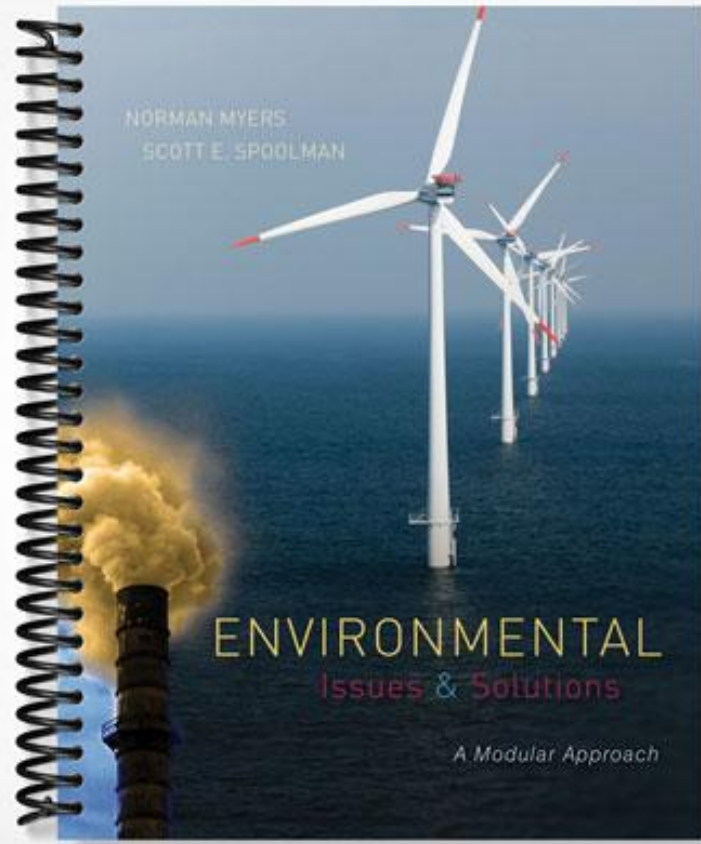


TEST BANK



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ENVIRONMENTAL
Issues & Solutions

A Modular Approach

Chapter 2 - Population Growth

TRUE/FALSE

1. As the population of a species approaches its carrying capacity, the species' growth rate speeds up.

ANS: F

As the carrying capacity is reached, the amount of available resources decreases and the growth rate declines.

PTS: 1 DIF: Knowledge

2. Most people in the world live in more-developed countries.

ANS: F

In 2012, about 82% of the world's population lived in less-developed countries.

PTS: 1 DIF: Knowledge

3. Total fertility rates (TFRs) have been increasing since the 1950s in less-developed countries and dropping in more-developed countries.

ANS: F

TFRs have fallen world-wide since the 1950s in all countries (see Figure 2.9)

PTS: 1 DIF: Knowledge

4. Most of the projected growth in the US between 2012 and 2050 will come from immigration.

ANS: F

Only 1/3 of the projected growth in the US between 2012 and 2050 will come from immigration.

PTS: 1 DIF: Knowledge

5. It is expected that aging baby boomers will put a strain on the United States government funded retirement and medical care programs.

ANS: T

As baby boomers (people born in the 1950s) retire, it is expected that they will put a considerable strain on the nation's Social Security and Medicare systems.

PTS: 1 DIF: Knowledge

6. An example of the tragedy of the commons is atmospheric warming.

ANS: T

Large-scale burning of fossil fuels has increased the global average of carbon dioxide in the atmosphere. The atmosphere is a global commons and the excess CO₂ is projected to disrupt the earth's climate during this century.

PTS: 1 DIF: Knowledge

7. The exact carrying capacity of the earth is 50 billion people.

ANS: F

The exact carrying capacity is not known, only estimated. If we were to establish 50 billion as the carrying capacity, it would require huge changes in consumption and technological impact.

PTS: 1 DIF: Comprehension

8. Around the world, women provide more health care within their families than that provided by all the world's organized health services.

ANS: T

Even though women are valuable members of society who provide vital medical care for free, they are still undervalued in many societies.

