1 ENVIRONMENTAL AND SOCIETY

A Sustainable Partnership?

PowerPoint® Lecture prepared by Gary A. Beluzo

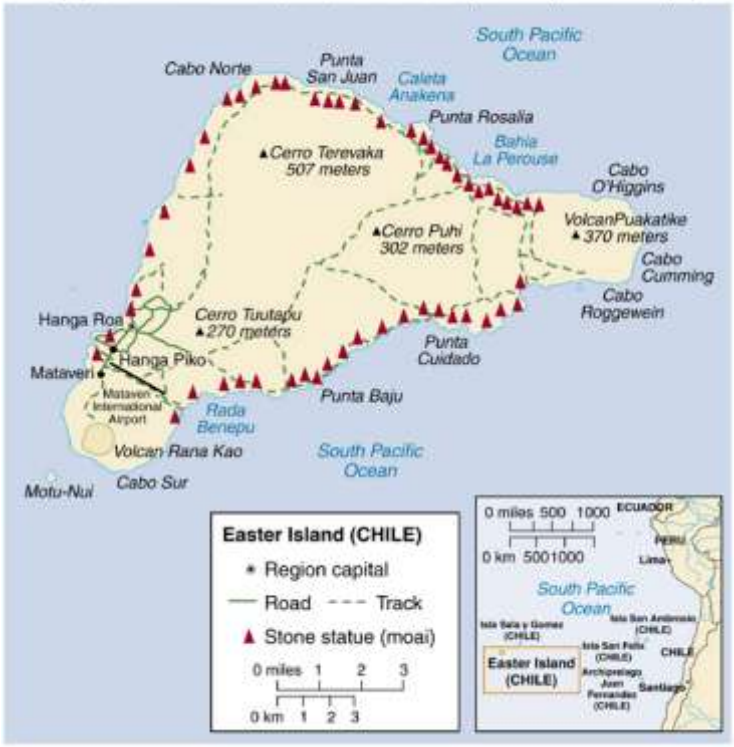
STUDENT LEARNING OUTCOMES

After reading this chapter, students will be able to

- Explain the mechanisms behind the collapse of Easter Island.
- Describe why equity and fairness are essential to sustainability.
- Identify the essential components of their ecological footprint.
- Explain how resource degradation and environmental degradation affect human well-being.
- Explain how subsidies and externalities contribute to environmental change.

Easter Island: The Island that Self-Destructed

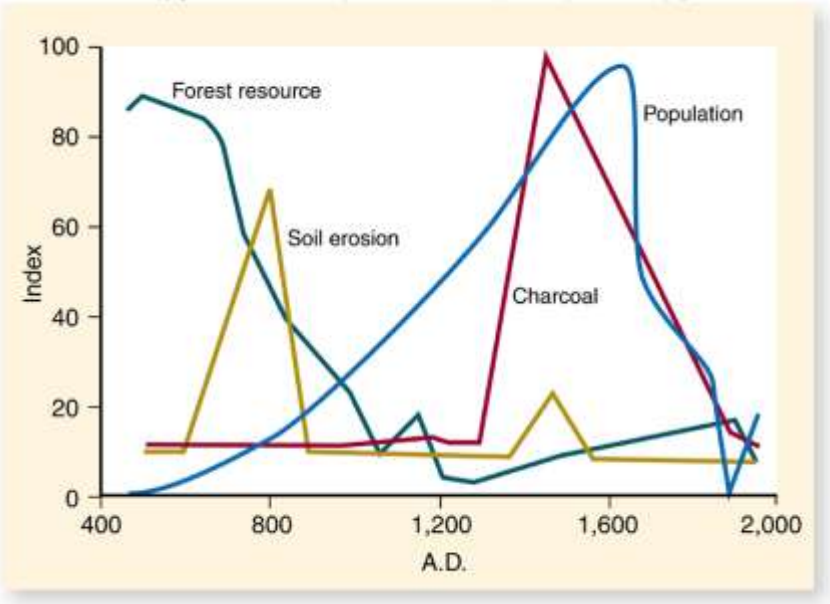
- **Most isolated inhabited land on Earth**
- Polynesians originally settled the island in first centuries AD
- “Discovered” on Easter Sunday, 1722 by Dutch explorers
- *Moai* were rock statues raised vertically without metal tools
- ***What caused Easter Island environment and society to change drastically?***



Principles of Sustainability

P1 ***A sustainable society does not use natural resources or produce wastes faster than they are regenerated or assimilated by the environment***

- Natural Resource
  - Meets our biological and economic needs and wants
- Environmental Services
  - Natural processes that regulate conditions to make planet suitable for life
  - Waste assimilation
  - Pollution
  - Forest and soils
  - How do scientists use pollen?



