact on the larger region. An MSA contains at least one urbanized area, as defined above, the county where the urbanized area is located, and surrounding counties where a high percentage of residents commute to the central area for work. Micropolitan Statistical Areas are similar but apply to urban clusters. As of 2020, there were 384 metropolitan statistical areas and 543 micropolitan statistical areas in the United States (see **Figure 6.4**).

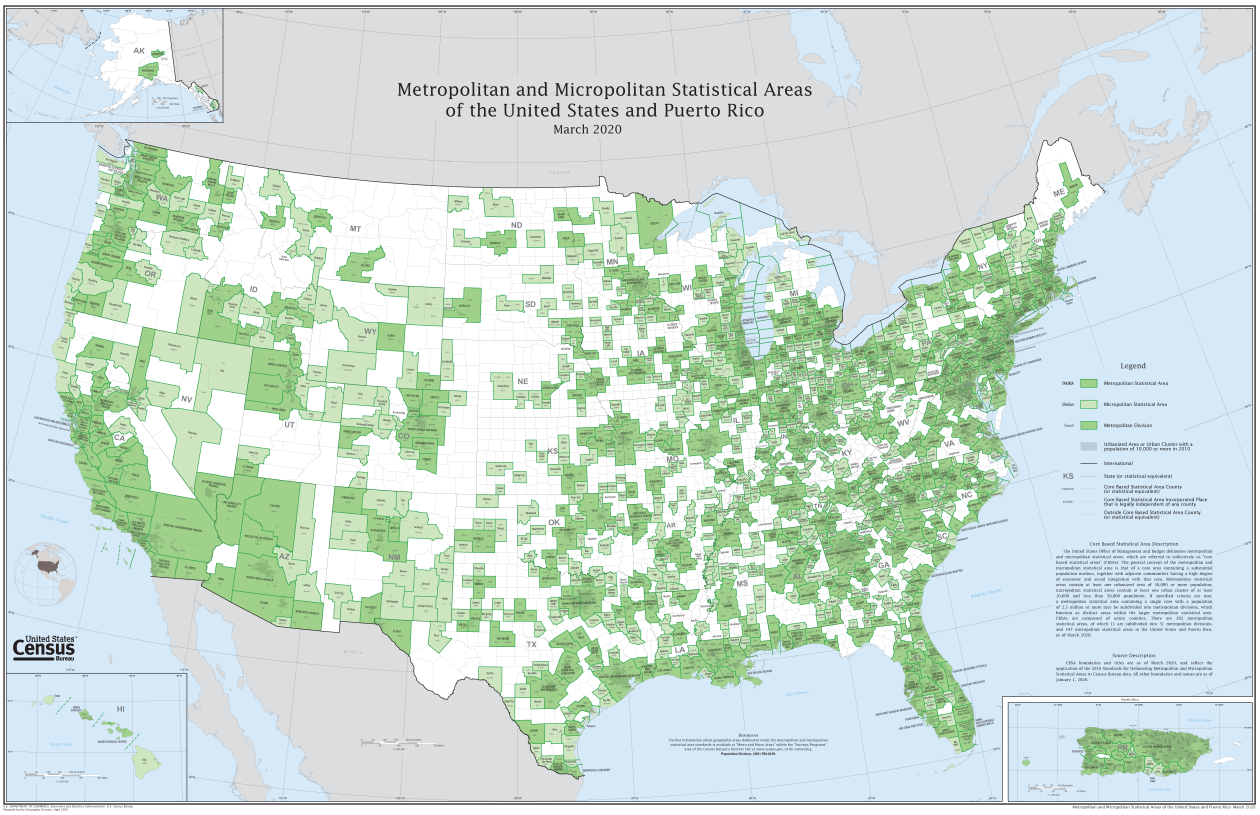


Figure 6.4: Map of Metropolitan and Micropolitan Statistical Areas in the United States (United States Census Bureau, Public Domain)

How do all these definitions actually work in practice? As an example, the city of Charlotte, North Carolina, is home to over 885,000 people living within its city limits. However, many people live just outside of the city and commute for work, so over 1 million people live within Mecklenburg County as a whole. But Charlotte is so big and built up that its reach actually continues outside of its county boundaries, with people living in the counties surrounding Mecklenburg and commuting to the county. Thus, the boundary of the larger metropolitan area

(known as the Charlotte-Concord-Gastonia MSA) extends far beyond Mecklenburg County – and reaches so far, in fact, that it actually extends over the border into neighboring South Carolina (see **Figure 6.5**).

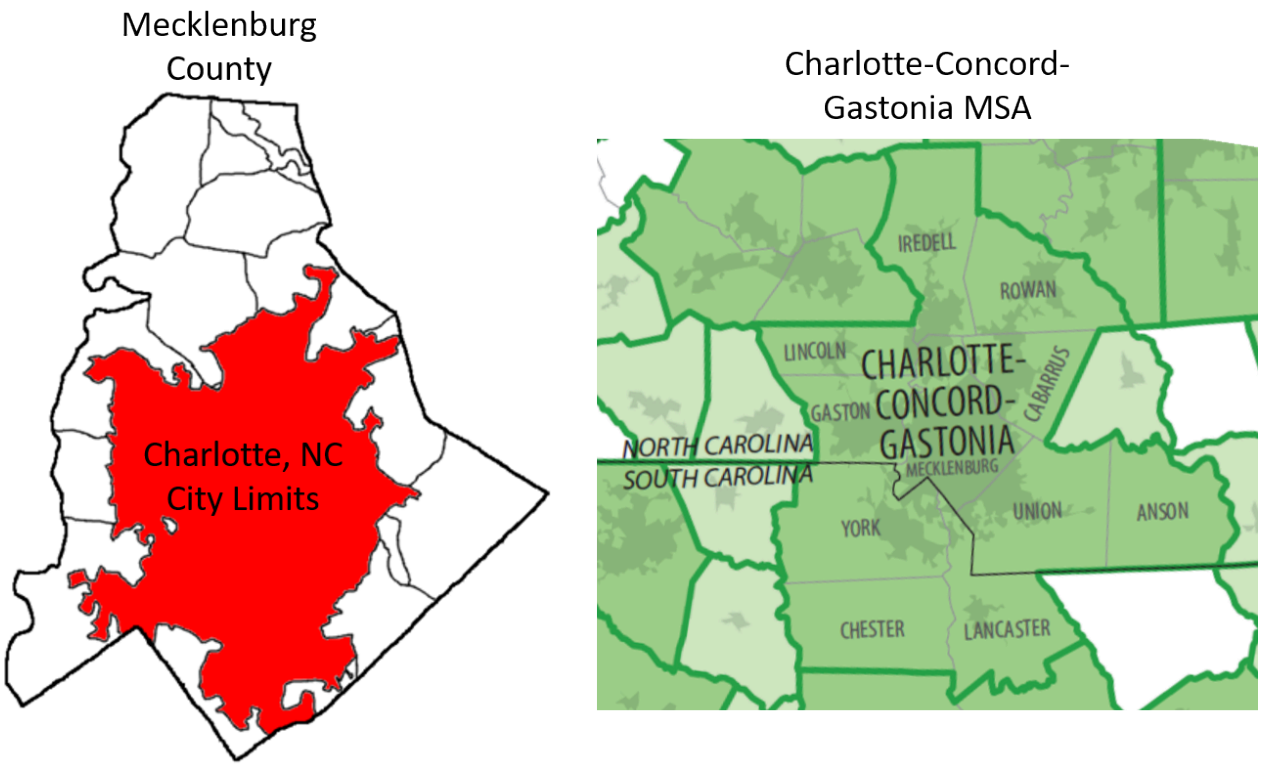


Figure 6.5: Comparison of Charlotte, North Carolina City Boundary, County Boundary, and MSA (Figure Adapted by Author, Originals by User: SoundGod3, Wikimedia Commons, CC BY-SA 3.0 and United States Census Bureau, Public Domain)

In fact, there are a number of cities around the world that have grown so large that they overlap with other large cities. This is called a **megalopolis** and they are relatively easy to spot using nighttime satellite imagery (see **Figure 6.6**). If you've ever traveled in the northeastern United States along the Interstate 95 corridor, you've likely run into considerable traffic at times (or the entire time) and noticed a relatively continuous built-up area. This megalopolis stretches from the Northern Virginia suburbs of Washington, DC all the way to Boston. It is the most populous megalopolis in the United States with over 50 million residents. The most populous single metropolitan area in the entire world is the Tokyo metro area, with over 37 million residents. It is part of the Taiheiyō Belt megalopolis, also known as the Tōkaidō corridor, stretching along the Pacific coast of Japan from Fukuoka to Tokyo. Over 74 million people live in this region.

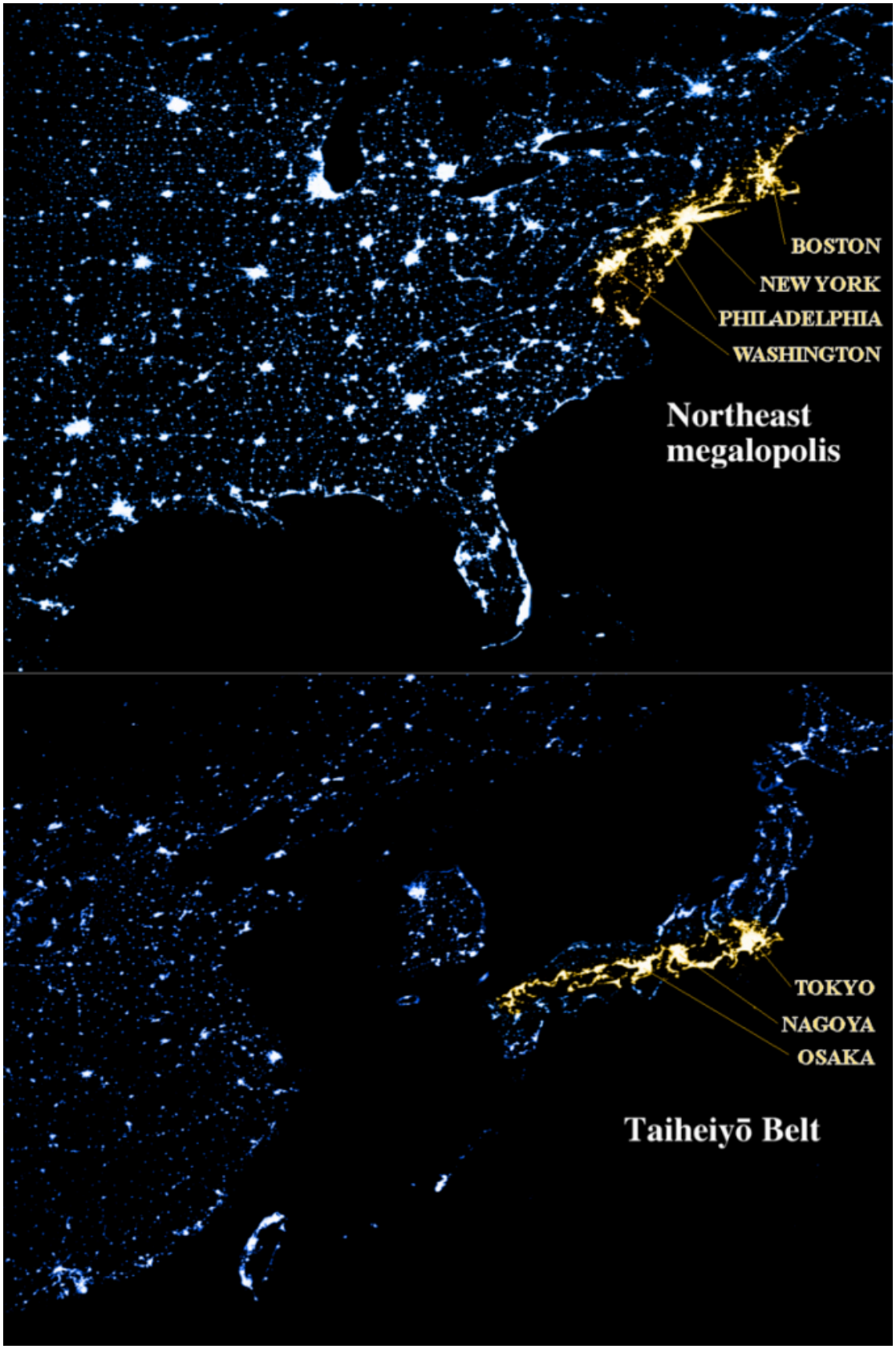


Figure 6.6: Satellite View at Night of the Northeast Megalopolis in the United States and the Taiheiyō Belt in Japan (NASA, Public Domain)

Today's modern, sprawling cities have also spawned new forms of development – and have been accompanied by new challenges. At the beginning of the chapter, you were asked if you wanted to live in a rural area, with more space between you and your neighbor and less housing density, or in a city, with a higher density and more amenities. Throughout the past several decades, however, people have answered that question with, "Can I have both…?" and have chosen to live in suburbs. Suburbs are areas just outside of cities or towns that aim to offer the best of both worlds for residents – proximity to the city for work or education or entertainment, and lower housing density for more affordable, larger homes. Over half of the population of the United States describes their neighborhood as "suburban." Suburban communities essentially offered the lower cost housing of rural areas, with larger lot sizes and more space between neighbors, and the close proximity to urban areas, usually near major highways or transit lines. For some, suburban communities also promised lower crime rates than central cities. In addition, since property taxes fund school systems, the stable, relatively high property tax bases of the suburbs tended to support better schools compared to cities, which may have some high income residents but also many lower income residents.

