Section E: Human Population Growth

1. The human population has been growing almost exponentially for three centuries but cannot do so indefinitely
2. Estimating Earth’s carrying capacity for humans is a complex problem
Introduction

• Humans are not exempt from natural processes.
1. The human population has been growing almost exponentially for three centuries but cannot do so indefinitely

- The human population increased relatively slowly until about 1650 when the Plague took an untold number of lives.
  - Ever since, human population numbers have doubled twice
    - How might this population increase stop?
• The Demographic Transition.

• A regional human population can exist in one of 2 configurations.

  • Zero population growth = high birth rates – high death rates.

The movement from the first toward the second state is called the **demographic transition**.
• Age structure.

  • **Age structure** is the relative number of individuals of each age.

  • Age structure diagrams can reveal a population’s growth trends, and can point to future social conditions.
Fig. 52.22
2. Estimating Earth’s carrying capacity for humans is a complex problem

- Predictions of the human population vary from 7.3 to 10.7 billion people by the year 2050.
  - Will the earth be overpopulated by this time?
• Wide range of estimates for carrying capacity.
  • What is the carrying capacity of Earth for humans?
  • This question is difficult to answer.
    • Estimates are usually based on food, but human agriculture limits assumptions on available amounts.

• Ecological footprint.
  • Humans have multiple constraints besides food.
  • The concept of ecological footprint uses the idea of multiple constraints.
• For each nation, we can calculate the aggregate land and water area in various ecosystem categories.

• Six types of ecologically productive areas are distinguished in calculating the ecological footprint:
  • Land suitable for crops.
  • Pasture.
  • Forest.
  • Ocean.
  • Built-up land.
  • Fossil energy land.
• Figure 52.23 graphs the ecological footprints for 13 countries.
• We may never know Earth’s carrying capacity for humans, but we have the unique responsibility to decide our fate and the fate of the rest of the biosphere.