

1 Chapter 6

Human Population

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2 This lecture will help you understand:

- The scope of human population growth
- The effect of population, affluence, and technology on the environment
- Fundamentals of demography
- The demographic transition
- Factors that affect population growth

3 Case study: China's one-child policy

- In 1970, China's 790 million people faced starvation.
 - The average Chinese woman gave birth to 5.8 children.
- The government instituted a one-child policy.
 - China's growth rate plummeted.
 - The government first used education and outreach and later instituted rewards and punishments.
 - In 1984, the policy exempted ethnic minorities and farmers.
- The program has been both successful and controversial.
 - The low growth rate makes it easier to deal with challenges.
 - It has produced unintended consequences: killing female infants and a black-market trade in teenage girls.

4 Human population growth: 7 billion

- Populations continue to rise in most countries.
 - Particularly in poverty-stricken developing nations
- Although the rate of growth is slowing, we are still increasing in absolute numbers.

5 The human population is still growing rapidly

- It took all of human history to reach 1 billion.
- In 1930, 130 years later, we reached 2 billion, and added the most recent billion in 12 years.
 - We add 80 million people each year (2.5 people/second).

6 Rates of growth vary from region to region

- At today's 1.2% global growth rate, the population will double in 58 years ($70/1.2 = 70$).
- If China's rate continued at 2.8%, it would have had 2 billion people in 2004.

7 Is population growth really a problem?


- Population growth results from technology, medical care, sanitation, and food.
 - Death rates drop, but not birth rates.
- Some people say growth is no problem.
 - New resources will replace depleted ones.
 - But some resources (i.e., biodiversity) are irreplaceable.
- Quality of life will suffer with unchecked growth.
 - Less food, space, wealth per person
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8 Causes and consequences of population growth


9 Some people fear falling populations

- Population growth is correlated with poverty, not wealth.
- Policymakers believe growth increases economic, political, and military strength.

- They offer incentives for more children.
- 67% of European nations think their birth rates are too low.
- In non-European nations, 49% feel their birth rates are too high.

10  **Population growth affects the environment**


- The IPAT model: $I = P \times A \times T$
 - Our total impact (I) on the environment results from the interaction of population (P), affluence (A), and technology (T).
 - Population: individuals need space and resources and produce waste
 - Affluence: per capita resource use
 - Technology: allows increased exploitation of resources
 - But can also reduce our impact (e.g., decrease emissions)
 - Further model refinements include: sensitivity of the environment to impacts, education, laws, ethics

11  **Demography**

- Humans can raise the environment's carrying capacity through technology.
 - How many humans can the world sustain?
 - 1–33 billion
 - Population growth can't continue forever.

12  **Demography studies human populations**

- Demography: the application of population ecology to the study of human populations
 - Population size
 - Density and distribution
 - Age structure, sex ratio
 - Birth, death, immigration, and emigration rates

13  **Population size and density**

- Nobody knows the ultimate human population size.
 - But numbers are not the only important aspect.
- Highest population density is in temperate, subtropical, and tropical biomes.
 - Density increases near coasts, waterways, and cities.

14  **Population density and distribution**


- Increased density impacts the environment, but relieves pressure in less-populated areas.
- Humans are unevenly distributed around the globe.
 - Unpopulated areas tend to be environmentally sensitive (i.e., deserts).

15  **A changing age structure poses challenges**

- Many populations are getting older.
 - Older people need care and financial assistance.
 - But also reduces the number of dependent children and crime rates

16  **Sex ratios**

- Naturally occurring sex ratios for humans slightly favor males (100 females born to 106 males).
 - Males are slightly more prone to death.
- In China, 120 boys were reported for 100 girls.
 - Cultural gender preferences, combined with the government's one-child policy, led to selective abortion of female fetuses.
 - Had the undesirable social consequences of leaving many single Chinese men
 - Teenage girls are kidnapped and sold as brides.