Suburbanization, though, led to a number of distinct challenges. One is sprawl. **Urban sprawl** is essentially just what it sounds like; it refers to the unrestricted growth of urban areas over large tracts of land (see **Figure 6.7**). "So what?" you might say. "The United States is huge! Why shouldn't we spread out?" While the U.S. does have a relatively large land area, the sprawling pattern of the suburbs and the increasing distance from the city center makes transportation planning quite difficult. Imagine you were planning bus lines in a city where most workers commute to and from the central business district. You would likely set up the transit lines in a nodal arrangement, with the CBD as the central node and lines extending outward – and this is how most city's transportation systems were historically arranged. But how do you develop bus and rail lines when there are many disconnected neighborhoods far from the city center, and workers might work in all different regions of a sprawling urban area? This becomes much more difficult.

Figure 6.9: A Sprawling Suburban Community near Dallas, Texas (© La Citta Vita, Flickr, CC BY-SA 2.0)

It also points to a larger process that has occurred in urban areas and that is **urban decentralization**. When cities were first developing, most of the goods and services were exchanged in the CBD, and thus most people worked in the center city. If you've ever talked to an older, longtime resident of a city, they might recall when the downtown had numerous department stores or a factory. The central business district was very much the *central* business district. Now think about your hometown or a city you've lived in. What is the CBD like today? Or put another way, if you needed to shop for clothes or wanted to buy an appliance, where would you go? Your CBD might still have small clothing stores or a family-owned appliance shop, but it's increasingly likely that you'd shop at a large mall or superstore outside of the CBD. As these stores have moved away from the CBD, it's led to decentralization. Our jobs, too, have decentralized as a result of deindustrialization. When industrialization was driving the growth of cities, factories tended to locate relatively close to the city center, in close proximity to workers' homes. Now, though, people in developed countries tend to work in more service-oriented jobs and the relatively higher cost of land near the city center led businesses to locate farther away. Furthermore, if more and more people are living in the suburbs, a business wanting to be closer to workers might choose to locate nearer to the suburbs rather than nearer to the center city. Think about closest city to where you live and where most people work. Are these businesses located in the historic "downtown" area or near the outskirts of the city? These processes have dramatically changed the way our cities are structured.

6.3 The Internal Structure of Cities

People are not distributed randomly within an urban area. Rather, they tend to concentrate in particular neighborhoods depending on socioeconomic characteristics. Businesses, too, do not locate randomly, but instead tend to cluster so as to be in close proximity to markets while at the same time, minimizing costs. There are a number of models that can help explain this internal structure of cities.

The **concentric zone model** was developed by sociologist Ernest Burgess in the 1920s and was first applied to the city of Chicago. Burgess found that urban land use could be characterized by concentric rings extending outward from the CBD (see **Figure 6.8**). Surrounding the CBD was a ring of factories transitioning into mixed commercial and residential, then a ring of workers homes, a ring of more expensive homes, and finally a higher class ring of commuters. While there are some cities that still resemble this model, advances in transportation technologies and deurbanization has changed our urban landscape considerably. In addition, while this model described historic Chicago quite well, it was less applicable to other cities around the world, particularly cities in Latin America.

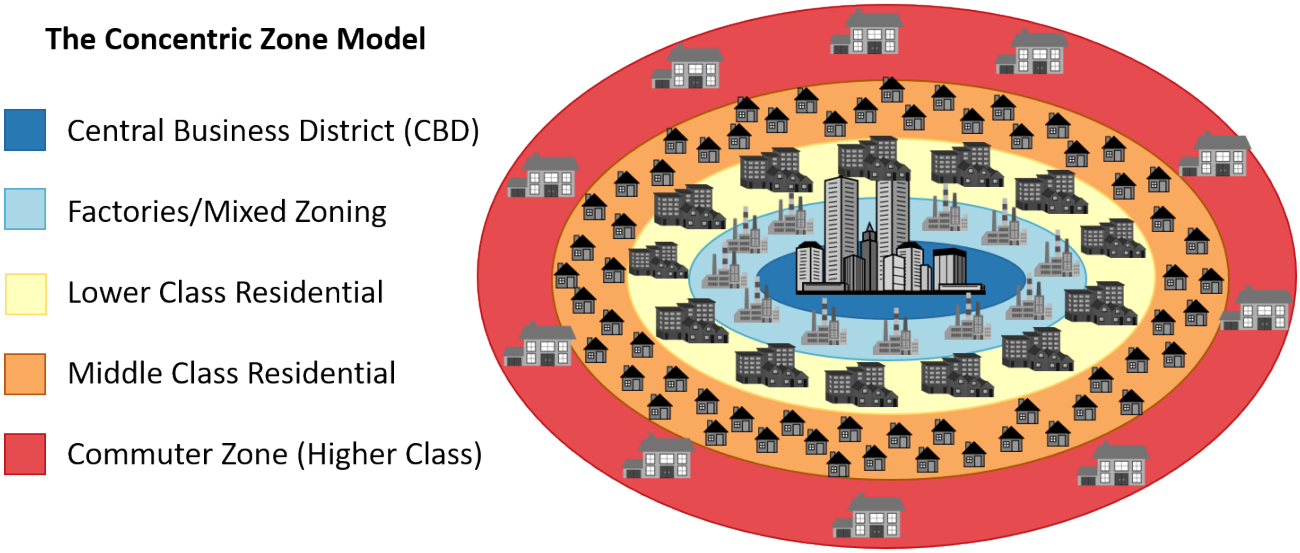


Figure 6.8 (Figure by author)

One key principle behind the concentric zone model is **bid-rent theory**, and you've probably encountered this theory in your own life. Essentially, the theory states that the price and demand for real estate decreases as the distance from the city center increases. Everyone in the city, both residents and business owners, are competing for the same land and the amount they are willing to pay is known as "bid rent." The land that is in highest demand is located close to the CBD, since it offers access to more consumers, and so business owners and residents will pay higher prices to be nearer to the city center. While you might expect to find the poorest housing on the outskirts of the city, it is a trade-off between the size of your home

and proximity to work, and thus we often find very large homes far from the city center, where people can afford to commute, and smaller apartments close to the city where residents can more easily get to work. Think about the places you've lived and home prices or rent costs, and consider how prices change with proximity to the city center.

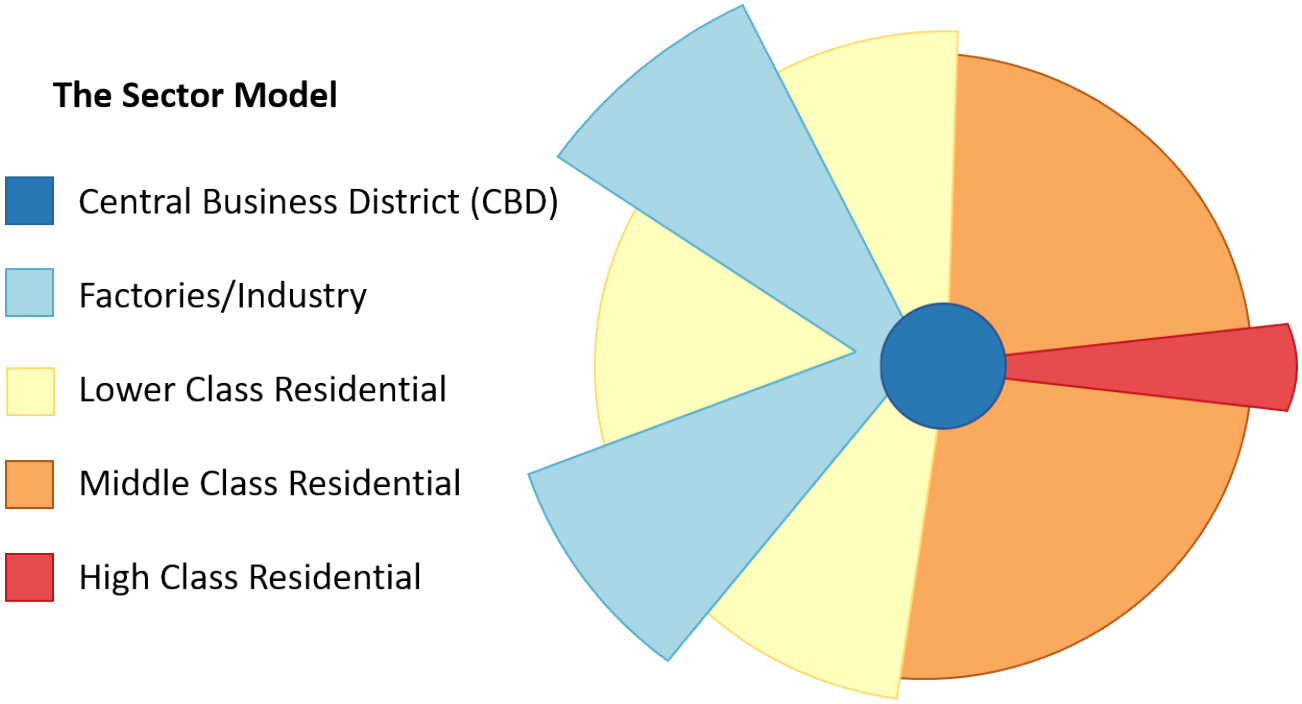


Figure 6.9: The Sector Model (Figure by author)

In the late 1930s, economist Homer Hoyt developed the Hoyt model of urban structure, often known as the **sector model**. In the sector model, zones of development and residences extend outward from the CBD in wedges, like slices of a pie (see **Figure 6.9**). Why would these wedge-shaped corridors develop? In the concentric zone model, few people had cars, so most workers needed to live close to wear they worked and factories needed to locate close to markets. As rail transportation developed, factories, businesses, and even residences could locate along to rail and streetcar lines.

As cities continued to expand, and as cars became more prevalent, the internal structure of cities shifted. Urban decentralization in particular meant that cities had not just one zone of businesses, but often several. The **multiple nuclei model** was developed by geographers Chauncy Harris and Edward Ullman in 1945 to describe a city that has nodes or nuclei of smaller CBDs on the outskirts of a city (see **Figure 6.10**). This more complex model helped explain how each smaller CBD would spur growth around it, and how clusters of industry or light manufacturing might develop away from the city center. Harris also created a revision of the multiple nuclei model known as the galactic, or peripheral, model. In this model, a circular highway surrounds a central city and its residential suburbs and various shopping areas and industries are positioned along the ring of highway, looking a bit like planets orbiting a central star (hence the name of the model.)

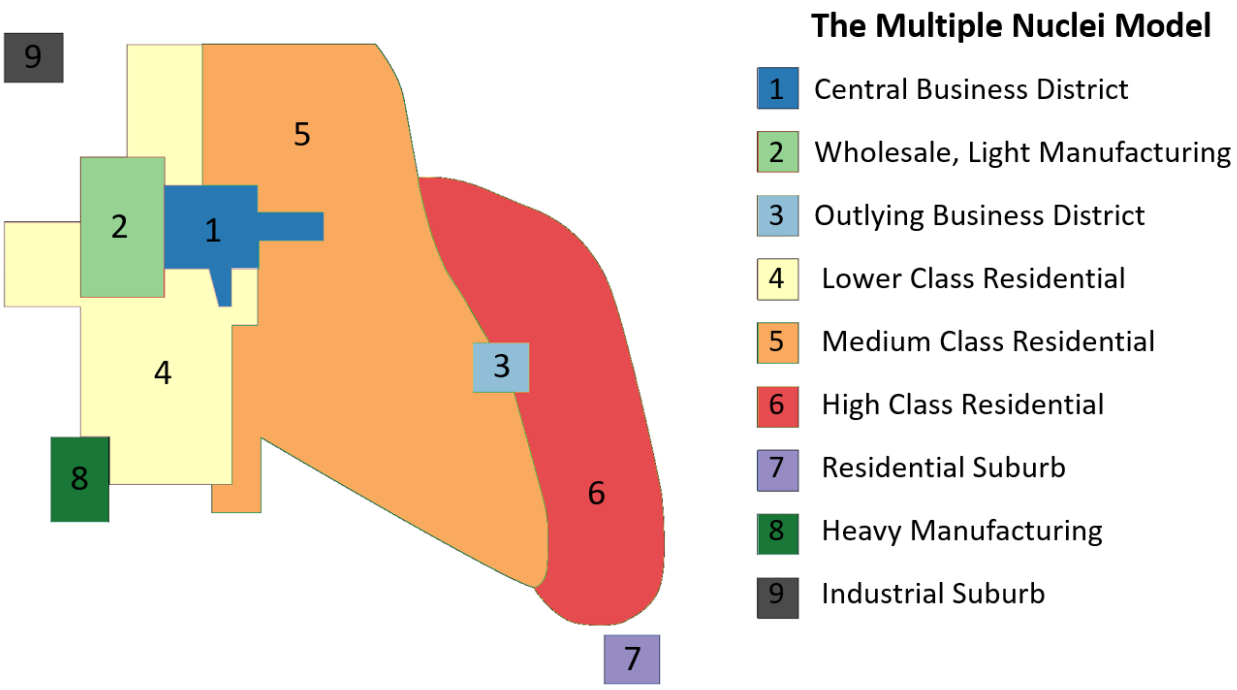


Figure 6.10: The Multiple Nuclei Model (Figure by Author; Derivative work of 11gardir and SuzanneKn, Wikimedia Commons, Public Domain)

So which of these models is most accurate? It depends on the city. Some cities do seem to have concentric rings of development, though the rings might be different from the ones theorized by Burgess. Other cities have wedge-shaped corridors of development, and these wedges might even align with more modern forms of transportation like interstates or highways, or even high-speed rail lines, so they look similar to the model developed by Hoyt. Still other cities have several clusters of businesses outside of the traditional city center, so they look more like the model created by Harris and Ullman.

