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Chapter 1
World Regions in Global Context

“...places are different because they are connected” (Marston, Knox, and Liverman, Del Casino, Robbins, 2013, p. 3).

Overview

This chapter introduces students to a global geography framework for studying world regions. It does so by suggesting that world regions cannot be studied in isolation of each other in terms of their human and physical geographies. In short, as the chapter argues, “places are different because they are connected” (p. 3). If there is one concept guiding this textbook, it is the notion that the key global physical and human geographic processes—e.g., climate, economy, politics—connecting regions are at the same time what makes them distinct from one another. In the relationship between globalization and regionalization (p. 6), places manage the environment and mediate the flow of goods and information to produce a global map of difference. More broadly, the chapter provides readers with a discussion of the core concepts animating geography, drawing from the wide array of physical and human geographic approaches used in the field today. It ends with a discussion of future geographies in the context of emerging spaces of conflict and scales of governance.

After completing this chapter, students should recognize that world regions are dynamic processes and that regional geographic analysis brings together the physical and human sides of the discipline. They should also recognize the broader global context for investigating the emergence of world regions. Key areas of inquiry found in the chapter include the physical processes of Earth as a system, the historical organization of the world into distinct places (urban and rural, global north and global south), the complex relationship between geography and culture and populations, as well as some of the wider global concerns that might change the world regional map in the future. Throughout the chapter, students are introduced to a number of key terms such as climate change, plate tectonics, imperialism, colonialism, division of labor, territory, demography, culture, and exploitation. At the end of this chapter, students should be able to recognize how various physical and human processes can be organized into a number of different regional maps at the global level.

This chapter relies on traditional core concepts in building its global geography framework. This chapter also offers a second layer of complexity by providing a discussion of the relationship between global geography and world history, which allows the instructor to de-center European narratives of colonialism (and development). Instructors can use this chapter to teach the core concepts of geography as well as challenge the more traditional reading of global connection, which is often theorized as something that takes place after 1492. Moreover, by integrating a discussion of “Future Geographies” in this introductory chapter, instructors can also provide a third layer of complexity to their discussion of world regions in a global context, one that suggests that world regions are not static but dynamic and changing over time.

Learning Outcomes

The learning outcomes of this chapter are:

1. Compare and contrast globalization and regionalization and explain the relationship between the two.

2. Identify the main climatic, geological, and ecological forces that shape world regions and how each force is changing in the current era.
3. Differentiate between forms of economic activity and explain why these forms vary spatially around the globe.

4. List contemporary economic development trends and identify the main measures used to assess social and economic advancement.

5. Explain the implications of globalization for modern states and identify the actors emerging in this process.

6. Specify how the global distribution of language and religions is changing.

7. Explain how globalization and regionalization affect key elements of culture.

8. Explain how and why regional population growth rates rise and fall.

Strategies for Teaching World Regions in Global Context

In Chapter 1, students are introduced to the overarching conceptual framework governing the textbook. This section suggests a series of questions that can help you frame the chapter’s overall approach and goals. In teaching this textbook, you want to emphasize the complex relationship between global process and regional difference.

A. Why does this chapter start with both the globe and the region?

1. For this textbook to be effective, students must appreciate that world regions are not isolated geographic spaces. That is why the section titled “Globalization and Regionalization” emphasizes up front the interconnectedness of global processes and regional mediation. The instructor must introduce students to the processes that bring the world together and that help create regional difference. This might be accomplished by beginning the class with a discussion regarding the global production chain of cell phone consumption discussed in the first page of the chapter. In general, the goal is to develop students’ skills as critical thinkers. Instead of taking regions at their face value, this textbook asks why world regions are there in the first place and what brings them together. In particular, it takes into account the fact that the processes underlying globalization and regionalization work to form new spaces of coherence, i.e., new emerging regions.