PTS: 1 DIF: Knowledge

9. People in poverty tend to degrade their forests, soils, and biodiversity.

ANS: T

As they struggle to survive, people in poverty do not have the luxury of preserving their resources for themselves or for future generations.

PTS: 1 DIF: Knowledge

10. The United States has a higher TFR than China.

ANS: T

China's one-child policy has created a lower fertility rate than in the US. The U.S. does not any restrictions on the number of children a couple (or single person) can have.

PTS: 1 DIF: Comprehension

MULTIPLE CHOICE

1. How long will it take to add another billion people to the world's population given the current growth rate?
- | | |
|-------------|-------------|
| a. 12 years | c. 22 years |
| b. 2 years | d. 50 years |

ANS: A

We are experiencing exponential growth of the human population and we are presently adding another billion people every 12-13 years.

PTS: 1 DIF: Knowledge

2. Compare the two possible scenarios of population growth shown in Figures 2.3 and 2.4. Figure 2.4 shows what happened when reindeer were placed on an island that had no other large animals except mice and rabbits. What else could have been placed on the island along with the reindeer so that the population growth would have resembled the pattern shown in Figure 2.3?
- a. wolves
 - b. moose
 - c. fast growing trees
 - d. artificial snow

ANS: A

Every population is kept in check by limiting factors. In stable reindeer populations, the size is maintained by either predators or disease. Without either of these limiting factors, the population grows until it consumes all of the available food and then crashes.

PTS: 1 DIF: Analysis

3. Which of these is considered to be a less-developed country?
- a. Nigeria
 - b. United States
 - c. Japan
 - d. Germany

ANS: A

The U.S., Japan, and Germany are highly-industrialized countries and as such are considered to be more-developed ones.

PTS: 1 DIF: Comprehension

4. Examine Figure 2.8. What does this tell you?
- a. Most of the world's population growth is in less-developed countries
 - b. Most of the world's population growth is in more-developed countries
 - c. Birth rates in less-developed countries are lower than death rates
 - d. Birth rates in more-developed countries are higher than death rates

ANS: A

Birth rates in less-developed countries have exceeded the death rates since 1950, while overall population change in more-developed countries has been relatively flat.

PTS: 1 DIF: Analysis

5. Which country would be *more* likely to have a growing population?
- a. One with a low disease rate
 - b. One with a lower life expectancy.
 - c. One with a high disease rate.
 - d. One with high accident rates.

ANS: A

High disease and accident rates decrease life expectancy.

PTS: 1 DIF: Comprehension

6. Why are TFRs *higher* in less-developed countries (LDCs) than in more-developed countries (MDCs)?
- a. Higher infant mortality rate in LDCs
 - b. Higher infant mortality rate in MDCs
 - c. Larger numbers of children are needed to tend crops in MDCs
 - d. Children are not needed to gather wood in LDCs

ANS: A

TFR stands for total fertility rate and this value is higher in LDCs because of (1) high infant mortality rates and (2) large numbers of children are needed to tend crops and gather wood.

PTS: 1 DIF: Comprehension

7. Which of the following countries has the fastest growing population rate?
- a. United States
 - b. China
 - c. Germany
 - d. Japan

ANS: A

The US has the fastest rate when the total number of births and immigration are taken into account.

PTS: 1 DIF: Knowledge

8. Why do countries with age-structure distributions similar to the leftmost type in Figure 2.11 (“Expanding Rapidly”) have rapid population growth rates?
- a. They have large numbers of girls who are about to become sexually mature
 - b. Most people in these countries are older than 15 years
 - c. Women older than 35 years are having more children in these countries
 - d. They have a larger ecological footprint

ANS: A

The large number of people younger than 15 (~29%) will soon enter their prime reproductive years.

PTS: 1 DIF: Comprehension

9. What will happen to the proportion of females to males (i.e., number of females / number of males) as the baby boomer population ages from 1985-2035? Hint: refer to Figure 2.12.
- a. increase
 - b. decrease
 - c. stay the same
 - d. impossible to calculate from available data

ANS: A

In 1985, the number of females and number of males was about the same (~20 million for each group). This yielded a female/male ratio close to 1. In 2035, the predicted number of females will be about twice the number of males, which will yield a ratio closer to 2. Thus the proportion increases over the period of time.