Furthermore, all of these models were created by American geographers largely describing cities in the United States. In other parts of the world, we find very different city models. In Southeast Asia, for example, we often find cities that extend from a port zone, reflecting a city structure that was historically centered around exports. Connected to the port zone might be wedges of development such as a commercial zone, and rings of residential developments. Similarly in Latin American cities, we find wedges of commercial, shopping, and higher class residential developments as well as rings of middle class homes and lower class residences. In many African cities, there are clear remnants of colonial development. African cities often have multiple CBDs in the center city: a colonial CBD with a rectangular street network, a traditional CBD with narrower streets and small shops, and a market zone filled with open-air markets. Surrounding the center city are often rings or sectors of manufacturing and ethnic neighborhoods. Ultimately, it's less useful to try and generalize all American cities or African

cities with one model. Instead, it's a better exercise to simply examine the structure of a city or a few cities within a region and look for patterns. Do most cities seem to have rings of development? Are most cities centered around ports? Where do the wealthy residents live? The poorest residents? Where do most people shop? Are these corridors of development aligned with lines of transportation? These are important questions to consider as human geographers.

The process of suburbanization and urban decentralization has also created new forms of land use such as edge cities and exurbs. **Edge cities** are urban areas that have a cluster of businesses, shopping, and entertainment located outside a traditional CBD. You can see how edge cities might emerge by examining the multiple nuclei or galactic city model. Essentially, as suburban communities develop, a few key businesses may wish to locate near these residents. Then, maybe a grocery store or shopping area opens up. The suburb continues to grow and eventually a larger business or shopping mall opens. Eventually, what was once a small suburb of people commuting to the central city for work has become its own little (or not so little) city – and businesses may even choose to locate here to be closer to workers rather than locating in the traditional city center. Some of these suburban developments grow so fast, they are known as "boomburbs," and their populations may eclipse those of the central city. **Exurbs** may also emerge that are considerable distances away from the city center, often in more rural areas, but near enough to transportation lines such as highways so that residents can commute for work. These areas have lower population densities and, unlike edge cities, offer fewer services and amenities.

6.4 Urban Transportation and Infrastructure

If you wanted to get to school, and did not own a car, how would you get there? Are you within walking distance or could you ride a bike? If you could walk or bike in theory, would it be a safe journey, with sidewalks and dedicated bike lanes? What if it's located farther away – is there a bus or other mass transit route that could connect you? As mentioned, the increase in suburbanization and urban decentralization has made developing urban infrastructure difficult.

The United States is heavily car-dependent, with 91% of people commuting to work using personal vehicles, according to the Bureau of Transportation Statistics. The vast majority of daily trips, 87%, are also completed using personal vehicles. But who pays for the roads personal vehicles use each day? Around half of U.S. road spending comes from fees directly paid by drivers, such as gas taxes, tolls, and so on. The rest comes from general tax dollars. Thus, the U.S. government encourages the use of personal vehicles through subsidizing its costs. The extensive investment in roads, and the creation of interstate highway systems, dramatically changed our urban landscape. In the 1950s and 60s, the building of the new Interstate Highway System in the U.S. ultimately displaced many communities within central cities, disproportionately impacting Black residents. Some highways cut right through the middle of neighborhoods, disconnecting areas from each other. Furthermore, the highway system privileged some cities while marginalizing others. If you travel along historic highways

in the U.S., you can see many old motels and restaurants, some that have since been abandoned. For cities along Interstate Highway routes, however, you might see exit areas bustling with development. To try and address some of the detrimental effects of urban highway construction, some cities have called for their removal and relocation. The Embarcadero Freeway in San Francisco, California, for example, was demolished and instead a multi-use transit route was created with both automotive traffic lanes and a street-car line (see **Figure 6.11**).

Figure 6.11: Site of the Former Embarcadero Freeway in San Francisco, California (© Miia Sample, Flickr, CC BY-SA 2.0)

Some cities developed mass transit systems as more sustainable ways to move workers around an urban system, and a way to ensure that residents without cars would still have access to goods and services. Mass transit is less harmful to the environment than private vehicles, with cars emitting far more carbon monoxide and volatile organic compounds than public transit vehicles. When cities were more nodal, with most development in the central business district, these mass transit systems were able to efficiently bring workers into the city center at the beginning of the day and return to their homes in the evening, but their development has

often not kept pace with urban decentralization and sprawl. Often, residents must switch trains or buses multiple times to be able to reach their final destination. Another challenge with mass transit is that ticket prices, as with gas taxes and toll expenses, do not fully cover the cost to operate. However, raising ticket prices would ultimately mean that those low income residents who are in most need of utilizing mass transit will not be able to use it, and overall ridership will decrease as the cost to ride increases.

Within the United States, public transit systems are often difficult to get to without walking or driving first, buses and trains are often infrequent (so if you miss one, you have to wait a considerable amount of time), and hours may not coincide with when people need to travel. Comparing this experience to public transit in Europe, you'll find that new cities and suburbs often developed around mass transit stations (rather than along highways as in the U.S.), so thus the mass transit lines were built *first*, and then residences and businesses followed. This model is far more cost-effective than trying to re-route existing transit lines to serve new suburbs. European public transit, and public transit systems in most other parts of the world, is generally far more frequent and available at longer hours than in the U.S. In addition to extending hours and adding trains, another strategy to make better use of existing mass transit lines is to invest in more feeder buses that can connect neighborhoods to existing transit stations.

Developing sustainable urban infrastructure is more than just transportation, however. Cities are increasingly encouraging green building or green construction, meaning constructing buildings in an environmentally responsible way. These buildings might include more energy-efficient lighting systems, efficient water systems, and systems for reducing waste. Sustainable urban infrastructure also includes things like greenspaces and parks. While you might view these simply as nice amenities, they can also serve important purposes, such as holding water and preventing flooding during rain storms, and improving urban air quality. Even within the area of transportation, cities are turning to building more walkable communities and ensuring that new road construction includes dedicated bike paths or mixed-use trails.

6.5 Urban Challenges

Our rapidly changing, often sprawling urban landscape has brought about considerable challenges. Perhaps the most significant issue globally is that the rapid rural-to-urban migration that occurred within many developing countries has not kept pace with urban housing. Globally, around 1 billion live in slums, an astoundingly high number that is a direct result of rapid urbanization and population growth (see **Figure 6.12**). Those who live in slums are often known as squatters, meaning they do not own or pay rent on the land they occupy (known as "squatting.") Slums reflect a lack of affordable, low income housing and while the specific features of slums vary around the world, they typically have a lack of or inadequate public infrastructure, to include clean drinking water and sewer services. Slum areas used to exist within the United States and Europe as well, but affordable mass transit systems and investments in public housing largely eliminated larger slums in more developed countries. The

United Nations has made it a goal to provide access to adequate, safe, and affordable housing and provide basic services for all people by 2030, though this will take considerable planning and investment.

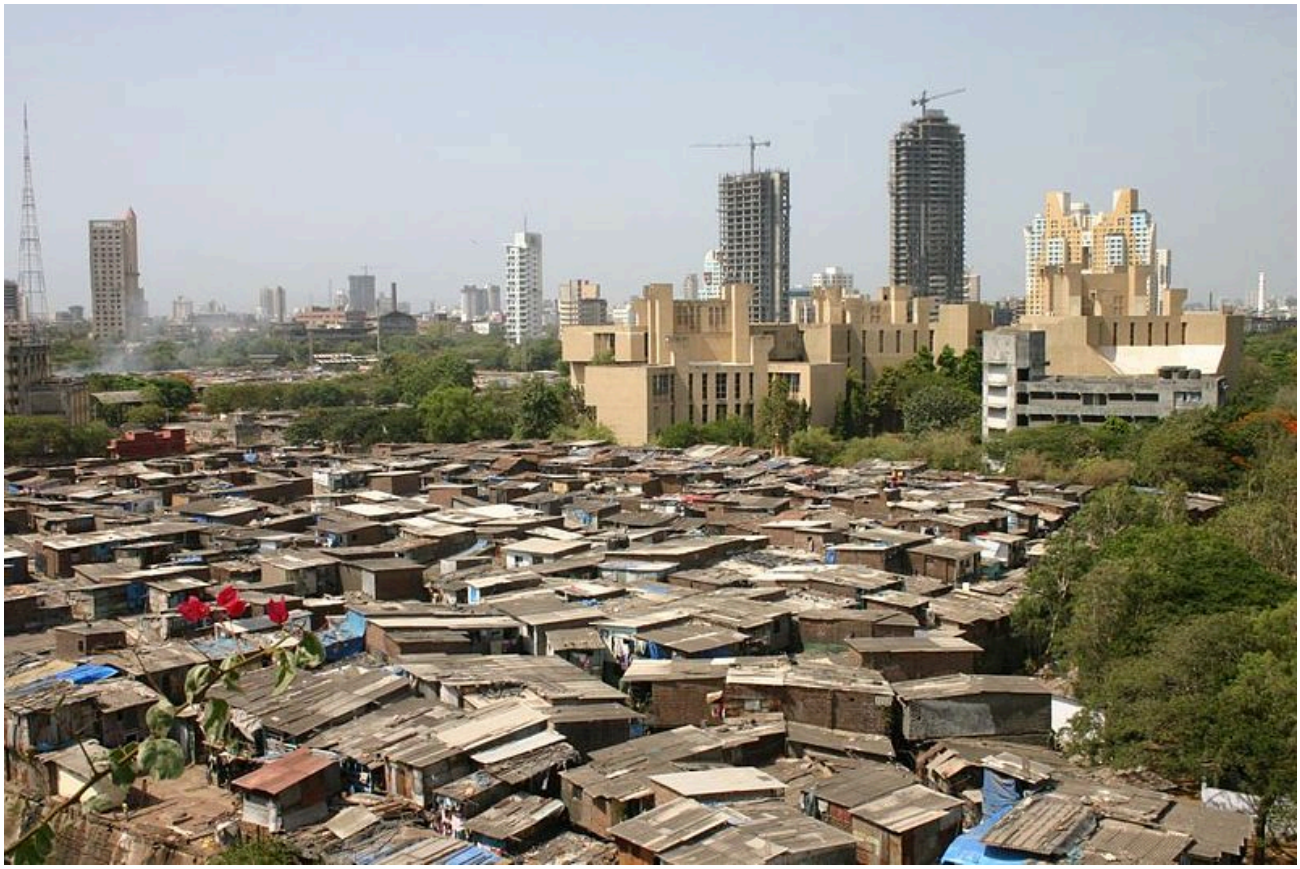


Figure 6.12: Slum in Mumbai, India (© Sthitaprajna, Flickr, CC BY-SA 2.0)

One unique way to ensure urbanization keeps pace with the development of affordable housing is to slow the process of urbanization itself. Bhutan, for example, has taken an approach that seeks to prioritize gross national happiness (GNH) over economic growth. Think about why so many people flock to the cities. They are generally in search of economic opportunities and access to more services, right? Well, what if a country could provide some of those services and ensure economic prosperity to those living in rural areas? And what if a government planned urban development in a decentralized way, to prevent all of the economic activity (and migration) from being centered on a single urban area? Bhutan's government has taken this approach, aimed to create a more sustainable path to urbanization.

More broadly, this notion of intentionally planning for the growth of cities can be termed "smart growth," in contrast to the sprawling urban developments that would otherwise occur unchecked. With smart growth, a city has well-defined boundaries, a mix of residential and commercial buildings, and a focus on reducing the need for cars through sidewalks, bike lanes, and affordable public transportation. Smart growth is beneficial to lower income workers

because it reduces the need for cars and the expense of commuting. It also reduces greenhouse gas emissions significantly.

A lack of affordable housing is not limited to developing countries, however. Even in the United States today, well over half a million people on average are homeless on a given night and around 1.5 million children experience homelessness each year. Rents for low wage workers can often far exceed wages in urban areas, and as mentioned, access to public transit systems outside the central city may be limited. Most researchers agree that rapid re-housing for homeless people, providing permanent housing quickly, is critical as it provides a better position to then address other issues, such as securing more permanent employment, but that connections to community resources are also needed, such as education and training, mental health support, and job placement assistance.

Another challenge facing many central cities has resulted from urban decentralization, and the loss of both businesses and residents to more affluent suburbs. This has left inner cities with significant problems to overcome – and a reduced tax base from which it can invest in its citizens. Inner city schools, supported by sometimes dwindling property taxes, are often perceived as lower quality compared to higher funded suburban schools, further spurring higher income residents to leave the central city and move to the suburbs. However, standardized test scores, which are generally used to determine school quality, have been shown to be more a reflection of a student's family and neighborhood than the teachers or school themselves. Thus, a student attending an urban school from a lower income family where neither parent attended college will not surprisingly tend to score lower on a standardize test than a higher income peer in the suburb whose parents both have college degrees.

Racial disparities in cities can be significant, and this is not just a modern issue. In the United States, the Federal Housing Administration was established in 1934 and refused to insure mortgages in or near African American neighborhoods while at the same time, subsidized the cost of building homes in subdivisions that were exclusively for white residents. These types of policies are known as **redlining** and in the U.S., they continued for decades. When many Americans see the segregation that is apparent on our urban and suburban landscape, they are often unaware that this segregation was explicit policy until relatively recently. Aggressive policing policies, too, have led to mass incarceration within U.S. cities that, coupled with high poverty rates, has had a significant impact on economic mobility.