2. The bulk of the chapter is centered on a tripartite organizational structure, developed through the key areas: environment and society; history, economy, and territory; and cultures and populations. This organizational structure should be introduced when guiding students through the building of a global framework. In short, you should be explicit as to why the book is organized the way that it is. This can help in developing students’ appreciation for how and why the world is dynamically interconnected. Take, as an example, the following section in “Environment and Society”:

   a. “Consider the climates of Phoenix, Arizona, and Manaus, Brazil. Phoenix has a dry, desert climate with very hot summer days and mild winters. Most precipitation falls as rain during summer thunderstorms. Manaus, on the Amazon River, has hot temperatures year round and abundant precipitation except for a short, somewhat drier season. Although many factors explain the differences in climate between Arizona and Brazil, the key explanation is that the cities are connected” (p. 8).
b. Using Figure 1.5, you can answer this question for students graphically, highlighting, through a discussion of climate patterns, how to frame a wider discussion of global connectivity.

c. You can tie this global climate discussion into a discussion of microclimatic difference at the regional level, asking how local features—e.g., latitude, altitude, maritime exposure, continentality, wind patterns—affect climatic patterns. Or, you can turn students attention
to Figure 1.13, which suggests that climate change is not a straightforward concept but geographically mediated.

![Figure 1.13](image_url)

3. Over the course of the chapter students are led to ask the questions: What is globalization and regionalization? And what is the relationship between them? To answer these questions, you must ask students to think about how the global processes you have traced so far have helped forge regional spaces and connections over time. As a key to developing the students’ conceptual knowledge of a global geography, you can ask: what do you think makes East Asia a coherent geographic space? How about Australia, New Zealand, and the South Pacific? Why divide out Sub-Saharan Africa from North Africa? This allows you to emphasize the concept of “regionalization” (p. 3).

B. Why does the chapter focus on the relationship between world history and global geography?

1. One of the main arguments of this textbook is that globalization, which is often thought of as a process of recent significance, is only the most recent manifestation of global connectivity. Students are therefore introduced, albeit briefly, to a world history approach to global geography that examines the global connections forged long before the period of European colonialism.  

2. Conceptually, students are asked to think about how processes of migration and movement have facilitated regional growth-through the exchange of ideas around agriculture, through conflict and conquest, and through exploration, for example. Figure 1.25 is an ideal figure to start a discussion of global connectivity, as these maps illustrate that global exploration and transregional understanding were centered not in one place-Europe-but in many places.
3. Looking at Figure 1.21, you can ask students to discuss what this map says about global connections. In short, this map can foster a discussion on global relations through examples of the spread of religion and language, which appear later in the chapter. Students should begin to appreciate how much movement and transregional connection has taken place before 1492. These transregional connections operated across vast amounts of space, and while people in North Africa or Greece were unlikely to know where China was, they might appreciate the goods, such as silk or porcelain, or technologies (silk weaving) which found their way to that region via the massive expanse of land and sea trade routes.
4. When teaching world regional geography, we have to also remember that a majority of our students were born after the Cold War ended (on average, a student out of high school would have been born in 1995 when they enter college in 2013). That is why Figure 1.25 provides a cartographic narrative of the Cold War, whereby students can link together a discussion of capitalism and communism as well as developmental politics, neoliberalism, and supranational organization. They will come to appreciate the emergence of organizations such as NATO and the EU, as well as other organizations discussed later in the text, such as the Association of Southeast Asian Nations (ASEAN, Chapter 10).

C. Why does the fifth edition emphasize culture and populations?

1. In the previous edition of this textbook, culture was discussed separately from populations, and the relationship between the movement and spatial distribution of people was not explicitly tied to cultural practices. In this edition, there is an emphasis on cultural patterns, social difference, and their connection to demographic patterns of settlement and mobility. This emphasis intentionally highlights how the globalization of culture and the production of social identity (religious, gendered, sexualized, racialized, etc.) are tied to intimate decisions about why people live where they do. Turn students’ attention to Figure 1.38. This figure highlights, in some detail, how globalization is not simply a process of influence out of North America or Europe. In fact, this figure highlights a recurring theme throughout the text—global processes flow in multiple directions that are altered by the flow of goods and people.

Figure 1.38

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2. Given the emphasis on a world history approach to global geography, students should not be surprised to find the pattern of Islamic practice in Figure 1.37 because of what they have already read about and discussed in regard to Figure 1.21. In fact, students should find strong parallels between the various sections once their attention is turned to culture and population.

3. In teaching about culture and populations, instructors should use the material found in the sections on the geography of language and religion to open up a broader discussion about why we see the patterns we do in Figures 1.37–1.40. As certain cultural practices (tied to language, for example) become more global, what happens to local linguistic practices? What is the relationship between global interdependence and local difference?

4. In this edition, there is also an explicit emphasis placed on a discussion of identity, allowing the instructor to discuss the problems and issues related not only to gender politics, but also to nationalism and nation building. Global connections have not only brought continuity but also highlighted differences both positively and negatively. This chapter allows you to begin a discussion of those differences, defining what they mean, so that students can then apply these concepts to future regional chapters.