PTS: 1 DIF: Analysis

10. Which country is most likely to experience labor shortages in the future?
- a. Germany
 - b. The United States
 - c. Italy
 - d. Guatemala

ANS: A

By examining Figure 2.11, it can be observed that countries with a *declining* population growth rate (such as Germany) have a larger number of older people compared to younger people. As these populations continue to age, the number of young people able to work will decline.

PTS: 1 DIF: Analysis

11. Which of the following resources is NOT in danger of being depleted?
- a. air
 - b. minerals
 - c. biodiversity
 - d. topsoil

ANS: A

We can degrade the quality of air but we cannot deplete it. The other listed resources can decrease in availability due to human actions.

PTS: 1 DIF: Comprehension

12. What event constitutes a tragedy of the commons?
- a. When a gold mining company accidentally spills 100,000 gallons of cyanide water into a stream
 - b. When a logging company harvests trees at a slower rate than the rate they are replenished
 - c. When Exxon-Mobile Oil company donates land for a new national park
 - d. A environmental law that limits what private landowners can do on their own land if endangered species live there

ANS: A

The tragedy of the commons concerns the overuse of resources to the point that they are degraded beyond use or outright depleted. It occurs when people and groups assume that the resource base is unlimited and their use won't affect the resource.

PTS: 1 DIF: Application

13. How can a more-developed country (MDC) with 100 million people have a larger environmental impact than a less-developed country (LDC) with a population of 400 million people?
- a. People in the MDC tend to consume more and have more harmful technologies compared to people in the LDC
 - b. People in the MDC tend to consume less and have less harmful technologies compared to people in the LDC
 - c. People in the LDC tend to overconsume compared to those in the MDC
 - d. People in the MDC are less affluent than people in the LDC

ANS: A

While population is a part of the IPAT model, the affluence (consumption) and type of technological impact can outweigh the population to produce an overall greater impact.

PTS: 1 DIF: Synthesis

14. Which technology would result in a higher value for “T” when calculating a country’s environmental impact using the IPAT model?
- a. Power plants that burn coal
 - b. Power plants that use solar cells
 - c. Air pollution control systems
 - d. Wind turbines

ANS: A

Environmentally harmful technologies that pollute (like coal burning) have higher T values.

PTS: 1 DIF: Comprehension

15. As a country progresses from an Industrial to a Post-Industrial phase, which characteristic is expected to remain the same?
- a. death rate
 - b. birth rate
 - c. total population
 - d. number of married couples

ANS: A

Using Figure 2.18, countries entering the Post-Industrial stage experience drops in population and birth rates but not in the death rate. As total population falls, so must the number of married couples.

PTS: 1 DIF: Comprehension

16. Approximately how much higher is our current ecological footprint than the estimated long-term ecological capacity of the Earth?
- a. 1/3
 - b. 1/2
 - c. 1/4
 - d. 3/4

ANS: A

Scientists estimate we are currently exceeding the Earth’s capacity by 1/3 (~30%).

PTS: 1 DIF: Knowledge

17. What is the consensus that the Earth has a carrying capacity of 7 billion people (which is our current population)?
- a. There is no consensus.
 - b. Experts agree that we have exceeded the carrying capacity and face a dieback.
 - c. Experts agree that continued economic growth can provide resources for tens of billions more.
 - d. Experts agree that with 7 billion people, we are close to the carrying capacity.

ANS: A

Depending upon who you talk to, you get widely differing answers.

PTS: 1 DIF: Comprehension

18. Which countries with already large populations threaten to accelerate resource depletion and environmental degradation in the upcoming years as their consumption levels and technological impact quickly rises?
- a. China and India
 - b. Germany and England
 - c. Nigeria and Guatemala
 - d. Italy and Greece

ANS: A

China and India are considered rapidly developing countries that are transitioning from less-developed to more-developed in a very short period of time.