Sometimes, a reverse of the suburbanization trend occurs, and large numbers of people move back to the central city areas, particularly in areas where housing had deteriorated and property values have fallen. Residents are able to buy these properties cheaply and renovate them. This process, where the character of a neighborhood changes as more affluent residents and businesses move in, is known as **gentrification** (see **Figure 6.13**). Cities generally support gentrification because it provides an increase in income and can spur ripple development and investment, and rising property values means increased property taxes for city governments. So what's the problem? Renovated homes, lots of new businesses, rising property taxes – what's not to like? Remember who were living in these homes prior to gentrification. These lower-priced homes were generally occupied by the lower income residents in a city, who often needed to be closer to the city center for work. With gentrification, the demand for housing increases, and property values (and prices) increase, generally leading to increases in rent as

well. The more affluent businesses that move in, too, often displace more affordable, locally-owned businesses. Often, low-income residents can simply no longer afford to live in areas that have been gentrified. Gentrification has a racial element as well, as the negative components of gentrification have been shown to disproportionately impact minority communities.

Figure 6.13: A Gentrified Community on 14th Street Northwest in Washington, DC (© Ted Eytan, Flickr, CC BY-SA 2.0

Gentrification itself isn't necessarily the problem, since in theory it could help revitalize a struggling inner city area, bringing in more development, more jobs, and improved housing. The displacement of low-income workers, however, is the critical issue, with these workers generally unable to afford the revitalized or newly constructed housing in gentrified areas and little attention paid to providing affordable housing options. Furthermore, coupled with suburbanization and urban decentralization, affordable housing may only now be located in the distant suburbs, far from the well-connected central city's transit systems. Paradoxically then, those who are in most need of mass transit options are then pushed out to the areas that are least served by them.

As cities continue to grow, change, and evolve, they will continue to face challenges. At the same time, they will likely continue to be centers of innovation, development, and interaction, just as they began. In many places, our world is no longer divided into strictly "urban" and "rural" areas, and cities extend far beyond their official boundaries. Rather, we might consider cities as

part of a larger, more fluid area of urban, suburban, and rural developments. Regional planning efforts will thus be critical in helping to develop sustainable cities that are well-connected with their outlying areas and provide affordable housing opportunities for all their residents.

7. Industry and Development

Learning Objectives

- Describe the key innovations of the Industrial Revolution
- Understand how the features of industry impacts industrial location
- Explain how to measure development
- Discuss the features of the modern global economy
- Identify the characteristics of sustainable development

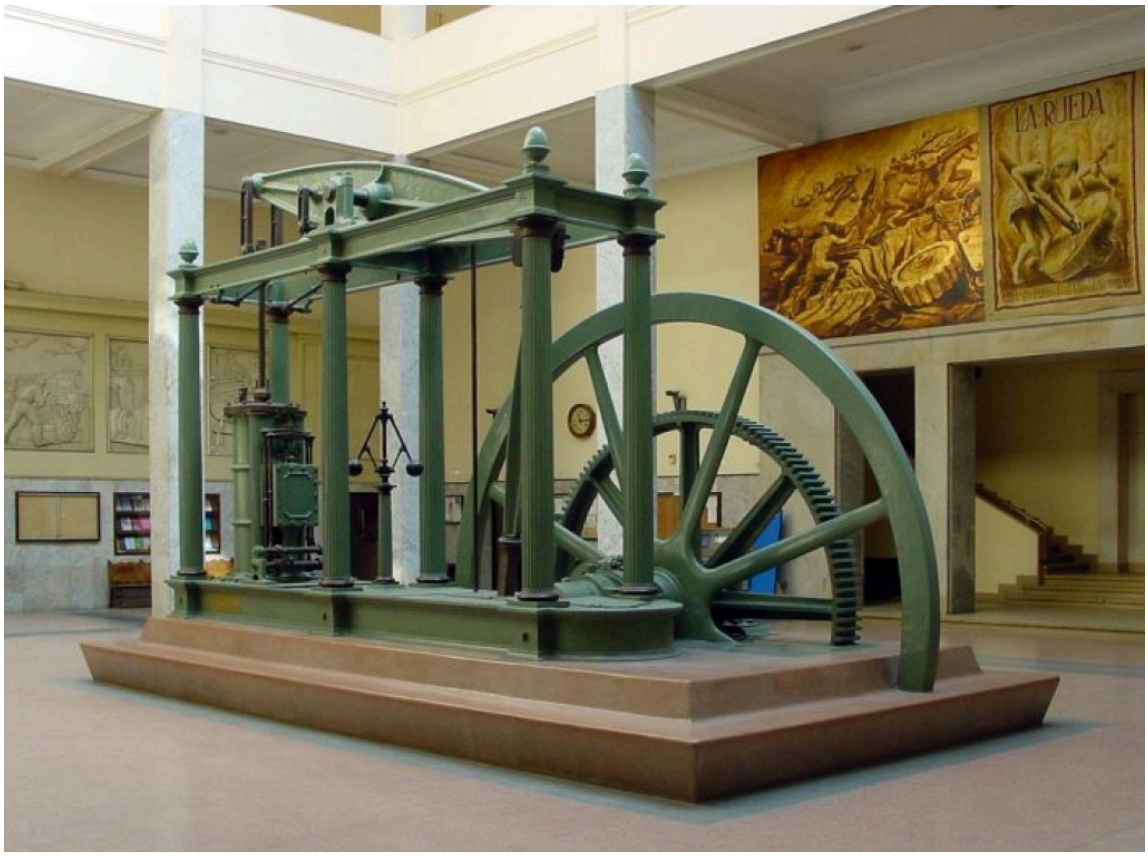
Consider the things you use on a daily basis. Where were they made? If you used a bowl or plate today, did you make it yourself or buy it in a store? Did you weave and sew your own clothing, or purchase it? Where was it made? Most products have a country of origin label on it, and students are often surprised at the great distances the products they use have traveled. You might have a pen from Mexico, a phone from India, a shirt from Cambodia, and a car from Japan. Our world has become increasingly globalized, and this doesn't just affect where we buy goods from, but where jobs are located, what types of development arise in different places, and how countries interact with one another. The Industrial Revolution profoundly changed our human landscape and for many of us, the jobs we currently hold or are working toward only exist as a result of industrial development. This chapter will explore these changes, beginning with the historic causes and changes that resulted from the Industrial Revolution, the patterns of industry found in the world today, and our global economic landscape.

7.1 The Industrial Revolution

How would your ancestors have made the items they needed for daily life? They might have whittled a spoon, forged a knife, or knitted a sock. If they had extra materials, they may have bartered with a neighbor, perhaps trading a handmade scarf for a chair. These types of home-based manufacturing activities were known as **cottage industries**. Even today, cottage industries remain and you can often buy handmade items produced in the home from online marketplaces. For a very long time, this was how all of our goods were produced.

The Industrial Revolution, however, marked a dramatic shift in how we would buy and sell goods. The **Industrial Revolution** refers to a transition to new manufacturing processes

beginning in the United Kingdom from the mid-1700s to the mid-1800s and gradually diffused to the rest of the world. There were a number of technological breakthroughs that occurred to spur a transition from cottage industries to wider-scale, industrial production. Most notably, perhaps, was the invention of the steam engine (see **Figure 7.1**), which not only led to the creation of machines that could be used to replace human labor, but also the transportation of industrially-produced items over vast distances. The creation of the steam engine enabled more, and better, iron production, since steam engines could drive huge blast furnaces and supply them with a steady stream of heat that was necessary for iron production.



7.1: A *Watt Steam Engine, Built in 1832 (© Nicolás Pérez, Wikimedia Commons, CC BY-SA 3.0)*

With this shift to steam engines came a shift in the sources of fuel. Previously, machines often relied on moving water, so a mill would need to be located along a river, for example, harnessing the power of the moving water. Other forms of production that required heat, such as smelting, generally used wood, which had become quite scarce across Europe. The Industrial Revolution led to the transition from wood and other bio-fuels to coal, which was far more abundant.

The transition to steam power also led to the invention of a variety of new machines which were able to replace human-powered devices. Imagine, for example, that you wanted to build a table. How would you shape the legs? You could carve and whittle them down, but this would be very time consuming, or use a device that relied on human power to turn and shape wood (which often required two people, one to spin the wood and the other to shape it.) With the

invention of the mechanical lathe, all sorts of products could be shaped and turned on an industrial scale – and interestingly the mechanical lathe led to the invention of other machine tools, since the lathe itself could help create new machine parts that would have not been able to be produced with human power previously. Other tools like boring machines and planers similarly led to innovations in other products.

Steam engines could also power numerous sewing machines and weavers within one building leading to a complete reshaping of textile manufacturing, which had previously been a cottage industry. Other textile innovations allowed materials to be woven faster, and in larger widths, than ever before, and for yarn to be spun at higher speeds. Before the Industrial Revolution, much of the world's textiles came from India. With the new technology in Britain, however, and British colonial expansion, the power shifted and Britain established cotton plantations in places like the Americas to support its textile operations. In this way, the shift from cottage industries to industrialization, and a focus on mass-producing goods, led to an unprecedented need for resources that often became the focus of colonization.

Finally, industrial innovations were applied to food processing as well. Whereas preserving foods on a small scale was a home-based endeavor previously, in 1810, a Frenchman started canning food in glass jars, which later switched to tin cans, as a way to feed large numbers of people while avoiding spoilage. Canned food spread across Europe, with the British Army and Royal Navy purchasing considerable quantities of canned foods, such as canned beef and soups. The idea that foods could be preserved so long after harvest further fueled industrialization itself, since more and more workers were moving to the cities where they no longer grew their own crops and access to fresh foods might be limited. This more steady supply of food supported a substantial increase in population. In England alone, the population increased from 8.3 million at the turn of the 19th century to 16.8 million by 1850.

Ultimately, though the Industrial Revolution would spread across Europe to the United States and beyond, the fact that so many industrial advances first began in Britain gave it a considerable advantage. The invention of the steam engine, for example, led to the creation of the steam-powered ship, which gave Britain considerable military advantage in defending itself against adversaries and acquiring new territory, and Britain would remain the world's largest manufacturer until the early 20th century, when it was surpassed by Germany and then the United States.

So if the Industrial Revolution happened over 200 years ago, how is it still relevant to modern geography? First of all, when we look at the modern map of Europe, and really more broadly at the map of global development, we see that the industrial powers in the world today still often correspond with the areas that were first to industrialize. The Rhine-Ruhr Valley, for example, located in Northern Germany and stretching into Belgium, France, and the Netherlands, was located in close proximity to coal fields and was a site of significant iron production. Today, this region includes the largest metropolitan region in Germany and has a specialization in finance and high tech industries. Even where areas have shifted, like cities within the Rhine-Ruhr valley, from heavy manufacturing to more high tech industries, they have largely retained their economic dominance.

The Industrial Revolution's effect on the environment was also significant and continues to be a concern. The rise of factory production led to a considerable increase in air pollution. Water pollution, too, intensified, as factories often discharged pollutants directly into rivers and

streams. Even today, the way we often produce goods and travel is largely connected to the burning of fossil fuels – the same resources that fueled our early industrial development.

The Industrial Revolution also brought about an increase in specialization. Consider, for instance, your ideal career. Perhaps it's teaching third grade. Perhaps it's working as a geospatial analyst on national defense projects. Perhaps it's working to alleviate child hunger as part of a nonprofit. Think for a moment about how highly specialized these careers are. Not that long ago in our history, we were basically all farmers. Now we have a tremendous variety of jobs we might hold, and most of these jobs are very narrowly specialized. Particular geographic areas tended to specialize as a result of Industrial Revolution as well, perhaps computer technologies or automobile manufacturing. This specialization gave areas a competitive economic advantage.

Economic prosperity was not universal, however, and some critics view the Industrial Revolution as bringing about broader social changes that were not altogether positive. The rapid rural-to-urban migration spurred by industrialization led to overcrowded slums and unhealthy living conditions, often accompanied by a rapid spread of disease. Furthermore, while these new migrants often found increased employment opportunities as a result of industrialization, they also often faced harsh, sometimes dangerous working conditions and long hours. Child labor was widespread, with children expected to contribute to family's income. However, the expansion of industrialization and increasing size of the working class also led to the rise of trade unions which, despite significant opposition from governments and employers, were able to secure better working conditions and higher wages for employees.

7.2 Patterns of Industry

Industrialization led to the creation of different economic sectors, and very different patterns of development across the world. For much of the time period after industrialization, there were three economic sectors: primary, secondary, and tertiary. **Primary sector** activities involve directly getting raw materials from the natural environment. This might include activities such as coal mining, fishing, or farming. **Secondary sector** activities involve transforming these raw materials into goods. Manufacturing would be considered a secondary sector industry. The **tertiary sector** involves providing a service to businesses and consumers, such as transporting manufactured goods or providing for their sale to consumers. To understand how these sectors work together, a primary sector activity might be logging. A secondary activity might transform this lumber into a chair. A tertiary sector activity would be a furniture store where the chair could be sold to a consumer.

As industries, and our economic landscape, became more specialized and complex, there was an addition of two more sectors to describe the work we do. The **quaternary sector** describes work that relates to information technology, such as computing or research. The **quinary sector** consists of jobs related to high level decision-making, such as government officials and senior managers. Sometimes public services are included in the quinary sector.

It can sometimes be difficult to differentiate between tertiary, quaternary, and quinary jobs

– and in fact sometimes quaternary and quinary activities are considered part of tertiary activities since they are all services – but what is more important perhaps is understanding that countries have a very different mix of these jobs and examining how a country's employment is structured based on these sectors can shed light on the country's development and economy as a whole **(see Figure 7.2)**. In general, less developed countries have a greater percentage of their workforce engaged in primary sector activities. As a country becomes more developed, there is generally a shift to more secondary and then to tertiary activities. Think about what career you are currently employed in or are working toward. What economic sector is it in?