D. Why end with sections on future geographies?

1. For the same reason that this textbook embeds contemporary globalization patterns within an extended historical timeline, it similarly recognizes that the same global processes shaping past and present regions are at work creating emerging regions. The 5th edition of the text does not include a 12th chapter on Future Geographies, but the material from that chapter, along with new material, plays an important role in this edition. That is because of the focus on “ongoing change,” which is a centerpiece of this book’s approach. As such, entering into a discussion of future geographies allows the instructor to situate the regions that are discussed throughout the remainder of the semester as partial snapshots of a moment in time. It also facilitates a greater discussion about global connection and change—what processes might create new regional formations in the future?

2. With this in mind, then, the future geographies section affords the instructor an opportunity to now situate world regions in a wider historical context, and it also allows the instructor to foreshadow a critical aspect of the regional chapters, which now include a Future Geographies section. By concluding with the question of how regions change over time, you are afforded an opportunity to suggest why we have traced a global geography framework from a historical perspective and how what we know now may help us understand where we are going in the future. To that end, Figure 1.49 brings us full circle, allowing instructors to integrate a discussion of conflict into a discussion of future global and regional change. How are tensions over resource depletion and acquisition, cultural identity, and governance challenging the coherence of the regions we see today? What do these tensions indicate about what the world map might look like in the next few years, decades, or centuries?
Video Analysis

You can use the video *The Millenium Goals—Dream or Reality?* from your World Regional Geography Videos on DVD Companion to address, either in groups or through individual writing projects, the following:

- Given the discussion in the text’s section on “Future Geographies,” what are the challenges that emerge between future resource needs, on the one hand, and the ability of the world’s economies to meet the needs of developing countries in the global south, on the other? Which of the Millennium Goals might be most greatly challenged by the growing concern over access to needed energy resources in the future? Explain.

Mastering Geography

For additional activities and examples, and learning management tools for this chapter and the rest of the text, visit Mastering Geography.
Examples of Additional Resources

- Intergovernmental Panel on Climate Change: http://www.ipcc.ch/
- Population Reference Bureau: http://www.prb.org/ (check out the 2011 World Population Data Sheet)
- U.S. Census, International Programs Website: http://www.census.gov/population/international/data/idb/informationGateway.php
- The World Bank: http://www.worldbank.org/ (check out Data & Research)
- National Geographic on World Music: http://worldmusic.nationalgeographic.com/
- World Mapper: www.worldmapper.org (check out the collection of world maps with territory weighted by variable)

Discussion Topics and Classroom Activities

1. Ask students to define “regionalization” and how geographers analytically construct regions through “logical division” and “grouping.” Using data from the Study Guide’s World Population Reference Sheet, ask students how they might go about using both methodological approaches to construct world regions.

2. Have students break out into groups and take one major world region. Based on their reading about plate tectonics and atmospheric circulation, have them briefly construct a microgeography of the physical world in their particular region. After completing this exercise, have the students briefly turn to the corresponding chapter in the book where it discusses this microgeography. What is different about what the students thought and what the book lays out?

3. Have each student briefly outline on his or her own the link between economic globalization and cultural globalization. What are some of the connections between the two? Have a few select students present their theories of how the two are linked and write these out on the board. Building from this set of links, have the class design a model of globalization that takes into account both cultural and economic change and their interconnections in a wider historical and transregional context.

4. Initiate a discussion about world population distributions and official population projections in 2025 and 2050 (Figure 1.46). Ask students to first describe the pattern they see, and then offer several hypotheses as to why the pattern looks the way it does. Ask students to further discuss how those patterns relate to future patterns of energy consumption as well as energy demands.

Answers to Thinking Geographically Questions (End of Chapter)

1. What is geography, and what can studying it provide beyond a description of the world?

- Taken from Greek, the term geography means literally “writing the world.” Geography studies the Earth’s characteristics, taking into account the physical and human processes that connect regions, while also recognizing that the situation demands of each region to mediate these processes in different ways.
- Beyond simply describing the Earth’s characteristics, geography studies the interrelations between places and regions with the understanding that world regions are interdependent, dynamic, and subject to change.

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2. What is global climate change, and what is the evidence that it may be happening? What might its impact include?

