

## **Chapter 2**

# **Environmental Sustainability and Human Values**

### ***Concept Check Questions***

#### 2.1 Human Use of the Earth

1. What is sustainable development?

Ans: Sustainable development is the economic growth that meets the needs of the present without compromising the ability of future generations to meet their needs.

2. What is sustainable consumption? How is it linked to a reduction in world poverty?

Ans: Sustainable consumption is the use of goods and services that satisfy basic human needs and improve the quality of life but that also minimize resource use. Sustainable consumption requires the eradication of poverty. This, in turn, requires that poor people increase their consumption of certain essential resources. Increased consumption of certain essential resources by those living in poverty raises demands on those resources. Sustainable consumption requires that highly developed countries voluntarily consume less to balance the demands on the resources.

3. How is voluntary simplicity an example of sustainable consumption?

Ans: People who embrace voluntary simplicity are committed to minimizing resource use and to seeking new ways to lowering consumption which leads to a sustainable level of consumption.

#### 2.2 Human Values and Environmental Problems

1. What is environmental ethics?

Ans: Environmental ethics is a field of applied ethics that considers the moral basis of environmental responsibility.

2. What assumptions are made in the Western worldview? In the deep ecology worldview?

Ans: The Western worldview is based on human superiority over nature, the unrestricted use of natural resources, and economic growth to manage an expanding industrial base. It is anthropocentric and emphasizes the importance of humans as the overriding concern in the grand scheme of things. The deep ecology worldview is based on harmony with nature, a spiritual respect for life, and the belief that humans and all other species have an equal worth. This biocentric worldview stresses that all forms of life have the right to exist and that humans are not different or separate from other organisms.

### 2.3 Environmental Justice

1. What is environmental justice?

Ans: Environmental justice is the right of every citizen to adequate protection from environmental hazards.

### 2.4 An Overall Plan for Sustainable Living

1. What is the global extent of poverty?

Ans: Poverty leads to tens of thousands of infant and childhood deaths worldwide. It is correlated with illiteracy, starvation, and lack of rights for women and children. It threatens the global ecosystem that sustains us all; failing to confront the problem of poverty around the world makes it impossible to attain global sustainability.

2. What are two ecosystem services provided by natural resources such as forests and biological diversity?

Ans: Forests and biological diversity provide ecosystem services such as protection of watersheds and soils and the maintenance of habitats for animals and plants.

3. What is food insecurity?

Ans: Food insecurity is the condition in which people live with chronic hunger and malnutrition.

4. How is stabilizing climate related to energy use? Deforestation?

Ans: Stabilizing the climate requires a comprehensive energy plan to include phasing out fossil fuels in favor of renewable energy, increasing energy conservation, and improving energy efficiency.

Shifting from non-renewable energy consumption to renewable sources of energy may help stabilize the climate. The same is true for shifting to the sustainable harvest of forest resources.

Sustainable harvesting also requires a comprehensive forestry usage plan which, at a minimum, requires planning for use of more sustainable renewable energy resources, increasing forest conservation and replanting. Addressing deforestation also means addressing poverty in many of the areas succumbing to deforestation.

5. What are two serious problems in urban environments?

Ans: Two serious problems in urban environments are water scarcity and effectively dealing with squatter settlements. A third problem is air pollution caused by ineffective transportation systems.

## ***Global-Local Questions***

### 2.1 Human Use of the Earth

1. Is sustainable development a reasonable goal at the local level? At the global level? Explain your answers. (p. 28)

Ans: Global sustainability requires an eradication of poverty and a stabilized population. This means that locally, consumption patterns in highly developed countries need to be reduced. Sustainability at all levels is reasonable but not simple. Each country needs to be more self sufficient for their food supply and meet their energy needs through renewable energy sources. The inequitable distribution of wealth complicates the ability to achieve sustainability at different levels.

## ***Interpreting Data***

### 2.4 An Overall Plan for Sustainable Living

1. In the early 1970's, global energy prices increased dramatically. What sort of relationship does this graph suggest between prices of food and energy at this time? (p. 41)

Ans: The graph suggests that the relationship between prices of food and energy in the early 1970's are directly related. As energy prices increased dramatically, the cost of food increased dramatically.