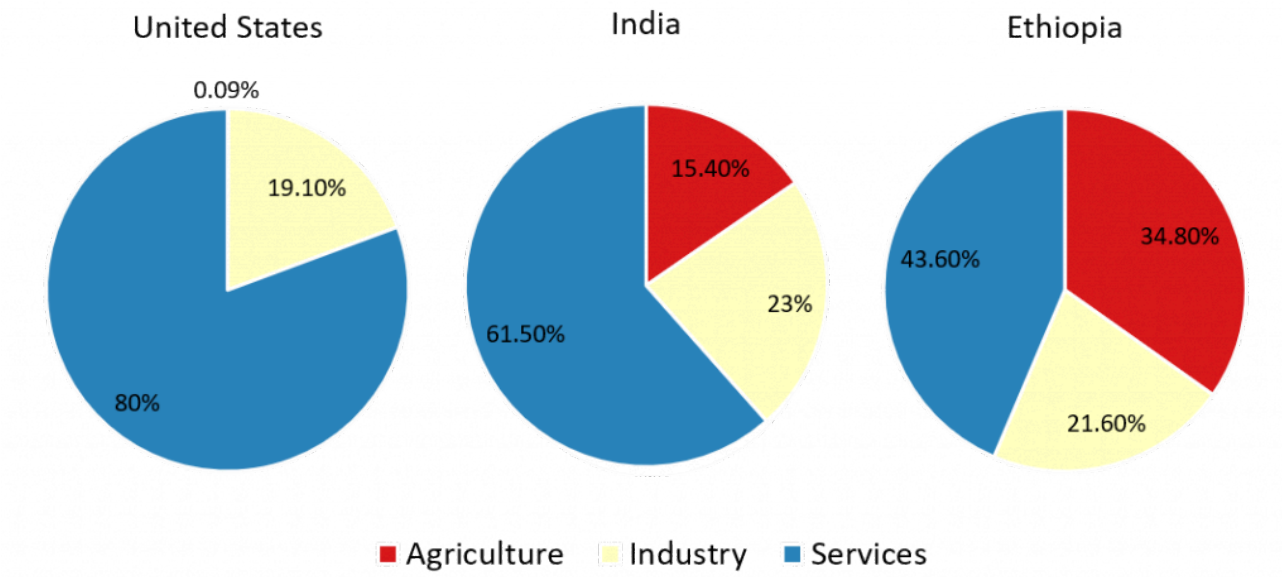


Figure 7.2: Comparison of Economic Sector Employment for the United States (2017), India (2016), and Ethiopia (2017) (Agriculture includes farming, fishing, and forestry. Industry includes mining, manufacturing, energy production, and construction. Data from CIA World Factbook. Figure by author.)

Geographers can also examine spatial patterns of where industries are located and why, and again these patterns differ by country and by geographic situation. Imagine you wanted to build a new factory. Where would you build it? Industries are located where the cost of transporting and producing goods is minimized, an idea known as least cost theory. But, where is it going to be least costly? That really depends on what you're making. Let's pretend you're making wooden chairs, to use our example earlier. If you've ever worked with wood before or visited a lumber mill, you know that wood is really heavy, and while modern milling techniques can maximize the number of boards we can get from one tree trunk, there is quite a bit of waste in the process. These boards are then cut down to the specifications of your chair design and put together before they can be sold to consumers, again adding some waste of wood into the process. It might make sense, then, to locate close to a lumber mill so you minimize the expense of transporting wood to your furniture factory. The lumber mill itself might locate relatively close to a forest to minimize the expense of shipping heavy logs long distances. **Bulk-reducing industries** are those where the inputs weigh more than the finished product.

Another example of a bulk-reducing industry is mining. Copper ore, for example, only

contains about 0.6% to 1% of actual copper – the rest is waste. Thus, smelting facilities where the valuable metals are extracted from the ore are typically located very close to the mine to reduce the cost of having to transport large amounts of wasted material. Utah's Bingham Canyon Mine, where copper is mined, is the largest man-made excavation and deepest open-pit mine in the world (see **Figure 7.3**) and the extracted ore is treated at a smelter a relatively short distance away. Because bulk-reducing industries do just that, they reduce in bulk as they're worked into more finished products, they tend to locate close to the resources used in their production.

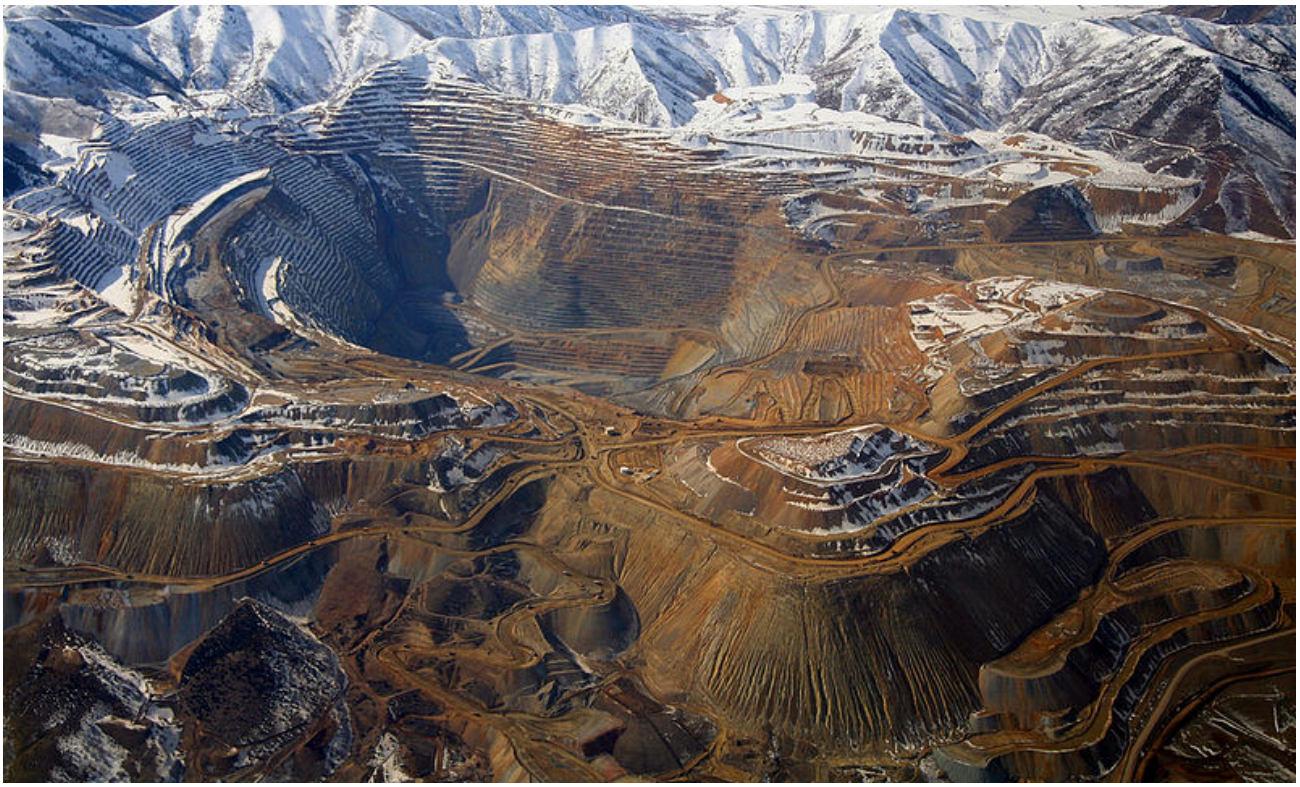


Figure 7.3: Bingham Canyon Mine, Utah (© Doc Searls, Flickr, CC BY 2.0)

Bulk-gaining industries, on the other hand, are those economic activities where the finished product weighs more than the inputs. Can you think of any examples of bulk-gaining industries? Consider products that have a lot of open space inside. Refrigerators are a good example. The individual components like metal and plastic are relatively easy to ship. However, once you put them together, you end up with a very large, and heavy, product. Soda bottlers are another good example. If you've ever worked in a fast food restaurant, you might have encountered boxes of soda syrup. How often do these have to be replaced? Surprisingly infrequently since a relatively small amount of syrup is mixed with carbonated water to make soda. If soda is bottled for sale, the inputs (soda syrup) are relatively light compared to the water it must be mixed with, but water is available anywhere. So where might these industries decide to locate? In general, it would make sense to locate closer to consumers in this case because the weight of the finished product is so high.

Other industries might make a product that is for a single market. Imagine you're making parts for a new car. It would make sense to locate as close to the automotive factory as possible. Many of these industries also practice what's known as **just-in-time delivery**. Just-in-time delivery is exactly what it sounds like – goods are delivered *just in time* to be used and only the goods that are needed are produced. This eliminates costly inventory and it also eliminates the possibility of having items that will not be able to be sold (perhaps with our car example, if a new model comes out that doesn't use that particular part.) A challenge with just-in-time delivery is that the elimination of inventory makes the manufacturer more vulnerable when shocks to the system happen. If there is a natural disaster, weather closing, or labor shortage, there is no extra inventory available to fulfill customer orders. Still other industries might make perishable products, and in these cases, it would be beneficial to locate closer to consumers to reduce spoilage.

Similar industrial developments have also tended to cluster together, a process known as **agglomeration**. What benefits would industries have from clustering together in a single area? Related businesses can reduce costs by sharing facilities or services, reducing transportation costs as complementary businesses seek to locate in close proximity, and take advantage of a large labor market. One example of agglomeration might be large shipyards (see **Figure 7.4**), which often have related firms like engine building facilities and steel mills located in close proximity. Another example, which you may be more likely to have come across, is a shopping mall. Unlike shipyards, the businesses located in shopping malls are not necessarily related, but they benefit from agglomeration because it gives them access to a larger market of consumers. You might have gone to the mall for some shoes, for example, and then decided that it was time for a pretzel. Clustering is not always beneficial, however, and deglomeration, or dispersal, can occur if rent becomes too expensive or an industry becomes over saturated in an area and there are no longer enough consumers to support all of the businesses located there. Shopping malls can similarly be an example of deglomeration as many urban shopping malls have closed as consumer spending habits have shifted.

Figure 7.4: The Puget Sound Naval Shipyard and Intermediate Maintenance Facility in Bremerton, Washington (© Jelson25, Wikimedia Commons, CC BY-SA 3.0)

As industries expand, they can also take advantage of **economies of scale**, where a company is able to decrease the cost per unit of output as it grows. How does this work? Imagine, for example, that you wanted to build a simple wooden chair. What supplies would you need? If you didn't already have carpentry as a hobby, you'd need to likely buy saws and woodworking tools in addition to wood. The cost of this one chair would be quite high. What if you got quite good at it and wanted to make five chairs? The cost to produce each chair would go down. Larger operations and facilities would have additional overhead costs and require additional employees and resources, so economies of scale often has an optimum limit, but in general as facilities expand, they are able to take advantage of their size and reduce the cost of production.

In addition to situational factors, site factors are also important components of industrial location and these include land, labor, and capital. Essentially, these factors relate to the costs of production inside the plant itself. Labor-intensive industries are those where a high proportion of expenses are spent on wages paid to employees. This is not to say that employees make a high wage in labor-intensive industries, but rather that wages, compared to other costs of production, represent a considerable expense. What industries would you consider to be labor-intensive? The textile industry is a good example. Sewing and other tasks within textile production is best done by people, as opposed to robots or some automated method, and it

requires a lot of people to manufacture textiles on a large scale so this is considered labor-intensive. The cost of land can be a considerable expense when opening a new factory, but in areas where land is plentiful, an industry might consider other features, such as proximity to a low-cost energy source like hydroelectric power. Capital costs can similarly be considerable when building a new facility. Government or finance industry initiatives to try and lure new developments can help reduce capital costs.

But once you decide on a location for your industry, how do you actually get your product to consumers? Industries transport goods by essentially the same ways we could travel: boat, rail, truck, or air. Generally, a company seeks the cheapest option, but that also depends on the good itself. For example, it would be cheaper, in theory, to ship asparagus by boat since this is generally a lower cost delivery method per mile. But asparagus is highly perishable and so very little of it would be edible by the time it reached its final destination. With a few exceptions, like asparagus and some berries which are sent by air, most food is transported by boat (see **Figure 7.5**). In fact, the majority of goods transported worldwide are transported by ships.