- Earth system scientists believe that evidence from the landscape and environment shows a recent history of increasing global climate. The evidence comes from analysis of the remains of animals, vegetation, landforms, and lakes. What is most remarkable about recent change is the retreat of glaciers at the poles and in highland environments. Another proxy indicator of climate change is the measure of CO₂ in the atmosphere. Although this is not a perfect indicator of climate change, based on measures of CO₂, scientists predict that temperatures could increase by around 3 degrees Celsius over the next 50 years.

3. How are the world regions we recognize today different from those prior to 1500 C.E.?

- Figure 1.21 illustrates some of the wide-ranging differences in the knowledge of the world prior to 1500 C.E. First, the figure illustrates that multiple peoples had wide-ranging transregional knowledge by 1500; with Islamic mapmakers having extensive knowledge of much more than the Middle East and North Africa. While the Americas remained isolated from Europe, Africa, and Asia, the peoples of North and South America had working knowledge of vast spaces of these two continents, and the peoples of the South Pacific explored and mapped a massive range of oceanic space.

4. How do economic activities differ from region to region? What factors account for these differences?

- The range of economic activities defining the global marketplace-e.g., primary, secondary, tertiary, quaternary - unfolds unevenly across regions. While appearing to conform to the demands of the global economy, where and why different industries emerge is also subject to local interpretation and change. Moreover, the flow of the marketplace is not a one-way process from the so-called West to the rest of the world, as trends and practices continue to emerge from multiple places across the globe and find their way into different markets (as an example, imagine the proliferation of Thai restaurants in the United States).

- Four Factors: (1) The geographies of Colonial expansion and capitalist production (for instance, the legacy of mineral extraction in South America shown in Figure. 1.24); (2) Shifts in the international division of labor that have led, among other things, to the movement of manufacturing activities from the U.S. to emerging economic powerhouses such as China and India (p. 27); (3) International-led directives by institutions like the IMF and World Bank to restructure the economies of developing regions, often in favor of primary economic-based models (p. 30); (4) The alternate creation of local and non-market forms of development as a critique to neoliberalism (p. 31).

5. What worldwide demographic trends may emerge over the next 25 years?

- Worldwide curb demographic trends over the next 25 years suggest that much of the world’s population growth will take place in the global south, particularly in the regions of South Asia, Sub-Saharan Africa, and East Asia. Population growth will remain relatively stable in North America; Latin America and the Caribbean; Australia, New Zealand, and the South Pacific; and Europe. In fact, Europe may see a population decrease in some countries by 2025, as these economies enter Phase 5 of the demographic transition.
6. Globalization has a complex impact on cultural identity. Describe how some groups seek to protect themselves from it while others embrace it.

- Some groups seek to protect themselves from it as the benefits of economic globalization continue to increase the differences between those who have access to the world’s wealth and others who don’t. Moreover, some seek to protect themselves as globalization appears to be eroding cultural difference and uniqueness, while transforming urban and rural space and people’s understanding of their place in the world. In other cases, some people have embraced increased globalization because of the benefits that accrue to them from growing global interconnections and the flow of resources and wealth, while taking advantage of global travel and the ability to increase access to the political-economic and sociocultural resources of not-so-distant places.

7. What are supranational organizations and how do they function with respect to formal states?

- These are the growing number of nongovernmental, internationally-based organizations that work through voluntary and altruistic practices to increase access to needed resources while also addressing basic human rights issues. These are supranational organizations. They often work in contradistinction to formal states, offering to “police” those states that seek to limit the rights of both citizens and noncitizens.

Apply Your Knowledge

1. Identify three examples of how globalization has affected your local community. Examine those examples for how they may have been modified by regionalization processes in the same community.

- Students can begin by evaluating their day-to-day interactions with spaces of consumption—e.g., grocery stores, restaurants, car dealerships—and the kinds of products they might find in these spaces. Or they can think about the aesthetics of the physical landscape around them—architectural styles, site plans, building materials, public art. Ask them to reflect on what kinds of influences shape these establishments, objects, and styles, and then where these influences come from (or more pointedly, where they think they come from). Encourage students to understand that regionalization is not simply defined by local culture, but also the particular physical geographies of the surrounding environment.

2. The impact that humans have on the planet varies by where they live. Visit the Global Footprint Network Website (http://www.footprintnetwork.org), select “Footprint for Nations” from the “Footprint basics” menu, and choose three countries. Compare their ecological footprint. What makes one country’s footprint different from another?

