

AP Environmental Science

Chapter 7: Human Population

Objectives: Students should be able to...

7.1 - describe the potential limits to human population growth.

- 7.1.1 Using the graph of human population growth over time (fig 7.1), identify major events in the timeline that had an impact on the growth rate
- 7.1.2 Explain Thomas Malthus' ideas about human population growth and resources to support the growth. Compare his ideas to those of other scientists and what evidence there is to support each theory.

7.2 - describe important aspects of global and national population growth using demographic terminology and tools.

- 7.2.1 Differentiate between immigration and emigration and inputs and outputs for population size
- 7.2.2 Define Crude Birth Rate (CBR) and Crude Death Rate (CDR)
- 7.2.3 Define doubling time
- 7.2.4 Solve the doubling time equation given certain variables
- 7.2.5 Identify the current size of the human population and the projected range of the future size and stabilization range.
- 7.2.6 Define Total Fertility Rate (TFR)
- 7.2.7 Define replacement-level fertility and identify the reasons behind why it changes depending upon the population
- 7.2.8 Explain how life expectancy and infant mortality can be used to determine the affluence and what other characteristics can be determined
- 7.2.9 Create an age structure diagram given data and correctly read a age structure diagram

7.3 - evaluate the social, economic, and environmental factors that have contributed to decreasing growth rates in many countries.

- 7.3.1 Define the Theory of Demographic Transition
- 7.3.2 Explain what is occurring at each phase of the Demographic Transition graph and the reasons behind the changes that are occurring (especially in relation to birth rates, death rates, and TFR)
 - 7.3.2.1 Slow
 - 7.3.2.2 Rapid
 - 7.3.2.3 Stable
 - 7.3.2.4 Declining
- 7.3.3 Identify countries that fall into each phase
- 7.3.4 Identify the role education, social status, and age can have how many children women have during their lifetime
- 7.3.5 Explain the different strategies taken by countries to lower their TFR. You should be most familiar with the following countries
 - 7.3.5.1 China
 - 7.3.5.2 India
 - 7.3.5.3 Kenya

7.4 - analyze relationships among changes in population size, economic development, and resource consumption at global and local scales.

- 7.4.1 Identify the top 5 most populous countries (in order)
- 7.4.2 Describe what is occurring with the growth rate in developed countries versus developing countries
- 7.4.3 Compare and contrast the affluence found in developing versus developed countries and the effect this has on the per capita ecological footprint of these countries
- 7.4.4 Identify the four components in the I=PAT equation and the effect each component has on the environmental impact of a population
- 7.4.5 Identify the trend in the percentage of individuals living in urban areas and the benefits and drawbacks of this trend
- 7.4.6 Identify the correlation between GDP and affluence and how it all connects to pollution and environmental impact levels (aka Kuznet's Curve)

7.5 - explain how people have attempted to harmonize economic development with sustainable development.

- 7.5.1 Identify the goal of the Millennium Ecosystem Assessment Project
- 7.5.2 Summarize what the conclusions drawn by the Millennium Ecosystem Assessment Project mean for the current human population and future populations

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Chapter 11: Feeding the World

Objectives: Students should be able to...

11.1 - describe human nutritional needs and the challenges of overcoming hunger and malnutrition.

- 11.1.1 Identify the time when agriculture became prevalent and its effect on the human population
- 11.1.2 Differentiate between the following terms
 - 11.1.2.1 Undernutrition
 - 11.1.2.2 Malnourished
 - 11.1.2.3 Overnutrition
 - 11.1.2.4 Food Security
 - 11.1.2.5 Food Insecurity
 - 11.1.2.6 Famine
- 11.1.3 Identify the percentage of grains, meat, and fish in the human diet
- 11.1.4 Identify the primary reason for undernutrition and malnutrition & why it is more complex than just lack of food
- 11.1.5 Identify the major use of grain and what issue results in energy due to this use
- 11.1.6 Explain why we observe the current trends in total and per capita grain production worldwide over the past 60 years

11.2 - explain the development of modern industrial agriculture, the role played by inputs such as irrigation water, fertilizers, and pesticides, and the environmental consequences of modern farming methods.

- 11.2.1 Define industrial agriculture, or agribusiness
- 11.2.2 Define energy subsidy and be able to read and understand Figure 11.4
- 11.2.3 Identify the most common energy subsidy in modern agriculture and explain what the consequence of this fact could be on humans
- 11.2.4 Summarize the Green Revolution
- 11.2.5 Explain Economies of Scale and its connection to small and large farms
- 11.2.6 Explain waterlogging and its possible consequences
- 11.2.7 Explain salinization and its possible consequences
- 11.2.8 Compare and contrast organic and inorganic (synthetic fertilizers)
- 11.2.9 Define monocropping and its benefits and drawbacks
- 11.2.10 Define pesticides, and differentiate between herbicide and insecticide
- 11.2.11 Differentiate between broad-spectrum and selective pesticides
- 11.2.12 Differentiate between persistent and nonpersistent pesticides
- 11.2.13 Define bioaccumulation and explain its effects on a community of organisms
- 11.2.14 Explain the pesticide treadmill and why it is an example of a positive feedback loop

11.3 - identify the benefits and costs of using genetically modified organisms in agriculture.

- 11.3.1 Identify the three general benefits that can be seen from genetically modified organisms
- 11.3.2 List and explain two examples of genetically modified organisms (GMOs) increasing crop yield and quality
- 11.3.3 Explain what scientists have done to crops to change the way pesticides are used in agriculture
- 11.3.4 Identify the difference between the United States and Europe on GMOs
- 11.3.5 Explain how GMOs might affect biodiversity in a community

11.4 - describe alternatives to industrial farming methods.

- 11.4.1 Define shifting agriculture and why “slash-and-burn” can have immediate benefits but long term costs
- 11.4.2 Define nomadic grazing and when it is useful
- 11.4.3 Define sustainable agriculture and explain the role of each of these terms plays in it
 - 11.4.3.1 Intercropping
 - 11.4.3.2 Crop rotation
 - 11.4.3.3 Agroforestry
 - 11.4.3.4 Contour plowing
- 11.4.4 Explain the purpose of plowing and tilling and the benefits and drawbacks of no-till agriculture
- 11.4.5 Summarize Integrated Pest Management (IPM)
- 11.4.6 Identify the basic principles of organic agriculture

11.5 - explain the environmental impacts of various approaches to raising and harvesting meat and fish.

- 11.5.1 Define Concentrated Animal Feed Operations (CAFOs), its purpose, and its environmental costs
- 11.5.2 Compare Free Range beef and chicken with CAFO beef and chicken with regards to the environment and cost to consumer
- 11.5.3 Define fisheries and compare wild-caught to aquaculture fish contributions to global fish production over the past 20 years (figure 11.20)
- 11.5.4 Define bycatch and its connection to fisheries and endangered species
- 11.5.5 Explain what Individual Transferable Quotas (ITQs) are and what role they play in more sustainable fishing methods
- 11.5.6 Define aquaculture and explain its benefits and drawbacks