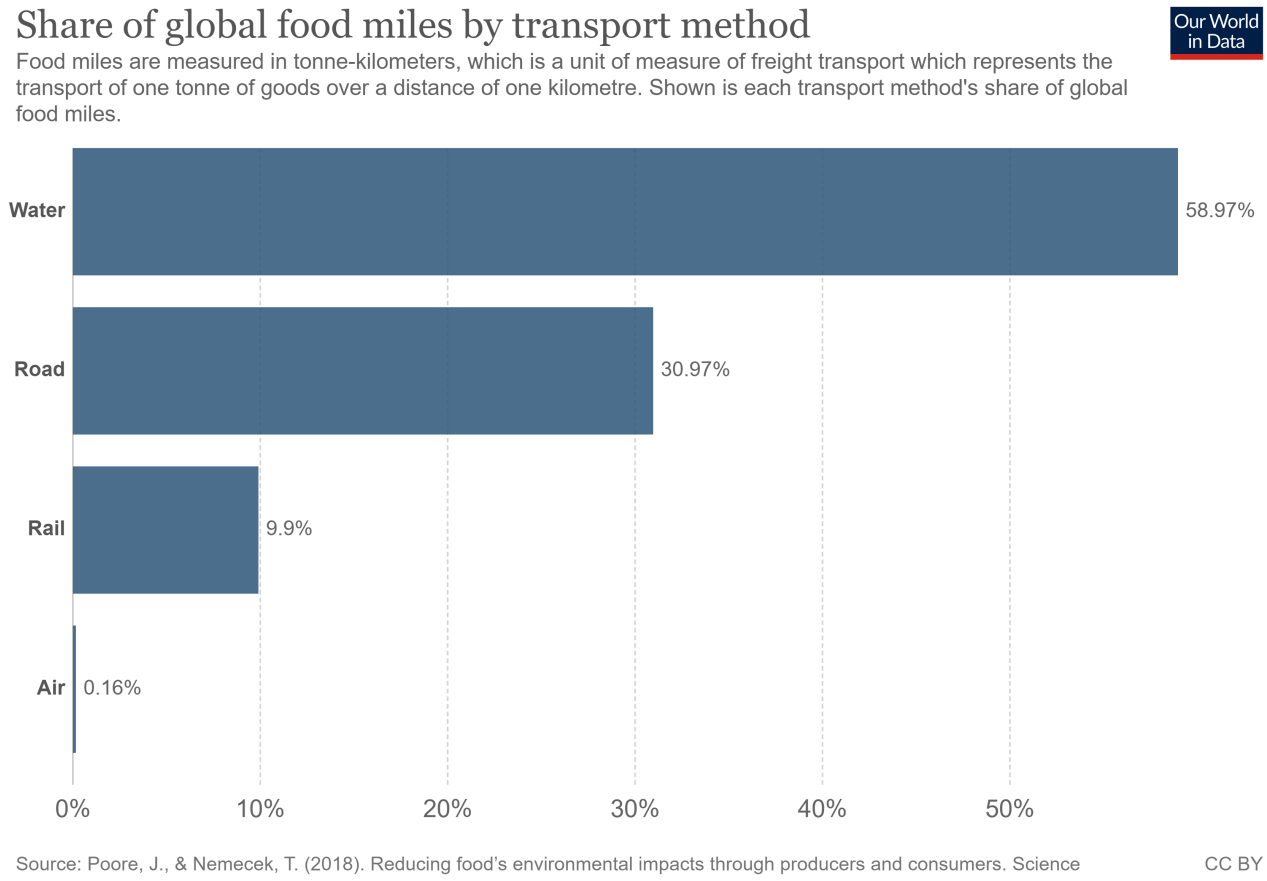


Figure 7.5: Share of Global Food Miles by Transportation Method, 2018 (© Our World in Data, CC BY)

Commonly, shipping containers are used as they provide a standardized way to transport a large amount of goods a long distance. Shipping containers can be efficiently stacked on large cargo ships and then moved to trains or trucks. Where goods transition from one

transportation method to another is called a **break-of-bulk point**. Break-of-bulk points, as the term implies, break down bulkier cargo deliveries into smaller units. This is where a large container ship offloads the individual containers, perhaps to the back of a truck which can then take the goods to the next destination (see **Figure 7.6**). The next time you get a package in the mail, see if it has a return address on it or is stamped with its location of origin and consider the journey that product took to get to you – and why the production facility was located at that particular place.

Figure 7.6: Port of New Orleans, Louisiana (© Gnovick, Wikimedia Commons, CC BY 3.0)

7.3 Measuring and Analyzing Development

Industrialization dramatically changed our human landscape and spurred considerable development, but this development was not evenly distributed. How do we measure and compare development across our world? First of all, when we say "development," what do we actually mean? Often, people equate development with economic development, such as the level of income or industrial output. **Gross domestic product**, or GDP, is one way to measure a country's economic development and it was commonly used historically. GDP measures the amounts of goods and services produced within a country in a given year. Can you think of any

limitations of measuring GDP? What about goods and services that are produced for a country but not *within* a country, such as goods or components produced overseas by an American company? **Gross national product**, or GNP, includes the value of the national output produced by a country, just as with GDP, but also includes investments made by residents and businesses both within and outside of a country. **Gross national income**, or GNI, is perhaps the most common measure of economic development today. GNI includes the total income earned by residents of a country regardless of whether that income is earned domestically or abroad. The World Bank classifies a country's level of development based on its GNI, and in general GNI does tend to correlate with other areas of development within a country. One statistic you may come across is "GNI per capita, PPP" and this simply means the gross national income of a country per person in terms of purchasing power parity, how much a country's currency can buy based on an international benchmark (which accounts for the fact that goods and services have different prices in different countries.)

But is income the only way to measure a country's level of development? What else could be included? What about social factors, such as education and literacy? And what about measures of health, like life expectancy? One of the most common measures of development is the Human Development Index, or HDI. The **Human Development Index** is a composite statistic created by the United Nations to measure a country's level of development. By "composite statistic," we mean that HDI takes more than just income level into account. Rather, HDI consists of life expectancy, education (measured as mean years of schooling completed and expected years of schooling upon entering the education system), and per capita income and creates an index of a country's development, with a maximum score of 1.0 and a minimum score of 0 (see **Figure 7.7**). The HDI is useful in comparing countries as well as grouping them based on their level of development. According to the UN's 2020 report, Norway had the highest HDI at 0.957. The United States was ranked 17th with an HDI of 0.926. Niger was ranked the lowest (189th) with an HDI of 0.394.

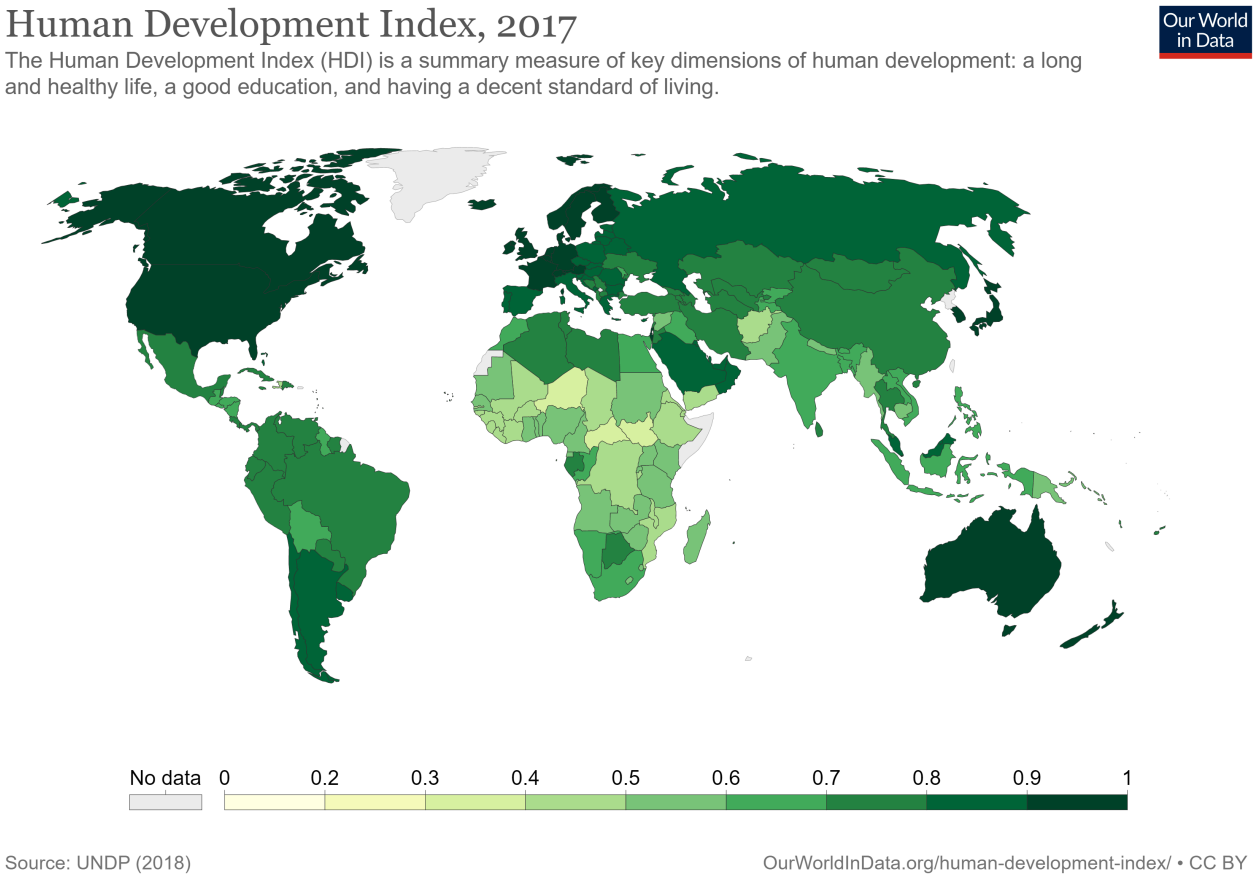


Figure 7.7: Map of Human Development Index by Country, 2017 (© Our World in Data, CC BY)

Does HDI paint a complete picture of a country's development, though? What information does the HDI miss? Remember, HDI, like GNI, is an aggregate measure of an entire country's level of development. It does not include issues like poverty or inequality. There can be significant regional variations of economic development within a country. For example, in 2019, the poverty rate for the entire United States was 10.5 percent. In Mississippi that same year, however, it was 19.6 percent while in New Hampshire, it was 7.3 percent. These aggregate statistics can also miss racial differences. In South Africa, for instance, nearly half of black South Africans are below the poverty line compared to only 1 percent of white South Africans.

HDI also doesn't account for disparities by gender. There are other statistics that measure these factors, including the **Gender Inequality Index**, or GII. GII is similar to HDI in that it is a composite index, which again allows for relatively easy comparison of country-level data. The GII essentially measures the loss of potential development within a country that results from gender inequality. It considers reproductive health, empowerment, and labor market participation. In every single country in the world, there is gender inequality, but the situation is slowly improving in most countries. Switzerland had the lowest GII in 2019, meaning it had the lowest levels of gender inequality. Mothers in Switzerland, for example, are given 14 weeks of paid maternity leave, as mandated by the Swiss Constitution. In 2019, the Swiss government

also approved a proposal requiring better representation of women on the boards of publicly traded companies. Yemen was ranked the lowest in terms of GII in 2019 with an index of 0.795. The United States was ranked 46th with 0.204. This inequality comes at a significant economic cost with research by the U.S. Treasury Department showing that achieving gender equity would add between $2 trillion and $4 trillion to the U.S. gross domestic product.

It is clear that economic development has occurred unevenly, both in terms of disparities within a country and between countries. There are several key theories that can help explain these spatial variations. American economist Walt Whitman Rostow proposed in 1960 that economic development occurs in five basic stages, commonly referred to as Rostow's Stages of Economic Growth. Each country, according to Rostow, is in one of the following stages of growth, and each stage varies in length:

1. The traditional society: characterized by hunting and gathering activities or subsistence agriculture; primary sector activities
2. The preconditions for take-off: shift to commercial agriculture; increasing spread of technology and infrastructure improvements
3. The take-off: increase in urbanization; secondary sector activities expand
4. The drive to maturity: industries diversify; transportation and social infrastructure develops
5. The age of high mass-consumption: highly urban society; widespread consumption of high-value consumer goods

While Rostow's model fits the historical development pattern of Europe and the United States quite well, in other geographic locations such as across much of Asia and Africa, the model seems to be less applicable. Furthermore, not every country has the same resources and may not have a long period of industrialization, perhaps shifting from more primary sector activities to service sector activities like hospitality or banking. Colonization, too, dramatically changes how rapidly a country is able to develop and how easily it can invest in its infrastructure.

Another theory that seeks to address the persistent underdevelopment of some states is dependency theory. **Dependency theory** is the notion that resources generally flow from peripheral countries to core countries, enriching the economies of the core countries at the expense of peripheral countries. Dependency theory essentially holds that it is to the core country's advantage to keep the peripheral countries in the periphery. Why is that? If core countries can limit the economic advancement of peripheral countries, they can buy goods and services from these countries more cheaply. This theory is counter to Rostow's model, viewing underdeveloped countries as not just in an "earlier" stage of a development model, but rather having a weaker position in the world economy that limits development. Countries in the periphery are often considered to be commodity dependent, meaning that they rely heavily on exporting basic products, which then makes them vulnerable to international markets and price fluctuations.

World Systems Theory, developed by sociologist and historian Immanuel Wallerstein in the 1970s, builds upon dependency theory and divides the world into three categories – the core, periphery, and semi-periphery – based on economic development and political power (see **Figure 7.8**). According to this theory, the world is increasingly interconnected, and while

there is an acknowledgement that peripheral countries are exploited by core countries, World Systems Theory notes that peripheral and semi-peripheral countries do see some benefits as result of trading with core countries. Furthermore, World Systems Theory, as the name suggests, views countries as part of a larger world economy. According to Wallerstein, just as within a typical capitalist economy, where there are differences in social class and the ownership over means of production, these ideas can be applied to a broader scale, with core countries controlling the major means of production and performing higher-skilled tasks while peripheral countries own very little and provide lower skilled labor.