- After students have chosen three countries, they can produce and print out one-page country profiles. Have them compare their respective graphs and reflect on possible reasons for the differences between them. Consider social, economic, and political factors. At this point in the course, they will not have entered into region-specific discussions so this might be an activity to return to at the end of the class. The rest of the text will describe in more detail some of the practices of consumption and environmental impact specific to different regions, but it is important that students have a general understanding that there are differences, that these are spatially variable (even within a country), but also that practices in one region are tied to those in another.
3. Identify three major rivers that have recently been dammed for hydroelectric power production. Use the Internet to compare the different impacts these dams have had on local people and environments. How do these impacts reflect the relationship between geologic forces, environmental conditions, and human activities?

- In addition to the Yangtze River in China (Three Gorges Dam) mentioned in the textbook, other major tributaries are: the Parana River in Peru and Bolivia (Itaipu Dam), the Columbia River in the United States (Grand Coulee Dam), or Euphrates River in Turkey, Syria, and Iraq (Ataturk Dam). In this exercise, emphasize the dynamic relationship between natural processes and human interaction paying particular attention to the way these interactions are present in the landscape. You might also contrast the recent trend in the United States of decommissioning dams with the continued construction of large dams across much of the developing world. What are some of the lessons we can learn from damming projects of the past?
- Geologic forces: As humans work to manage and control the environment through large-scale dams, plate tectonic movements are shifting the landscape, in some cases propelled by the weight of large scale constructions like dams. As a result, large-scale dams have been linked to increased seismic activity.
- Environmental conditions: Dams have a dramatic impact on the surrounding environment both upstream and downstream. Erosion, decreased water quality, and a loss of biodiversity are among a number of environmental impacts.
- Human activities: Economically, the construction of dams provides employment opportunities for local communities, but these are not sustainable in the long term. Migration is also a major impact—take the Three Gorges Dam for instance, which resulted in approximately 1.2 million people displaced from their homes. The loss of historic sites is also a significant threat of damming projects, as was the case of the historic town of Hasankeyf in Southeast Turkey.

4. Using the definition of sustainability presented in this section, research a corporation that is attempting to produce sustainable products. What are the challenges of developing a sustainable product? What are the benefits?

- Definition: “meeting current and future human needs, while simultaneously preserving our world’s precious environmental resources.” (p. 21)
- In the United States, many corporations have embraced sustainability as a marketing tool, prompting the emergence of what some term “ethical consumerism.” Ethical consumerism refers to the choice of individuals to purchase products that are ecologically friendly. Ask students to make a list of the different advertisements they’ve observed in which sustainability has been a marked selling point. Even industries that are not necessarily sustainable, such as oil and gas companies (oil and gas are, after all, non-renewable resources), have embraced the sustainability discourse. Exxon Mobil and Shell are some examples.

5. The world has always been global. Briefly discuss how and why this is the case. List a few examples of global connections in 1200, in 1500, and in the past 50 years.

- Review Figure 1.12. Note that each of these dates signify a different level or character of global integration beginning with expanding trade and exchange of currency in the 1200’s, European colonization to the Americas and Africa in the 1500’s, and Cold War polarization and post-industrialization in the last 50 years.
6. Describe the geography of the Cold War. Who were the major players, and how were they aligned in relation to each other? How have regional relationships changed in the wake of the Cold War?

- The Cold War was a sustained ideological struggle between two global hegemons—the United States and the Soviet Union—but they were aligned with coalition of other countries. Both propagated particular socio-economic visions for the world that pinned the values of Communism against those of Capitalism. The Cold War found a physical expression in various proxy wars between governments in the developing world with support of the U.S. and Soviet Union.
- The Cold War ended with the dissolution of the Soviet Union and many ushered in what appeared to be the triumph of Western capitalism. In the wake of the Cold War and the collapse of the Berlin Wall, the Eastern Bloc states began a democratic transition period. As Chapter 3 highlights, this transition has not been smooth. In the meantime, the Global Economic Crisis of 2008 revealed some deep weaknesses in the system at play and Russia’s economy strengthened alongside others of the developing world, such as China, India, Brazil, and Turkey.

7. Conduct research and provide specific examples of jobs in industries from each of the four sectors of the global economy. Provide examples of how the four sector examples you have chosen are connected to each other through global exchange.

8. Use the Internet to search for “alternative development” schemes. Choose one example and describe how that development scheme provides an alternative to more traditional forms of economic neoliberal development.