17  **Population growth depends on various factors**

- Whether a population grows, shrinks, or remains stable depends on:
 - Rates of birth, death, and migration

- Birth and immigration add individuals.
 - Death and emigration remove individuals.
 - Technological advances led to dramatic decline in human death rates.
 - Widening the gap between birth rates and death rates resulting in population expansion
- 18 **Growth rates are decreasing, but...**
Falling growth rates do not mean a decreasing population, but only that rates of increase are slowing.
- 19 **Factors affecting total fertility rate**
- Total fertility rate (TFR): the average number of children born per female
 - Replacement fertility: TFR that keeps the size of a population stable
 - For humans, replacement fertility = 2.1
 - Urbanization decreases TFR.
 - Access to medical care
 - Children attend school and impose economic costs
 - With social security, elderly parents need fewer children to support them.
 - Greater education allows women to enter the labor force, with less emphasis on child rearing.
- 20 **Worldwide, total fertility varies widely**
- Every European nation now has a TFR < replacement level
 - Natural rate of population change: population change due to birth and death rates alone
 - In countries with good sanitation, health care, and food, people live longer. (They have a higher life expectancy.)
- 21 **The demographic transition**
- Demographic transition: a model of economic and cultural change to explain the declining death and birth rates in industrialized nations
 - Stable pre-industrial state of high birth and death rates changes to a stable post-industrial state of low birth and death rates
 - Industrialization causes these changes.
 - As mortality decreases, there is less need for large families, and parents invest in quality of life.
 - Because of high birth rates and low death rates, population growth occurs.
- 22 **The demographic transition's four stages**
In this model, population growth is seen as a temporary phenomenon as societies industrialize.
- 23 **Is the demographic transition universal?**
- It has occurred in Europe, U.S., Canada, Japan, and other nations over the past 200-300 years.
 - But it may or may not apply to all developing nations.
 - The transition could fail in cultures...
 - That place greater value on childbirth or
 - Grant women fewer freedoms
- 24 **Empowering women reduces growth rates**
- Fertility rates drop when women gain access to contraceptives, family planning programs, and better educational opportunities.
 - In 2007, 54% of married women worldwide used contraception.
 - China = 86%; the U.S. = 68%; 20 African nations < 10%
- 25 **Population policies and family planning work**

- Many countries provide incentives, education, contraception, and reproductive health care.
 - Funding and policies that encourage family planning lower population growth rates in all nations.
 - Thailand has an educational based approach to family planning and its growth rate fell from 2.3% to 0.7%.
 - Brazil, Mexico, Iran, Cuba, and other developing countries have active programs.
- 26 **Poverty and population growth are correlated**
- Poorer societies have higher growth rates than wealthier societies.
 - Consistent with the demographic transition theory
 - They have higher fertility and growth rates, with lower contraceptive use.
 - Poverty results in environmental degradation.
- 27 **Wealth also produces environmental impacts**
- The population problem does not exist only within poor countries.
 - Affluent societies have enormous resource consumption and waste production.
 - People use resources from other areas, as well as from their own.
 - Individuals' ecological footprints are huge.
- 28 **The wealth gap and population growth cause conflict**
- The stark contrast between affluent and poor societies causes social and environmental stress.
 - The richest 20% use 86% of the world's resources.
 - Leaves 14% of the resources for 80% of the world's people to share
 - Tensions between "haves" and "have-nots" are increasing.
- 29 **Wealthy nations must help others**
- If developing countries cannot overcome their increasing social, economic, and environmental problems...
 - And if developed nations do not help...
 - Then these countries may not advance through the demographic transition, and instead will result in greater population growth, and worsening social and environmental conditions.
 - A profoundly negative outcome for humans and the environment
- 30 **Conclusion**
- The human population is larger than at any time in the past.
 - Populations are still rising, even with decreasing growth rates.
 - Most developed nations have passed through the demographic transition.
 - Expanding rights for women slows population growth.
 - Will the population stop rising through the demographic transition, restrictive governmental intervention, or disease and social conflict caused by overcrowding and competition?
 - Sustainability requires a stabilized population in time to avoid destroying natural systems.