Principles of Sustainability

P2 ***Decisions that promote sustainability are consistent with the fact that human society is a system that is part of a larger system, the natural environment….***

- **System**
  - Collection of parts that generate a regular or predictable pattern
- Society and Environment are an interconnected system
- Connections may **amplify or dampen** the effects of human actions on the environment
  - Positive feedback loops
  - Negative feedback loops

Principles of Sustainability

P3 ***The first two principles must be meshed with the ethical and moral principles that govern fairness among nations, between genders, and among current and future generations.***

- Equity and Fairness
  - How civilizations flourish
  - The “Birdman Cult”

Principles of Sustainability

P4 ***Social incentives must reward those who act in a sustainable way and punish those who act in a non-sustainable manner.***

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Are we headed in the right direction?

Violating Principle 1: Depletion and Degradation of Natural Resources and Environmental Services

- Non-Renewable Resources
- Global Climate Change
- Loss of Biodiversity

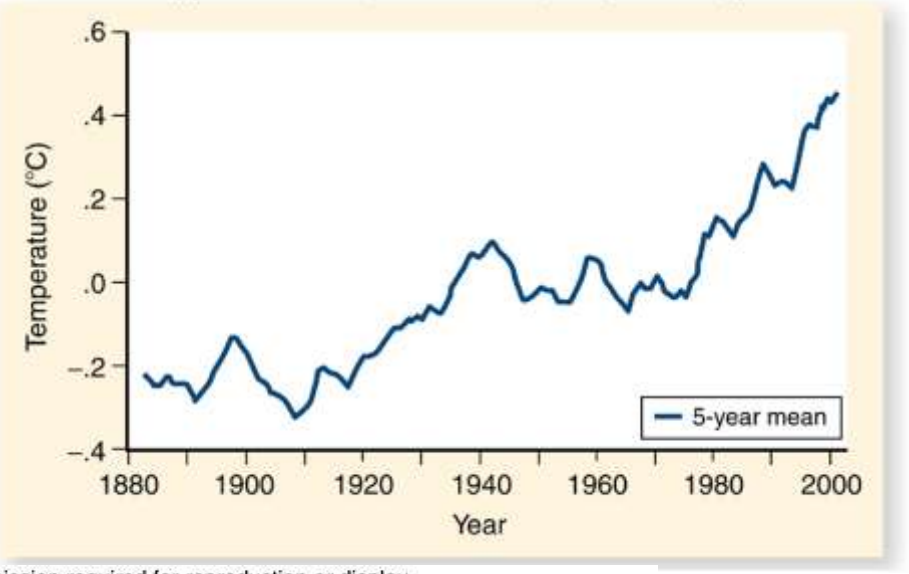

TABLE 1.1 The Rates of Use of Natural Resources Compared to Their Rates of Natural Renewal

Resource	Rate of Replenishment	Rate of Use or Degradation by Humans	Ratio of Use to Replenishment
Biodiversity	20,000 years for evolution to create 20 species of mammals	20 species of mammals extinct in twentieth century	1,000:1
Crude oil	0.8 million barrels per year created by geologic processes	30 billion barrels per year used by the global economy	31,000:1
Tropical forests	1.0 million hectares of humid tropical forest regrowth per year	5.8 million hectares of humid tropical forest cut per year	5.8:1
Fertile soil	1 ton/hectare/year of new soil created	16 tons/hectare/year eroded from U.S. farmland per hectare per year	16:1

Are we headed in the right direction?