PTS: 1 DIF: Comprehension

19. According to many experts, which of these options would be most successful at slowing population growth in less-developed countries?
- a. Empowering women with education and opportunity to start businesses
 - b. Appointing younger men as tribal leaders
 - c. Allowing foreign agencies to provide child care
 - d. Allowing girls to skip school so they can contribute more to their families

ANS: A

Allowing women to be educated will open up economic opportunities for them and they will be able to contribute to their society as more than just child bearers.

PTS: 1 DIF: Knowledge

20. What is a promising way to help transition people out of poverty?
- a. Promote more low interest microloans
 - b. Promote more high interest microloans
 - c. Promote more loans from traditional banks
 - d. Promote more macrocredit banks

ANS: A

Non-traditional microcredit banks that loan small amounts of money at low interest rates have proven to help people work their way out of poverty.

PTS: 1 DIF: Knowledge

21. What program lowered TFRs by 55% in the world's less-developed countries between 1960 and 2010?
- a. family planning
 - b. encouraging unplanned pregnancies
 - c. discouraging use of contraceptives
 - d. lowering literacy rates for women

ANS: A

TFR stands for total fertility rate and family planning provides information on birth control and birth spacing.

PTS: 1 DIF: Knowledge

22. What is the proper term for a person who is homeless and starving due to environmental degradation?
- a. environmental refuge
 - b. environmental advocate
 - c. environmental stalwart
 - d. environmental protector

ANS: A

When your environment becomes degraded to the point that you can no longer make a living from it, then you become an environmental refugee.

PTS: 1 DIF: Knowledge

23. Why do poor couples in India tend to large families?
- a. So that they will be taken care of when they are old.
 - b. To get more money from the government.
 - c. A strong cultural preference for girls.
 - d. The high status of women.

ANS: A

In countries that lack government provided retirement programs (like Social Security in the US), the only way you can be sure you will be provided for in your old age is by your children taking care of you. Thus, the more children you have the better you will be provided for.

PTS: 1 DIF: Knowledge

24. What was the *original* motivation for China's one-child policy?
- a. avoid mass starvation
 - b. increase economic clout
 - c. control of the world
 - d. be a model for the rest of the world

ANS: A

The Chinese government became concerned that the population would out-strip the country's food production.

PTS: 1 DIF: Knowledge

25. What cultural bias has created problems with China's one-child policy?
- a. strong preference for boys
 - b. refusal by men to wear condoms
 - c. expensive health care
 - d. lack of available contraceptives

ANS: A

The age old preference for boys has caused an abundance of males and a shortage of females.

PTS: 1 DIF: Knowledge

26. What change has occurred in the number of environmental refugees between 1995 and 2011?
- a. increased greatly
 - b. remained the same
 - c. decreased
 - d. barely increased

ANS: A

From the mid-1990s to 2011, the number of environmental refugees increased from 25 million to 40 million.

PTS: 1 DIF: Knowledge

27. What caused the greatest number of refugees from 1995-2011?
- a. environmental degradation
 - b. civil war
 - c. religious persecution
 - d. political oppression

ANS: A

Growing populations in less-developed countries end up living in marginalized, degraded environments.

PTS: 1 DIF: Knowledge

28. What typically happens to poor people born in less-developed countries that already have large populations?
- a. They are forced to live on land with degraded soils and water resources.
 - b. They are given their choice of the best farmland.
 - c. They are provided with generous grants from the government.
 - d. They are given equal access to the country's natural resources.

ANS: A

Given that all of the best land is already taken in overcrowded countries, those born into poverty have little access to the resources they need to make a living.

PTS: 1 DIF: Application

29. What kind of growth is taking place in a population that doubles its size in 1000 years, and then doubles it again in 100 years, and finally doubles again in just 10 years?
- a. exponential
 - b. linear
 - c. circumstantial
 - d. negative growth

ANS: A

In exponential growth, while the growth rate remains at a positive, fixed (non-zero) value, the population doubles at increasingly smaller time units.

PTS: 1 DIF: Knowledge

30. An increase in the amount of which of these limiting factors will lead to population decline?
- a. predators
 - b. food
 - c. water
 - d. space

ANS: A

Limiting factors place natural controls on the growth of a population. If you provide more food, water, and space the population typically increases. Predators reduce the population.