## ***Think Critically Questions***

### 2.2 Human Values and Environmental Problems

1. Why is there an overlapping goal between these two extreme worldviews? (p. 33)

Ans: The western worldview perceives nature as resources there to promote the health and wealth of humans. Wasting these resources would ultimately lead to the degradation of human health and their economy. The deep ecology worldview believes everything in nature has an intrinsic value. Despite the different reasons, both worldviews believe in conserving both human and non human life.

### 2.3 An Overall Plan for Sustainable Living

1. Where do human activities fit into this diagram? (p. 42)

Ans: Humans fit into many parts of the diagram. They are causing the climate change through our use of fossil fuels as a source of electrical energy. It will impact the plants and animals that we depend on for food and materials. The change in precipitation will change water supplies. Change in animal distribution may change disease vectors. As land animals ourselves, we are part of the diagram in many ways.

### ***What is happening in this picture?***

- These Fishermen are pulling up a net of jellyfish, which have proliferated, harming local fish populations. Suggest a possible reason that jellyfish swarms have become so common.

Ans: Increased atmospheric CO<sub>2</sub> levels may have caused an increase in dissolved CO<sub>2</sub> in the ocean, resulting in changes in ocean food web dynamics. The increased CO<sub>2</sub> levels and the changes in ocean food web dynamics may be beneficial to jellyfish reproduction and life, thereby increasing jellyfish swarms.

- Given the population and the climate change are being blamed for the increase in jellyfish, suggest a plan to correct the problem. Will your plan be a quick fix, or will it take many years to address? Why?

Ans: Answers may vary. An example of possible answer is:

Shift away from consumption of fossil fuels and other nonrenewable resources to the use of renewable energy resources; eliminate poverty and stabilize human population. This plan will take many years due to the complexity of the economic, political, and technological challenges.

Answers may also include one or more of these components:

- educate children
- elevate status of women
- improve energy efficiency

- Where would you put “Proliferating jellyfish swarms” in figure 2.14?

Ans: Answers may vary.

## ***Critical and Creative Thinking Questions***

1. Development is sometimes equated with economic growth. Explain the difference between sustainable development and development as an indicator of economic growth, using the figure.

Ans: Sustainable development can only occur within the limits of the environment. Unlike wasteful, unrestrained economic development and population increase which presently drive economic growth, sustainable development must be able to meet both the present and future needs of all the world's people. Moreover, the number of people, their degree of affluence (level of consumption), and their choices of technology all interact to produce the total effect of a given society on the sustainability of the environment.

2. How are sustainable consumption and voluntary simplicity related?

Ans: Voluntary simplicity is a type of sustainable consumption which recognizes that individual happiness and quality of life are not necessarily linked to the accumulation of material goods. Voluntary simplicity is a commitment at an individual level to the overall goals of sustainable consumption.

3. How do the three factors shown in the figure interact to promote sustainable development?

Ans: Environmentally sound decisions, economically viable decisions, and socially equitable decisions all interact to promote sustainable development. Environmentally sound decisions do not harm or deplete natural resources for future generations. Economically viable decisions consider all costs, including long-term environmental and societal costs. Socially equitable decisions reflect needs of society and ensure that costs and benefits are shared equally by all groups.

4. State whether each of the following statements reflects the Western worldview, the deep ecology worldview, or both.

Explain your answers.

- a. Species exist to be used by humans.
- b. All organisms, humans included, are interconnected and interdependent.
- c. There is a unity between humans and nature.
- d. Humans are a superior species capable of dominating other organisms.
- e. Humans should protect the environment.
- f. Nature should be used, not preserved.

- g. Economic growth will help Earth manage an expanding human population.
- h. Humans have the right to modify the environment to benefit society.
- i. All forms of life are intrinsically valuable and therefore have the right to exist.

Ans:

- a. Western worldview – view that humans are responsible for managing natural resources to benefit human society
- b. Deep ecology worldview – view that richness and diversity of life forms contribute to the flourishing of human and nonhuman life on Earth
- c. Deep ecology worldview – view that richness and diversity of life forms contribute to the flourishing of human and nonhuman life on Earth
- d. Western worldview – view based on human superiority over nature and that humans are responsible for managing natural resources to benefit human society
- e. Deep ecology worldview – view that humans have no right to reduce species richness and diversity except to satisfy vital needs
- f. Western worldview - view based on human superiority, the unrestricted use of natural resources, and economic growth to manage an expanding industrial base
- g. Western worldview - view based on human superiority over nature and that humans are responsible for managing natural resources to benefit human society
- h. Western worldview – human centered view that nature should be conquered and exploited to benefit human society
- i. Deep ecology worldview – the value of nonhuman life forms is independent of the usefulness they may have for narrow human purposes

5. What social groups generally suffer the most from environmental pollution and degradation? What social groups generally benefit from this situation?

