

# 4

# HUMANS AND ENVIRONMENT

## CHAPTER SUMMARY

- The earth is closed to all inputs except the sun's energy; hence, everything is connected to everything else and a global perspective is necessary.
- The term ecosystem combines the concept of a system—a set of interrelated components that form a whole—with that of ecology—the study of organisms in their homes.
- Human activity has caused major damages to the earth's ecosystems.
- The ecosystem impacts of humans' use of technology and energy are many.
- The recognition by political bodies of many of these impacts has led to the concept of sustainable development.
- Human activity can have large global impacts.

## LEARNING OBJECTIVES

After reading this chapter, you should be able to

- describe the relationship between humans and ecosystems, including humans' impacts on ecosystems, climate, and the types of impact occurring (e.g., increase pollution or loss of biodiversity);
- identify the relationships between natural resources and human values, including the use of stock resources and renewable resources;
- value and recognize the importance of scale: everything is related to everything else;
- identify the types of energy fuels humans use and the differences in their environmental impacts;
- have a general idea of environmental ethics and how these views shape our understanding of the human–environment relationship; and
- describe some of the interventions designed by governments or desired by scientists to manage human impacts to ecosystems, and their success to date.

## KEY TERMS

**Acid rain** The deposition on the earth's surface of sulphuric and nitric acids formed in the atmosphere as a result of fossil fuel and biomass burning; causes significant damage to vegetation, lakes, wildlife, and built environments. (p. 118)

**Adaptation** The process by which humans adjust to a particular set of circumstances; changes in behaviour that reduce conflict with the environment. (p. 125)

**Agricultural revolution** The slow transition, beginning about 12,000 years ago, from foraging to food production through plant and animal domestication. (p. 99)

**Anthropocentric** Regarding humans as the central fact of the world; stressing the centrality of humans to the detriment of the rest of the world. (p. 107)

**Biomass** The mass of biological material present in an area, including both living and dead plant material. (p. 99)

**Catastrophists** Those who argue that population increases and continuing environmental deterioration are leading to a nightmarish future of food shortages, disease, and conflict. (p. 124)

**Conservation** A general term referring to any form of environmental protection, including preservation. (p. 125)

**Cornucopians** Those who argue that advances in science and technology will continue to create resources sufficient to support the growing world population. (p. 124)

**Desertification** The process by which an area of land becomes a desert; typically involves the impoverishment of an ecosystem because of climate change and/or human impact. (p. 111)

**Domestication** The process of making plants and/or animals more useful to humans through selective breeding. (p. 99)

**Ecocentric** Emphasizing the value of all parts of an ecosystem rather than, for example, placing humans at the centre, as in an anthropocentric emphasis. (p. 106)

**Ecology** The study of relationships between organisms and their environments. (p. 97)

**Ecosystem** An ecological system; comprises a set of interacting and interdependent organisms and their physical, chemical, and biological environment. (p. 97)

**Energy** The capacity of a physical system for doing work. (p. 99)

**Industrial revolution** The process that converted a fundamentally rural society into an industrial society beginning in England c. 1750; primarily a technological revolution associated with new energy sources. (p. 99)

**Ozone layer** Layer in the atmosphere 16–40 km (10–25 miles) above the earth that absorbs dangerous ultraviolet solar radiation; ozone is a gas composed of molecules consisting of three atoms of oxygen ( $O_3$ ). (p. 116)

**Pollution** The release into the environment of substances that degrade air, land, or water. (p. 100)

**Recycling** The reuse of material and energy resources. (p. 125)

**Renewable resources** Resources that regenerate naturally to provide a new supply within a human lifespan. (p. 99)

**Stock resources** Minerals and land that take a long time to form and hence, from a human perspective, are fixed in supply. (p. 99)

**Sustainable development** A term popularized by the 1987 report of the World Commission on Environment and Development, referring to economic development that sustains the natural environment for future generations. (p. 127)

**System** A set of interrelated components or objects linked together to form a unified whole. (p. 118)

**Technology** The ability to convert energy into forms useful to humans. (p. 119)

## RESEARCH QUESTIONS

1. Examine the fuel mix for energy supply in your region and your regions' energy plans. Are they sustainable? If not, how could they be improved for sustainability?
2. Describe how sustainable development policy differs from economic policy and illustrate your case with examples.
3. Do scientists agree about whether humans have passed the point of no return concerning environmental degradation? Consider climate change, water use, and biodiversity loss.
4. How has human activity affected the global water cycle? Using specific case studies, discuss how our impacts on water quality and quantity have been felt in different regions of the world.
5. What is systems thinking and what is its importance to environmental knowledge?

## LINKS OF INTEREST

- Greenpeace  
<http://www.greenpeace.org>
- International Union for Conservation of Nature  
<http://www.iucn.org/>
- International Panel on Climate Change  
<http://www.ipcc.ch/>
- Club of Rome

<http://www.clubofrome.org/eng/home/>

- United Nations Environment Programme  
<http://www.unep.org/>
- Waterlution  
<http://www.waterlution.org/>

## SUGGESTED READINGS

Goudie, A. 2006. *The Human Impact on the Natural Environment*, 6th edn. Oxford: Blackwell.

An excellent general textbook by a well-known geographer.

Kemp, D. D. 1998. *The Environment Dictionary*. New York: Routledge.

A remarkably comprehensive dictionary, written by a geographer.

Park, C. 2001. *The Environment*, 2nd edn. New York: Routledge.

A comprehensive text on the environment and human interactions with it; covers all the topics addressed in this chapter and includes numerous detailed regional examples.

## YOUTUBE VIDEOS

- National Geographic. 2015. “Climate Change 101 with Bill Nye.” YouTube video, 4:09. Posted December 2015. <https://www.youtube.com/watch?v=EtW2rrLHs08>
  1. How has the earth’s climate changed historically?
    - There has been continual change in the earth climate. The majority of which is caused by orbital variation. However, we’re witnessing an abrupt increase in the earth’s temperature. Ten out of the last 13 years were the warmest on record. The majority of scientists agree that this increase is not caused by orbital variation but by human impacts.
  2. How has our increased consumption of GHG’s increased the earth’s temperature?
    - We have released a large number of non-natural greenhouse gasses because of our desire and use of fossil fuels. GHG traps heat from the sun and causes the increase in temperature.
- CrashCourse. 2013. “5 Human Impacts on the Environment: Crash Course Ecology #10.” YouTube video, 10:37. Posted January 2013. <https://www.youtube.com/watch?v=5eTCZ9L834s>
  1. What do the earth’s support services provide?

- They create and replenish the earth biological systems. These include recycling the compounds we need for life including the Carbon cycle, hydrologic cycle, nitrogen cycle, and phosphorus cycles. They also help form new soils and oxygen.
2. What are provisioning services?
- Gives us the materials we need to live. For example, the oceans provide food, while the rivers and lakes provide water, plants and animals provide fibre, and all around us are forms of fuel.