PTS: 1 DIF: Knowledge

31. What shape is used to describe a population that has reached its environmental carrying capacity and stabilized?
- a. S
 - b. J
 - c. K
 - d. V

ANS: A

As limiting factors act to determine the carrying capacity and the population size stabilizes, the curve of size vs. time has a sinusoidal shape that resembles an S-shaped curve.

PTS: 1 DIF: Knowledge

32. Human population is currently following a J-shaped growth curve. Which of these hypothetical factors would maintain this growth pattern and prohibit the growth curve from turning into an S-shaped one?
- a. New medicines to stop the spread of disease
 - b. Better farm machinery
 - c. New fossil fuel supplies
 - d. Improved factory fishing boats

ANS: A

Humans have been able to use a variety of technological advancements to expand their population. They have been taxing the land, oceans, and energy supplies with these technologies. Science, on the other hand, is based on understanding the natural world and there is still much left to learn. As we continue to understand different diseases we can continue to devise solutions for these age old limiting factors.

PTS: 1 DIF: Evaluation

33. What do less-developed countries have **more of** compared to more-developed countries?
- a. population
 - b. income per person
 - c. consumption per person
 - d. waste per person

ANS: A

Since people in more-developed countries consume more than those in less developed countries, they also produce more waste per person. Less developed countries contain most of the world's population.

PTS: 1 DIF: Knowledge

34. What percentage of the 25 key nonrenewable mineral resources must the US import?
- a. All or nearly all
 - b. Little to none
 - c. 1/4 to 1/2
 - d. 1/2 to 3/4

ANS: A

The US exhausted its supplies of these key minerals long ago (~100 years ago) and now relies entirely on other countries to supply these materials needed for critical technologies such as cell phones, computers, jet engines, and many others.

PTS: 1 DIF: Knowledge

35. Which of the following actions would trigger an ecological tipping point?
- a. Repeatedly clearing a tropical rainforest in Indonesia
 - b. Repeatedly repaving a mall parking lot
 - c. Repeatedly clearcutting a pine plantation in southern Georgia
 - d. Repeatedly cutting the grass on a golf course

ANS: A

Rainforests are natural ecosystems with poor soils that are easily disturbed and then eroded when disturbed. The other systems listed are heavily managed by humans and their natural complexity has already been compromised.

PTS: 1 DIF: Comprehension

36. How can the IPAT model be used to predict changes caused by continued growth in China?
- a. If China continues to use harmful technologies its environmental impacts will increase.
 - b. The IPAT model predicts that China's military might will grow sharply.
 - c. The IPAT model predicts that China's environmental impacts will dramatically decrease.
 - d. As China's population increases, the share of resources it consumes will decrease.

ANS: A

The IPAT model is a formula based on population, affluence, and type of technology. The technology used can either be harmful (increased T) or helpful (decreased T). Low T causes a lower impact.

PTS: 1 DIF: Knowledge

37. Humans have long used technology as a way to solve our problems. What is the consensus among environmental scientists and economists about creating and using better technology to offset our current environmental impacts?
- a. There is no consensus, it depends on who you talk to.
 - b. Both groups agree that more technology is the key to alleviate environmental impacts.
 - c. Both groups disagree that more technology is the key to alleviate environmental impacts.
 - d. Economists believe in more technology to solve our problems but the scientists say we need less.

ANS: A

Economists and scientists are trained in very different ways. Economists have long recognized that technology is how industrialized (more-developed) countries have transformed themselves into economic powerhouses. They see only the positive aspects. Scientists are trained in different ways and are divided on the benefits of more technology, some think we simply need less technology.

PTS: 1 DIF: Comprehension

38. Which statement best represents the views of a mainstream economist from a technologically advanced country?
- a. The Earth can support a world population of 30 billion people without serious environmental harm.
 - b. The Earth can support a world population of 300 billion people without serious environmental harm.
 - c. The Earth can support a world population of 30 billion people but with serious environmental harm.
 - d. If the population of the earth exceeds 7 billion, we will experience a major human dieback.