Violating Principle 2: Policies that Lack a Systems Perspective

- Policy-Making without a Systems Approach
- Reductionistic Solutions
  - Taller Stacks solve local problem but lead to Regional Problem

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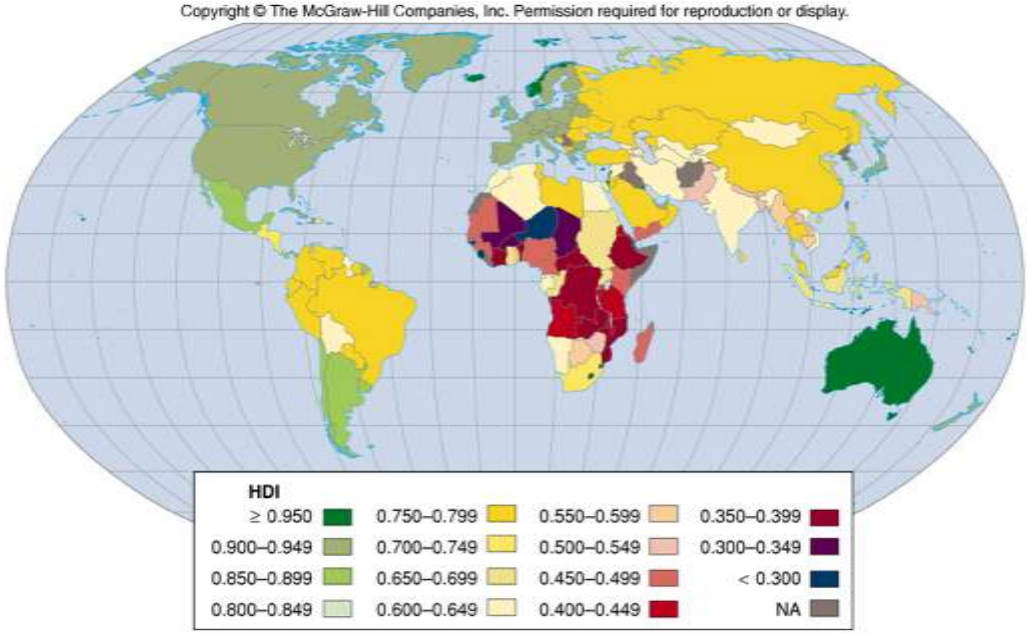
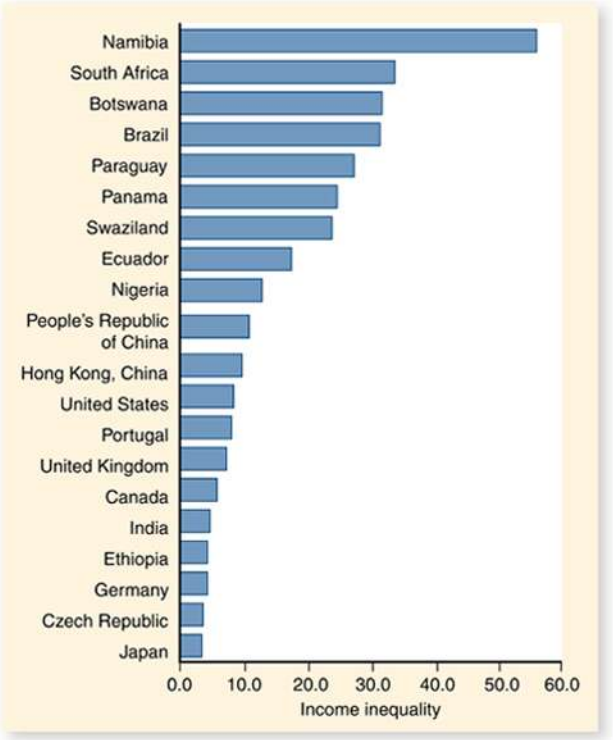
Are we headed in the right direction?

Violating Principle 3: Unequal Opportunities for Human Development

- More Developed versus Less Developed Nations (**GDP**)
- Life Expectancy
- Disparate Income





Are we headed in the right direction?

Violating Principle 4: Actions must be both Environmentally and Economically Stable.

- Subsidies benefit corporations but discourage sustainable practices and often harm the environment
- Environmental Performance Bonds

The Ecological Footprint

Equal to all the natural resources and environmental services used to produce your food, clothing, and shelter, and the other goods and services that you use

- Individuals Can Make a Difference
- How do your actions affect sustainability?
- Ecological Footprint of the *Moai*?

Your Ecological Footprint?

(Assume 10 kilometers from School or Work)

Drive a Car

- Burn 1 liter gas
- 8000 kcals
- 2 kg carbon emissions
- ¼ kg of carbon monoxide

Bicycle

- Burn 210 kcals
- 40x less than car
- No harmful chemicals