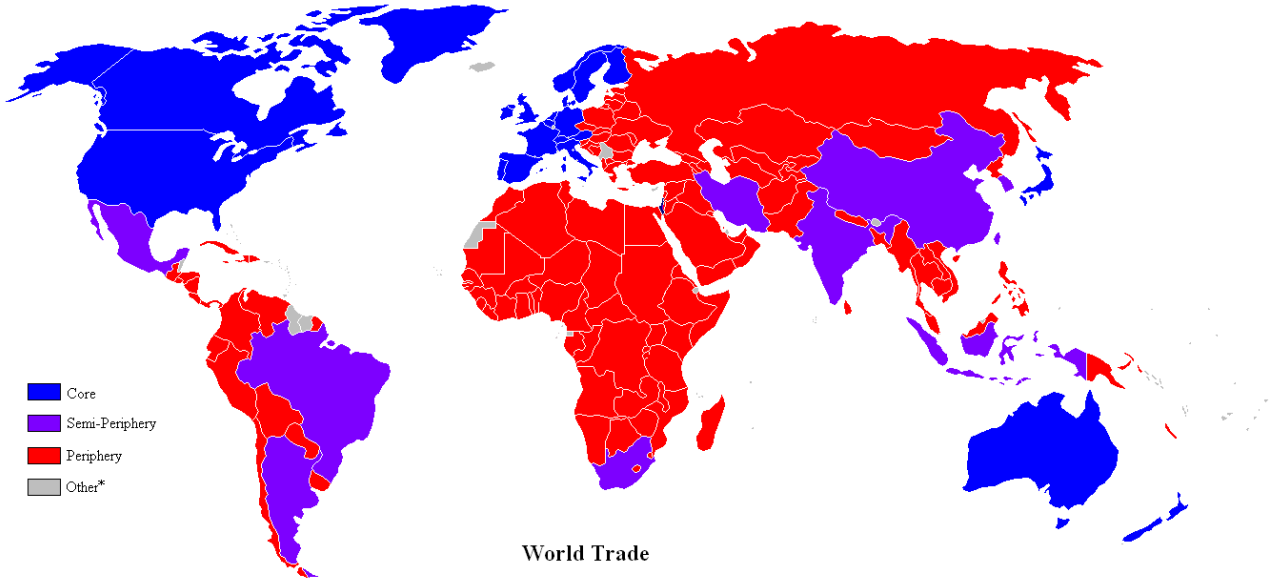


Figure 7.8: Map of Core, Semi-Peripheral, and Peripheral Countries (© Lou Coban, Wikimedia Commons, Public Domain)

All three models present different, generalized perspectives on global uneven development. They are often criticized, though, for being overly general and overlooking the unique geographic situations and histories of particular countries as well as regional differences or struggles within countries. As a human geography student, rather than ascribe to one particular theory exclusively, it might be more helpful to use these theories as lenses to help analyze and critically examine the world. How have countries developed historically? In what cases did a country clearly pass through progressive stages of development as in Rostow's model? In which cases did a country shift around, perhaps following one economic system before shifting to another? Which countries tend to dominate the global economic system, and which countries have relatively little power? How would you explain why these differences exist?

7.4 Global Economics and Trade

The global economy has become increasingly interdependent and these global connections have led to the creation of a number of new organizations and trading relationships. Perhaps the most well-known is the World Trade Organization (WTO). The WTO was formed in 1995 and it regulates and facilitates international trade, providing a framework for negotiating trade agreements. Generally, these agreements seek to promote free trade, and indeed the WTO has significantly contributed to the reduction of trade barriers and an increase in global trade. The WTO's approach to trade is often characterized as neoliberalism. **Neoliberalism** is an ideology that promotes free market competition and views economic growth as critical to human progress. Under neoliberalism, goods and capital should be allowed to flow freely, with only minimal government intervention.

As mentioned, though, the world's resources are not distributed evenly, and some criticize the WTO's approach as contributing to a widening gap between rich and poor countries. Promoting neoliberal trade policies early in a country's development can make it susceptible to commodity dependence and an over-reliance on primary sector industries that can be difficult to disentangle from. Furthermore, even once a country begins to industrialize and diversify, it can be difficult for them to compete with more advanced countries in the global core. Others argue that the reduction in global tariffs contributed to wage and job loss in the United States as firms moved their production overseas.

In general, our entire economic system and the production of goods and services is far more fluid than at any previous time in human history. In early industrialization, we were often limited by local resources and labor markets. Today, though, multinational firms may have facilities all over the globe, importing resources from one area, putting some components of a product together using low wage laborers in another location, and finishing the product in an entirely different place. This portioning out of business activities is known as **outsourcing**. Often, companies outsource to other countries where labor rates, in particular, are lower. Sometimes, activities which are detrimental to the environment are also outsourced to areas where environmental regulations are not as strict.

A number of other trade organizations have emerged that have further fostered global cooperation and contributed to globalization. One of the founding principles of the European Union was the goal of free trade across its member states, and the EU itself is a member of the World Trade Organization. Mercosur, or the Southern Common Market, is a South American trading organization promoting free trade and the fluid movement of goods and people across its member states, which include Argentina, Brazil, Paraguay, and Uruguay. The United States–Mexico–Canada Agreement (USMCA), which replaced the former North American Free Trade Agreement (NAFTA), is a free trade agreement between Canada, the United States, and Mexico.

Some trade organizations were created not as regional partnerships but with a focus on specific goods or resources. The Organization of the Petroleum Exporting Countries, more commonly known as OPEC, was founded in 1960 among six of the world's top oil-producing states. It now has 13 member states all over the world, including Algeria, Venezuela, Angola,

and Iraq. OPEC is highly influential in the global oil market and OPEC exports account for over half of global oil trade. Oil prices, like other resources, are determined by global supply and demand. If countries over-produced oil, then prices would drop. Similarly, if there was a huge spike in demand without an accompanying increase in supply, prices would increase. OPEC sets production targets for its member countries and through these targets, is able to stabilize the market price of oil, limit over supply, and ensure steady profits.

Let's imagine that a country wanted to increase its development and global trade but had limited financial resources or was experiencing economic hardships. How could a state fund investments in its infrastructure and improve its economic position? Private citizens or businesses could ask a bank for a loan but states often turn to the International Monetary Fund, or IMF, an international financial institution. The IMF aims to promote global economic growth and stabilize the world's financial markets as well as provide loans to countries who may be experiencing economic distress. In cases of public health disasters, such as the COVID-19 pandemic, the IMF provides debt relief grants for low income countries to be able to better address crises.

Connecting with World Systems Theory, one of the most significant criticisms of the IMF is that it reflects, and often reinforces, the political and economic power imbalances that exist in our world. In addition, IMF loans come with specific conditions that must be met to ensure a country repays its debt, and generally these conditions include increased privatization, instituting more liberal trade policies, and accepting foreign investment. Historically, these lending conditions were enforced through Structural Adjustment Programs, or SAPs, a set of guidelines and policies aimed at improving a country's financial situation. In practice, however, SAPs often reduced government funding for social programs and a country's most vulnerable citizens, instead focusing on spending on production and trade, activities which generate more economic benefits in the short-term but may not address underlying infrastructure, healthcare, or education needs within a country. Today, the IMF uses a system known as Poverty Reduction Strategy Papers, ideally a process driven by the country requesting a loan rather than the IMF, but in practice, containing much of the same policies promoted through Structural Adjustment Programs.

The increase in interconnectedness of our global economy has, in many ways, contributed to greater global prosperity. However, this increasing interdependence also means that what happens in one country can have a significant impact on another. The Great Recession of 2007-2009, for example, was very much a global economic decline that began with the bursting of the United States' housing bubble. This then triggered a financial crisis in Greece as a result of its significant government debt and the country received massive bailouts from the IMF and other international organizations in order to stabilize. In essence, the increasing interconnectedness of our world means that when one of us does well, we all benefit (though we don't experience equal benefits), but when one is struggling, we all feel the effects.

The impact of economic globalization is also evidence on our landscape. In peripheral and semi-peripheral countries, industrialization and globalization has led to the creation of special manufacturing zones. In China, for example, Special Economic Zones (SEZs) have been established that allow free market economic policies that are more attractive to foreign investment and businesses. If you examine a map of SEZs (see **Figure 7.9**), what do you notice about their location? SEZs are located along China's coast to better facilitate exports. Special

Economic Zones where free trade is promoted aren't limited to China, however. Today, there are SEZs all across the world including Latin America and Asia and the first was actually established in Ireland.

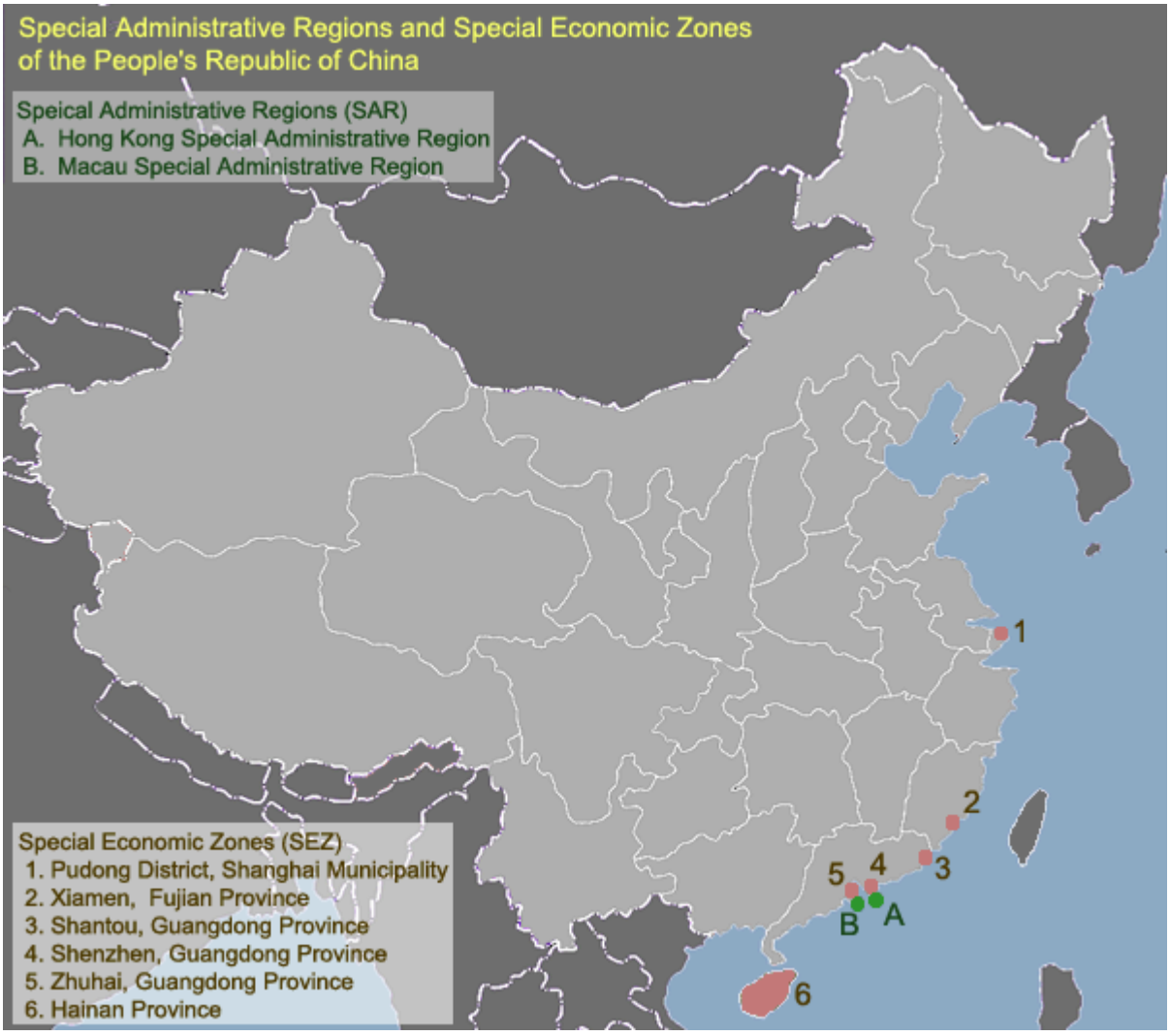


Figure 7.9: Map of Special Administrative Regions (SARs) and Special Economic Zones (SEZs) in China (© Alan Mak, Wikimedia Commons, CC BY-SA 3.0)

7.5 Sustainable Development

We've come a long way as a human race and the way we live and work continues to evolve. The process of industrialization and development has not always been easy, though, and the negative effects have been significant. So, is it possible to develop in a sustainable way? And what does that even mean? Sustainable development broadly refers to development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Essentially, it is considering the long-term impacts of development

rather than just short-term gains. The notion of sustainable development is often applied to environmental impact, and while this is an important component of sustainability, true sustainable development also considers social and economic impacts.

Consider, for example, how we generally finance development. Large corporations and businesses are more easily able to secure loans from financial institutions. But what about smaller businesses or even individuals who are looking to expand or enter a market and need only a small sum of money? **Microfinance** broadly refers to financial services that target individuals and small businesses. Part of microfinance is microlending, offering small loans to lower income clients. Microfinance, though, is not limited to loans and can also include smaller savings and checking accounts, microinsurance programs, and payment systems. For women in particular, microfinance can provide a much-needed way to advance economically in areas where there might not be access to traditional banking and financial services, or in cases where banks would be unwilling to provide such a small loan to a household with no assets. Rates of repayment on microfinance loans are extremely high.

As consumers, we have an important role in shaping global development, though we might not often realize it. Everything we buy is essentially a vote that we support the production of that item and the way it was produced. When we buy clothing produced in a textile mill that has poor working conditions or even employs slaves, we are saying that we support that system continuing – and over $120 billion of the garments imported by more developed countries in 2018 were at risk of having been produced by modern slaves. When we buy food like coffee from suppliers who pay farmers barely above or even sometimes below the cost of production, we're saying that we are okay with that arrangement if it allows us to pay lower prices.

So what if we don't actually support those kinds of unsustainable developments? Are there any alternatives? One solution is known as fair trade, which aims to do just that – help producers in developing countries create more sustainable and equitable trade relationships. Fair trade seeks to ensure that producers are paid a fair wage and have decent working conditions, including a ban on forced labor and child labor. It also aims to make sure that products are produced in environmentally sustainable ways and that producers have a greater voice the production process. There are a number of organizations that provide fair trade certification, and while the price of fair trade products might be higher, proponents argue that these higher prices provide more sustainable development for producers and more accurately reflect the product's true cost.

The United Nations also developed a set of Sustainable Development Goals (SDGs) in 2015 with the intention of achieving them by 2030. The 17 SDGs are:

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure

10. Reducing Inequality
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life On Land
16. Peace, Justice, and Strong Institutions
17. Partnerships for the Goals

While significant progress had been made in reducing poverty worldwide, the COVID-19 pandemic contributed to the first increase in global poverty since 1998. In addition, school closures contributed to a decline in global education as well as access to food, since many young children relied on schools for nutritious meals. Broadly, the world's poorest and most vulnerable were those hit hardest by the effects of the pandemic.