Ans: Generally, low-income and minority communities suffer most from environmental pollution and degradation. Rich and powerful communities in industrialized nations generally benefit from environmental pollution and degradation.

6. Why is human population control an important part of global sustainability?

Ans: In order to stay within Earth's carrying capacity, not only must excessive consumption be reduced, but a stable population must be reached and sustained.

7. How is forest destruction related to declining biological diversity?

Ans: Modern methods of forest clearing and use have converted once renewable resources into unsustainable ones. Moreover, tropical rain forests, which are biologically the world's richest terrestrial areas, have been reduced to less than half their original area in recent decades. With forest destruction, comes the overwhelming loss of both biological diversity and ecosystem services that the forest once provided.

8. What is food insecurity? How does food insecurity affect the environment?

Ans: Food insecurity is the condition in which people live with chronic hunger and malnutrition. Food insecurity affects more than 800 million people in rural areas of the poorest developing nations. Improving agriculture is a top priority in the fight against food insecurity; however, expanded agricultural productivity has taken place at high environmental costs. Such negative environmental effects of agriculture include loss of soil fertility, soil erosion, aquifer depletion, soil and water pollution, and air pollution.

9. Discuss two ways to make cities more sustainable.

Ans: Answers will vary. Answers may include references to urban transportation systems, innovative approaches to recycling and reusing of water in areas with water scarcity, and improvement to squatter settlements.

10-12. The graphs below show a computer simulation by the U.S. National Climate Assessment. In (A), the level of atmospheric CO<sub>2</sub> is projected for the 21st century. As a result of increasing levels of CO<sub>2</sub> in the atmosphere, more CO<sub>2</sub> dissolves in ocean water, where it forms carbonic acid. The increasing acidity dissolves and weakens coral skeletons, which are composed of calcium carbonate (B). (Values in parts A and B are midrange projections.) W

10. Why could rising CO<sub>2</sub> levels in atmospheric be catastrophic to corals and other shell-forming organisms?

Ans: As a result of increasing levels of CO<sub>2</sub> in the atmosphere, more CO<sub>2</sub> dissolves in ocean water, where it forms carbonic acid. The increasing acidity dissolves and weakens coral skeletons, which are composed of calcium carbonate. This could be catastrophic to corals and other shell-forming organisms because weakened skeletons imply imminent loss of habitat and protection for these organisms and may lead to a dramatic reduction in their respective populations. Additionally, such a dramatic reduction in shelled animals would most definitely negatively affect ocean food web dynamics.

11. How do these graphs relate to Figure 2.14?

Ans: Figure 2.14 illustrates cascading responses of increased carbon dioxide through the environment. The referenced graph represents quantitative measurements of changes in atmospheric CO<sub>2</sub> and illustrates the damage that is being done to animals with shells.

12. SUSTAINABLE CITIZEN QUESTION

How might the loss of corals and shell-forming organisms impact you? Others in your community? Do all of Earth's people share equally in impacts from and responsibility for ocean acidization? Explain.

Ans: Answers will vary.

Possible answers include:

The loss of corals and shell-forming organisms might result in the losses of (1) habitat for other ocean species, (2) human food sources, (3) biodiversity, (4) links in the ocean food chain, and (5) economic factors. All of these potential resultant losses both directly and indirectly negatively impact me and others in my community by decreasing food diversity and food supply.

Yes, all of Earth's people share in the impacts from and the responsibility for ocean acidization. This is because the oceans connect continents and the countries on those continents, and they supply food, O<sub>2</sub>, and resources yet to be discovered to the people in the countries on the continents. However, all of Earth's people do *not* share *equally* in the impacts from and the responsibility for ocean acidization. Overconsumption, over population, waste disposal, energy exploration and extraction, and other abuses of the ocean and its resources in one part of the Earth can dramatically affect oceans all over the globe because the oceans are all connected.