ANS: A

Economists believe that technology is the key to solving society's problems and stimulating the economy. They have little training in the adverse aspects of harmful technologies or in the correlation between population and environmental degradation.

PTS: 1 DIF: Application

39. What percentage of women in the world suffers from poverty?
- a. 70%
 - b. 100%
 - c. 0%
 - d. 20%

ANS: A

7 out of 10 women suffer from poverty.

PTS: 1 DIF: Knowledge

40. How was population growth slowed in Thailand?
- a. family planning
 - b. one-child policy
 - c. mandatory sterilizations
 - d. jail time for those who don't use condoms

ANS: A

Thailand has implemented an aggressive family planning policy that encourages participation through enticements.

PTS: 1 DIF: Knowledge

COMPLETION

1. The maximum population that a species can attain in a particular environment due to limiting factors is called its _____ capacity.

ANS: carrying

PTS: 1 DIF: Knowledge

2. The process of degrading or depleting resources that are publicly held or available to everyone (like air) is called the _____ of the commons.

ANS: tragedy

PTS: 1 DIF: Knowledge

3. Irreversible changes in ecological systems caused by human activities that result in large scale environmental changes are causing those systems to experience an ecological _____ point.

ANS: tipping

PTS: 1 DIF: Knowledge

4. A successful way to lower birth rates in many countries is through the use of _____ planning.

ANS: family

PTS: 1 DIF: Knowledge

5. People who have been forced to leave their homes because of degraded soil and water are called _____ refugees.

ANS: environmental

PTS: 1 DIF: Knowledge

SHORT ANSWER

1. If a certain species of bacteria is capable of reproducing quickly enough that it could cover the earth in a one foot layer in two days, why hasn't this happened?

ANS:

Limiting factors such as temperature, the availability of food, and abundance of predators keep its growth in check.

PTS: 1 DIF: Knowledge

2. Our current agricultural technology is based on using large amounts of fossil fuels, particularly petroleum. Propose a hypothesis that predicts what will happen if we run out of petroleum.

ANS:

If we do not find a suitable energy replacement, then the human population might decline, and some scientists have predicted that a crash is possible.

PTS: 1 DIF: Evaluation

3. How are we depleting groundwater stored in aquifers?

ANS:

We are extracting it from the ground (with wells) quicker than it can replenished (by percolation).

PTS: 1 DIF: Knowledge

4. What are two major reasons we should care about human population growth.

ANS:

Since we depend upon the earth's life support system for our livelihood, having more people places a strain on this finite resource base and there is solid scientific evidence that we are degrading the capacity of the planet to support not only more people but its current population.

PTS: 1 DIF: Knowledge

5. How is dumping radioactive waste in the oceans a tragedy of the commons?

ANS:

Since the oceans are a commons area that is shared by all people on the planet, this resource is degraded when human use overwhelms the natural systems and impairs the rate of replenishment.

PTS: 1 DIF: Application

ESSAY

1. Why is the human population currently experiencing exponential population growth after 10,000 years of fairly flat growth? How long can this growth pattern continue?

ANS:

Our use of fossil fuels has given us access to a huge energy supply that gives us a distinct technological advantage. Improved agricultural methods and technology has allowed us to dramatically increase the world's food supply. Much of this increase in food supply has been accomplished with the use of non-renewable fossil fuels. Advances in medical technology have increased the number of children surviving childbirth and extended the average lifetime. It is projected that these advances will enable the human population to grow exponentially until around 2050.

PTS: 1 DIF: Application

2. How can we use the parable of the tragedy of the commons to create sustainable societies?

ANS:

The majority of resource depletion has traditionally taken place in areas for which our resources were considered "unlimited" and for which there was no little or no regulatory oversight to limit the overconsumption. This lack of oversight worked fine when the population pressures were low and when the degree of technological advancement was limited. Now that humans have developed the capacity to overwhelm almost every resource base to the point where it can be degraded and depleted, we can use the lesson of the tragedy of the commons to guide and change our current direction. While this means that we may have to abandon the idea that the planet is a "commons" for all to use as they wish, it is a necessary insight into our relationship with nature if we are to create a sustainable society.

PTS: 1 DIF: Application