You'll notice that these so-called "development" goals really encompass much more than just industry and the production of goods, and this really is a reflection of the fact that development impacts every area of our lives. What we do and how we produce goods has a profound effect on the environment, on our economics, on our broader society to include things like education and healthcare, on how our cities grow and change, on where our population is located, on poverty within our countries and around the world. Our human landscape is shaped by our development practices.

We are more connected to one another than ever before, and these connections are clearly apparent as we examine global industry and development. But because of this increased connectivity, we also have new opportunities to collaborate and innovate. The COVID-19 pandemic's rapid and wide-reaching spread illustrates how interconnected we are in our modern society, but the development of the vaccine also provides an example of the value in harnessing these global connections as scientists and researchers were able to share knowledge and learn from one another on a scale that has never been seen before. What other solutions could we tackle with the same spirit of openness and global cooperation? How can we leverage these connections to find new ways of sustainably developing and improve our world? Our story is your story. What you want for your life and your work, how you view the environment and Earth's resources, how you view our role in the global economy, all of these will shape the jobs of the future, what we produce, and how we produce it. What does our future hold? It's up to you.

Glossary

accent

a difference in the pronunciation of words within a language

acculturation

when a dominant culture is present and exerts influence but minority cultural features are still retained

agglomeration

a clustering of economic activity, such as when similar industries locate near one another

agnostic

the belief that the existence of God/gods cannot be proven

agribusiness

a company connected with the production of food

Agricultural Revolution

the transition from hunting and gathering to the domestication of plants and animals

agriculture

the science, art, and practice of cultivating plants and livestock

animism

the belief that objects, people, and creatures all possess a divine essence

antecedent boundary

a boundary that was created before modern human settlement occurred

arithmetic density

the number of people per unit area

assimilation

the process by which a minority group adopts the values and traits of a more dominant cultural group

atheist

a lack of belief in God/gods

autocracy

a form of government where power is held by a single ruler

balkanization

the process of a state breaking up into a smaller independent units, which may be hostile toward one another

bid-rent theory

the idea that the price and demand for real estate decreases as the distance from the city center increases

bounds

general boundary descriptions that utilize local landmarks or physical geographic features

branch

a large division within a religion

break-of-bulk point

a location where cargo arriving in bulk is broken up into smaller units to transport elsewhere

bulk-gaining industry

an economic activity where the finished product weighs more than the inputs

bulk-reducing industry

an economic activity where the inputs, or raw materials, weigh more than the finished product

carrying capacity

the maximum population size that can be sustained by an area based on the resources available

cartography

the art and science of map-making

central business district

the center of a city and the focal point for the exchange of goods and services

centrifugal force

a force that pushes people apart within a country and threatens national unity

centripetal force

a force that unifies people within a state

chain migration

where migrants from one area follow the path of other migrants from the same area, much like links in a chain

city-state

a sovereign city that controls the surrounding territory

colony

a territory that is ruled by another state

commercial agriculture

a form of agriculture where crops are grown primarily for sale off the farm

compact state

a shape of a state where the distance from the center to any point on the boundary is roughly the same

concentration

the spread of a particular feature over space

Concentric Zone Model

a model of the internal structure of a city where zones of businesses and residences are arranged in concentric rings outward from the CBD

contagious diffusion

the rapid and expanding spread of a cultural feature from person to person

cottage industry

a home-based manufacturing activity, such as weaving

crude birth rate

or CBR, the total number of live births in a year for every 1,000 people

crude death rate

or CDR, the total number of deaths in a year for every 1,000 people

cultural relativism

the idea that a person's values and beliefs are a product of a unique cultural tradition and should not be judged based on others' views or practices

culture

the social behaviors and beliefs as well as material forms found in human societies

democracy

a form of government where people have the right to select their leaders

Demographic Transition Model

or DTM, a model of how a country's population structure and growth changes over time

denomination

a subgroup of a religion within a branch that has a common tradition and typically has a single administrative body

density

the frequency of a particular feature within a given area

dependency ratio

the number of people who are too young or too old to work compared to the number of people in their productive years

dependency theory

a theory of uneven development that holds that resources generally flow from peripheral countries to core countries

devolution

when a central government delegates additional powers to a sub-national entity

dialect

a particular regional speech pattern found within a language

diaspora

a group of people who are living outside of their geographic homeland

distance decay

the notion that the likelihood of interaction between two things decreases as their distance apart increases

doubling time

the amount of time a population takes to double in size

economies of scale

the cost advantage gained by industries as they grow in scale and are able to decrease the cost to produce each unit

edge cities

an urban area with businesses, shopping, and entertainment outside of the traditional CBD

elongated state

a state that is long and narrow

emigration

refers to migration from a location

environmental determinism

the view that cultural features and societal developments are determined by environmental conditions

Epidemiological Transition Model

or epidemiological transition, describes changing disease patterns and causes of death that correspond with broader societal and population changes

ethnic cleansing

the forced removal or killing of an ethnic group in order to create a more ethnically homogenous region

ethnic religion

a belief system primarily associated with a particular ethnic group and generally tied to a particular geographic area

ethnicity

a shared identity with a group of people who have a common history or cultural tradition

ethnocentrism

evaluating or judging another culture's traits based on one's own cultural system

expansion diffusion

the spread of culture through an expansive process, growing larger as it spreads but remaining in its original location

exurb

an area of lower density housing outside the central city and surrounding suburbs where people live and commute to the central city for work

fascism

a political system characterized by an extreme form of nationalism and the rule by a dictator

federal state

a form of government where the power resides in units of local government, such as self-governing territories or states.

folk culture

cultural features practiced by small, homogeneous groups that generally live in rural, more isolated areas

forced migration

the involuntary movement of people from one place to another

formal region

an area that has one or more common characteristics

fragmented state

a state that is fragmented into multiple, noncontiguous parts

functional region

an area organized around a particular node or focal point

fundamentalism

a form of a religion that is characterized by a strict, literal interpretation of scripture and a return to the religion's core principles

Gender Inequality Index

or GII, a measure of gender disparity created by the United Nations that uses reproductive health, empowerment, and labor market participation to measure the loss of achievement in a country due to gender inequality

gentrification

the process by which the character of a neighborhood changes as more affluent residents and businesses move in

geographic information system

a computer system that can capture, store, query, analyze, and display geographic data, also known as GIS and sometimes referred to a geographic information science

gerrymandering

a political tactic used to create voting districts that give an advantage to one political party

globalization

the increasing interconnectedness and integration of the countries of the world resulting from advances in communication and transportation technology

Green Revolution

agricultural innovations that resulted from the use of new technologies in the 1950s and 1960s that significantly increased global agricultural production

gross domestic product

or GDP, a measure of the amounts of goods and services produced within a country in a given time period

gross national income

or GNI, the total income earned by residents of a country

gross national product

the value of all goods and services produced by a country and the value of all of the overseas investments by its residents and businesses

hierarchical diffusion

the expansive spread of a cultural feature from a person of influence or authority to the wider population

Human Development Index

or HDI, a composite statistic created by the United Nations to measure a country's level of development

human geography

the study of humans and their interaction with the earth

immigration

migration to a location

Industrial Revolution

a period of transition to new manufacturing processes beginning in the United Kingdom from the mid-1700s to the mid-1800s

infant mortality rate

or IMR, the annual number of deaths of infants under 1 year of age, compared with total live births

intensive subsistence agriculture

a form of subsistence agriculture where farmers cultivate a small area of land using additional effort

internal boundary

a boundary within a state

internal migration

a permanent move within the same country

international migration

movement from one country to another

interregional migration

movement from one region to another

intervening opportunity

the presence of an opportunity between a migrant's home site and their intended destination

intraregional migration

migration within one region

just-in-time delivery

a system of producing goods only as needed in order to reduce inventory and align with the buyer's needs

language branch

a collection of languages within a language family that are related through a common ancestral language that existed several thousands of years ago

language families

a large group of languages that were united by a common ancestral language before recorded history

language group

a collection of languages that share a common origin in the relatively recent past

languages

a structured system for communication

latitude

lines that circle the globe running east-west parallel to the equator

life expectancy

the average number of years a newborn infant can expect to live

long lot

long, narrow divisions of land usually lined up along a waterway

longitude

lines that run vertically north-south around the globe intersecting at the poles

megacity

a city with a population of over 10 million people

megalopolis

a group of two or more overlapping metropolitan areas

metes

a boundary defined by a specific distance between two points as well as an orientation and direction

Metropolitan Statistical Area

a United States Census designation, defined as an urban area, the county within which it is located, and surrounding counties where a high percentage of the residents commute to the central county for work

microfinance

financial services that target individuals and small businesses on a smaller scale than traditional financial institutions

migration

a permanent move to a new location

missionary

a member of a religious group who helps diffuse and promote their religion in an area

monoculture

a form of farming where a single crop is grown

monotheistic

the belief in one God

multiculturalism

the presence of multiple, distinct cultural identities

multiple nuclei model

a model of internal city structure where clusters of development occur in nodes or separate nuclei outside of the CBD

nation

a group of people with a strong cultural and ethnic identity

nation-state

an independent state that has a homogenous cultural and ethnic identity

nationality

a personal allegiance to a particular country

natural increase rate

or NIR, the percentage by which a population grows in a year

neocolonialism

a form of control using economic influence or indirect political control rather than direct military or political authority

neoliberalism

an ideology that promotes free market competition

nomadic pastoralism

a form of subsistence agriculture where domesticated animals are herded in search of fresh pastures for the animals to graze (also known as pastoral nomadism)

nontheistic

not having a belief in God/gods

oligarchy

a form of government where the power structure rests with a small group of people

outsourcing

contracting out a portion of a business to another party, which might be located in another country

pattern

the arrangement of a particular feature within an area

perforated state

a state that completely surrounds another state

physical geography

the study of Earth's natural environment

physiological density

the number of people per unit of arable land

plantation agriculture

a form of commercial agriculture where large farms specialize in the production of one or two crops

polytheistic

the belief in many gods

popular culture

broad cultural features found dominant, heterogeneous societies

population pyramid

a graphical presentation of a country's population by age and gender groups

possibilism

the idea that the physical environment places some limits on human activity, but that people can adapt and adjust to their environment

primary sector

an economic activity that involves directly getting raw materials from the natural environment

primate city

a city that is the largest city in a country, is more than twice as populous as the next largest city, and is emblematic of the national culture

projection

a way to flatten the globe's surface onto a flat surface to create a map

prorupted state

a shape of a state that has an extension that protrudes from its main territory

protruded state

see prorupted state

pull factors

reasons to migrate to a particular location

push factors

reasons that push people to move from their current location

quaternary sector

an economic activity that relates to information technology, such as computing or research

quinary sector

an economic activity related to making high level decisions

race

identity with a group of people who have a shared biological heritage

racism

the belief that race corresponds with differences in both physical appearance and behavioral traits and the belief that one race is superior over another

rank-size rule

the observation that the nth largest city in a country has 1/n the population of the largest country

redlining

a policy aimed at denying services to residents of particular ethnic or racial communities

refugee

a person who has been forced to cross national boundaries and cannot return home safely

regions

areas that are broadly divided based on their physical or human characteristics

relic boundary

a boundary that no longer functions but is still apparent on the landscape

relocation diffusion

diffusion of culture through the physical movement of people from one place to another

scale

the ratio of the distance on a map to the corresponding distance on Earth's surface

Second Agricultural Revolution

the increases in agricultural production that coincided with the innovations created during the Industrial Revolution

secondary sector

an economic activity that uses a raw material to create a finished good

sect

a division within a religion that characterizes a smaller group that has split from an established denomination

sector model

a model of city structure where zones of development extend out from the CBD in wedges

seed agriculture

the reproduction of plants through the use of seeds

self-determination

the right of a group of people to govern themselves

shatter belt

a region caught between more powerful states (can also be spelled shatterbelt)

site

the location of a settlement on Earth and its physical characteristics

situation

the location of a place relative to other places and geographic features

sovereignty

the authority of a state to govern itself within a territory

state

an organized territory led by a government that has control over its domestic and foreign interests

stateless nation

an ethnic group that does not govern its own state and is not the majority population of any nation-state

stimulus diffusion

the spread of an idea or principle rather than the original cultural feature or product

subsequent boundary

a boundary established after human settlement

subsistence agriculture

a form of agriculture where a farmer grows crops primarily to feed themselves and their families

superimposed boundary

a boundary created by an outside power that ignores underlying cultural differences

supranational organization

an organization or political entity that is comprised of a number of different member states and whose administrative structure extends across multiple national boundaries

sustainability

the ability of a natural system to be productive indefinitely

syncretism

the blending of cultural features to form new traits

terrorism

the use of violence to achieve political goals

tertiary sector

an economic activity that provides a service to businesses and consumers

time-space compression

the idea that the relative distance between spaces has been reduced due to advances in transportation and communication technologies

total fertility rate

or TFR, the average number of children a woman will have throughout her childbearing years (defined as ages 15-49)

transition zone

an area marked by a gradual spatial change

unitary state

a form of government where a central government entity has all or most of the governing power

urban area

an area that includes a city and its surrounding, developed region

urban decentralization

the process of businesses, workers, and consumers, moving away from the central business district

urban sprawl

the unrestricted growth of an urban area over a large tract of land, also known as sprawl or suburban sprawl

urbanization

the shifting of population from rural areas to urban areas

vegetative planting

the reproduction of plants using a fragment of the parent plant

vernacular region

a region that is perceived to exist