- “Alternative development” schemes can look very different. At their core is a mission to empower people in the global south in ways that do not further their dependency on the global north.
- The Honeybee Network (http://www.sristi.org/hbnew/index.php) began in India in the mid-1980s with the goal to empower people through the democratization of knowledge. While economic development plays a role, it is part and parcel of a larger theme to preserve, protect, and innovate local knowledge. Among some of the Network’s projects are the cataloguing of medicinal plants and the support and development of ecologically friendly innovations, such as bicycle-powered washing machines and scooter-driven flourmills.

9. Conduct research and provide a current or historical example of the relationship between nationalism and migration policies for a specific nation. Discuss the impact this relationship has had on the nation, its region, and other affected regions. (Hint: You might search for news stories that link the rise of nationalist-oriented political parties and migration policies.)

- Nationalism and migration are hot-button topics, and there should be plenty of resources, both primary and secondary, to explore the relationship between these two processes. You can consider a case that is more familiar to students, such as legal and illegal migration from Latin America into the United States. Or you can discuss political tensions in Europe over migration from North Africa and the Middle East. In both cases, migration stands as a key issue in party politics. In Europe, a rise in right-leaning nationalist parties, and popularity of these parties, has come in direct response to racial tensions between established and new Muslim migrant communities and non-Muslim populations.
10. Using a newspaper search engine, find articles that show examples of the relationships among religion or language and national identity. List two or three of the key themes that emerge in these stories. (Hint: For example, what are some other actions to bilingual laws in countries such as Canada and New Zealand? Or, what are the concerns about the expansion of Muslim mosques in countries such as the United States or France? What themes do news stories on these topics have in common? How do the themes in the stories differ?)

- Ask students to define the concept of nation. What is a nation? What is a national identity, and what gives that identity meaning? How does language or religion contribute to this sense of identity? Then review how these articles define a nation. Ask students to reflect on the limits with these definitions. While this question broaches some sensitive subjects, try to couch this discussion in the context of student’s lives and their self-recognized identities, whether national or not. Tie this question to Question 12 (below) to contrast student’s diverse experiences and definitions of identity to the rigid categories that are portrayed in the newspaper and the cultural landscape.

11. Research regional religious diversity for the area in which you live. What range of religions is practiced? To what degree are these religions publicly evident in practices and architecture? Are some religions more in evidence than others?

- Answers will vary. Students can make a list of their engagements with different religions in the community whether through family, friends, school, etc. Answering the second portion of this question requires an exercise in cultural landscape studies. How does the physical landscape in their community reflect the predominant cultural or social values of place? Where and how are these dominant values challenged?

12. Keep a log of your activities for one full day, including where you go and what you do. Once complete, review the log for how your experience of particular places you visited intersects with your own social identities (e.g., your gender, race, sexuality, ethnicity, religion, age, or class).

- Before beginning this exercise, students can make a list of different social identities. To what degree are these identities discreet? In other words, how are they experienced differently by different people? To that end, students need to be able to link identity with space. How are these identities embedded in the visual landscape and how are they informed and reinforced by place?

13. Apply the concept of climate change to the question of future global sustainability. Research and explore one geoengineering option and list its pros and cons.

- Review Figure 1.50 and choose one of the geoengineering methods identified in this image: chemicals to save the ozone, aerosols in the stratosphere, giant reflectors in orbit, cloud seeding, iron fertilization of the sea, pump liquid CO₂ to deep sea, pump liquid CO₂ into rocks, genetically engineered crops, greening deserts.
- While geoengineering technologies hold promise, scientists suggest that they could result in unintended negative impacts on the environment and the cost to implement such techniques in relation to their overall impact may not be viable. Atmospheric seeding and iron fertilization are two options you could explore.
- Atmospheric seeding: releasing light colored sulfur particles into the atmosphere to reflect the rays of the sun. This approach is aimed to simulate what happens when a volcano erupts, as it has been shown that large volcanic eruptions actually cool Earth (Mount Pinatubo in the
Philippines, for example). However, some scientists argue that atmospheric seeding might negatively impact temperature and precipitation, and may even eat away at the ozone layer.

- Iron fertilization of the sea: fertilizing the oceans with iron to increase the phytoplankton population, thus increasing carbon uptake from the atmosphere. Potential negative impacts are an increase in acid content in the ocean and increase in dead zones caused by dying plankton.