AP Environmental Systems Ch. 1

**Environmental Problems, Their Causes, and Sustainability**

**Core Case Study:** A Vision of a More Sustainable World in 2065

* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in human attitudes toward the environment, and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in behavior, can lead to a much better future for the planet in 2065
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ The capacity of the earth’s natural systems and human cultural systems to survive, flourish, and adapt into the very long-term future

**1-1: What Are Some Principles of Sustainability?**

* Nature has sustained itself for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of years by using solar energy, biodiversity, and nutrient cycling
* Our lives and economies depend on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the sun and on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resources and natural services (natural capital) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the earth
* Shift toward living more sustainably by:
	+ Applying \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pricing, searching for win-win solutions
	+ Committing to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the earth’s life-support system for future generations

Environmental Science Is a Study of Connections in Nature

* Environment: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ around us
* Environmental science: interdisciplinary science connecting information and ideas from:
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sciences: ecology, biology, geology, chemistry
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sciences: geography, politics, economics
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: ethics, philosophy

Three Scientific Principles of Sustainability

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on solar energy
	+ The sun provides warmth and fuels photosynthesis
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Astounding variety and adaptability of natural systems and species
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cycling
	+ From the environment to organisms and then back to the environment

Sustainability Has Certain Key Components

* Natural \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: keep species alive
	+ Natural \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: useful materials and energy in nature
	+ Natural \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: important nature processes such as renewal of air, water, and soil
* Ecosystem services
	+ Processes provided by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ecosystems

Other Principles of Sustainability Come from the Social Sciences

* Full-cost pricing
	+ Include harmful \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ costs of goods and services
* Win-win solutions
	+ Benefit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A responsibility to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ generations

Some Resources Are Renewable and Some Are Not

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ we obtain from the environment to meet our needs
	+ Some \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ available for use: sunlight
	+ Some not directly available for use: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* An \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resource
* Solar energy
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resource
* Several \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to several \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ years to renew
* Examples: forests, grasslands, and fertile soil
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ yield
	+ Highest rate at which we can use a renewable resource without \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ available supply
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resources
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ stock on earth
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resources
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mineral resources
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mineral resources

Countries Differ in their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Use and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Impact

* More-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ countries
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nations with high average income
	+ 17% of the world’s population
* Less-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ countries
* 83% of the world’s population

**1-2: How Are Our Ecological Footprints Affecting the Earth?**

* As our \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ grow, we are depleting and degrading more of the earth’s natural capital

We Are Living \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Environmental \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: wasting, depleting, and degrading the earth’s natural capital
	+ Happening at an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rate

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Comes from a Number of Sources

* Sources of pollution
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sources
		- Single, identifiable source
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sources
		- Disbursed and difficult to identify
* What are some strategies for pollution cleanup and prevention?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Degrading Commonly Shared Renewable Resources

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of resources
	+ Open access \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resources
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resources
* Tragedy of the commons
	+ Common property and open-access renewable resources are degraded from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ What are some solutions?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ecological Footprints: A Model of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Use of Resources

* Ecological footprint
	+ Amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ productive land and water needed to provide a person or area with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resources, and to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ wastes and pollution
* Per capita ecological footprint
* Ecological \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Footprint is larger than biological capacity for replenishment

IPAT is Another Environmental Impact Model

* I = P x A x T
	+ I = Environmental \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ P = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ A = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* T = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Case Study:** China’s Growing Number of Affluent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* World’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ population
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ largest economy
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the most polluted cities are in China
* Projections for next decade
	+ Largest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of cars

Cultural Changes Can Grow or Shrink Our Ecological Footprints

* Humans were \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 12,000 years ago
* Three major cultural events
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ revolution
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ revolution
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ revolution
* Current need for a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ revolution

**1-3: Why Do We Have Environmental Problems?**

* Major causes of environmental problems
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ growth, unsustainable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ use, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of full-cost pricing, and increasing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from nature
* Our environmental \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ play a key role in determining whether we live unsustainably or more sustainably

Experts Have Identified Several Causes of Environmental Problems

* Population growth
* Wasteful and unsustainable resource use
* Poverty
* Failure to include the harmful environmental costs of goods and services in market prices
* Increasing isolation from nature

The Human Population is Growing at a Rapid Rate

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ growth
	+ Population increases at a fixed percentage per unit time
* No one knows how many people the earth can support \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (carrying capacity)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Has Harmful and Beneficial Environmental Effects

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environmental impact due to:
	+ High levels of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ High levels of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Unnecessary \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of resources
* Affluence can provide funding for developing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to reduce:
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Environmental \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Resource \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Has Harmful Environmental and Health Effects

* Unable to fulfill basic needs
	+ Adequate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Working to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Prices of Goods and Services Do Not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the Harmful Environmental Costs

* Companies do not pay the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cost of resource use
* Goods and services do not include the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environmental costs
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ receive tax breaks and subsidies

We are Increasingly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from Nature

* Increasing populations in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ areas
* Nature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ disorder
	+ Not having enough \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with nature

People Have Different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on Environmental Problems/Solutions

* Environmental \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: What is right and wrong with how we treat the environment?
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ worldview
		- We are separate from and in charge of nature
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ worldview
		- Manage earth for our benefit with ethical responsibility to be stewards
	+ Environmental \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ worldview
		- We are part of nature and must engage in sustainable use

**1-4: What Is an Environmentally Sustainable Society?**

* Living \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Live off the earth’s natural income without \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the natural capital that supplies it

Environmentally Sustainable Societies

* Environmentally sustainable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Meets current needs in a just and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ manner without \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ future generations’ ability to meet their needs
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ income
	+ Renewable resources

A More Sustainable Future is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Overall attitude that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environmental wisdom with compassion for all life
* Social scientists suggest it only takes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of the population to bring about major social change
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ social change can occur more quickly than we often think

Three Big Ideas

* A more sustainable future will require that we:
	+ Rely more on energy from the sun and other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy sources
	+ Protect \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through the preservation of natural capital
	+ Avoid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the earth’s vitally important chemical cycles
* A major goal for becoming more sustainable is full-cost pricing—the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of harmful environmental and health costs in the market prices of goods and services
* We will benefit ourselves and future \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ if we commit ourselves to:
	+ Finding win-win-win \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to our problems
	+ Leaving the planet’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ system in at least as good a shape as what we now enjoy

Tying It All Together

* The key to environmental solutions
	+ Apply the principles of sustainability to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of our economic and social systems, and individual \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The 21st century’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ generation will decide the path which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ takes