

Ch. 12 – Human Population: Growth, Demography, and Carrying Capacity

Factors Affecting Human Population Size

Pop. size is affected by _____, _____, _____ and _____

$$\text{Population change} = [\text{_____} + \text{_____}] - [\text{_____} + \text{_____}]$$

Zero Population Growth (ZPG) –

Crude Birth Rate (CBR) –

Crude Death Rate (CDR) –

Rate of World's Population Change (%) = (Birth Rate – Death Rate)/1000 people x 100; = (Birth Rate – Death Rate)/10

China and India constitute _____ % of world's population. U.S. _____ % of world's population.

Average Annual population growth rate _____ % (global)

Developing countries will constitute _____ % of population growth between 1998 and 2025

Global Fertility Rates

There are two types of fertility rates

1. Replacement Level Fertility

Population Momentum –

Total Fertility Rate (TFR)

- The most useful measure of fertility for projecting future population change. TFR is an estimate of the average number of children a woman will have during her childbearing years under current age-specific birth rates. In 2000, TFR was 2.9 (1.3 in developed countries; 3.2 in developing countries).
- Highest TFR: _____ = _____ children per woman.
- If the world's TFR remained at _____, the human population would reach _____ billion by the year 2150.
- TFR = 2.3; World population = _____ billion (2025)
- (See charts on p.241)

U.S. Fertility Rates

- U.S. pop.: _____ (1900); _____ (2002)
- TFR (US) has oscillated wildly (see p.243) TFR (2000) = 2.1
- US has the highest _____ and highest _____ rate of any industrialized country. The rate of pop. growth has declined, but population is still growing faster than most developed countries. Population growth in 2000 was ~1% (double the rate of other industrialized countries).
- Growth added 2.76 million people; 1.66 million more births than deaths; 800,000 legal immigrants; 300,000 illegal immigrants.
- Moderate Projection: US pop. of 404 million by 2050 (41% increase).
Less Conservative Projection: pop. = 507 million (86% increase)
- ***Because of the high per capita rate of resource use in the US, each addition to the US pop. has an enormous environmental impact.
- In Pacific Northwest population growth is higher than that of _____.

Reasons for Projected Growth:

- 1.
- 2.
- 3.
- 4.
- 5.

Case Study: Increasing Fertility Rates and Environmental Problems in California

What Factors Affect Birth and Fertility Rates?

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.

What Factors Affect Death Rates?

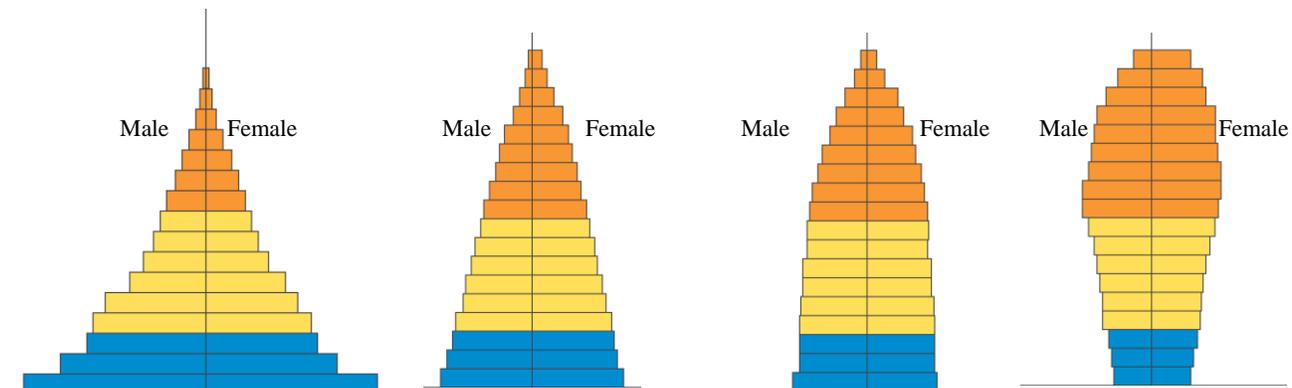
- Decline in the CDR (_____) has led to the rapid incr. in world's pop. People started living longer: "It's not that people stopped breeding like rabbits; it's just that they stopped dying like flies" (UN)
- Two useful indicators of overall health in a country:
 1. **Life expectancy** (_____)
 - Life Expectancy: 75 years (____); 64 years (_____)
 - Globally, life expectancy = 48 years (1955), 66 years (1998), 73 years (2025, projected)
 - Life expectancy in Africa is _____ years
 2. **Infant mortality rate** (_____)
 - Infant mortality is the single most important measure of a society's quality of life – because _____.
 - U.S. infant mortality rate = 7.0/1000 (1998); 32 other countries had lower rates;
 - These rates are high because _____, _____ and high birth rate among _____.
 - Babies born to teenage women are more likely to have _____ – the most important factor in infant deaths.
 - _____ – has the highest teenage pregnancy of any industrialized country

Population Age Structure

Age Structure Diagrams – show the proportion of the population at each age level.

Three main age categories:

- Prereproductive (ages 0-14)
- Reproductive (15-44)
- Postreproductive (45+)



Type: _____

How Does Age Structure Affect Population Growth?

A wide base (0-14 years) has a string built-in momentum to increase pop.

1998: Half of world's women were in the reproductive age group;

- World: 31% of people <15 years.
- In developing countries: 34% <15 years; (19% in developed countries)
- Africa: 44% <15 years

How can Age Structure Diagrams be used to make population and economic projections?

- Baby-Boom vs. Baby-Bust Generations. Any boom or bust in the age structure of a population can create _____ and _____ changes that ripple through a society for decades. Competition for jobs; political clout; retirement benefits and needs.

What are some of the effects of population decline?

- _____ population decline: negative effects are manageable.
- _____ pop. decline can lead to severe economic and social problems.
- A _____ of elderly will lead to a large share of medical care, social security and other costly social services. Labor shortages (unless you can utilize increase automation, immigration of foreign workers or both).

Case Study: The Graying of Japan.

- 1949: TFR = _____
1998: TFR = _____ (one of the world's lowest)
- Declining workforce: encourage automation and women working outside the home.
- Japan resists increasing immigration – fearing a breakdown in its _____.

Solutions: Influencing Population Size.

How is Migration Related to Environmental Degradation?

- People voluntarily move from _____ affluent areas to _____ affluent areas both within countries and between countries.
- 1995 – 27 million international environmental refugees moved from one country to another because of _____, _____, _____, and _____. (23 million traditional refugees in 1995)
- 1988-1998: 50 million people left homeless by _____ (earthquakes, hurricanes, floods and landslides)
- Most countries restrict immigration. Only a few accept large numbers of immigrants or refugees (U.S., Canada and Australia).
- U.S. Immigration – 1999
 - 800,000 legal immigrants and refugees
 - 300,000 illegal immigrants (constituting 40% of pop. growth)
 - 75% of legal immigrants live in CA, FL, IL, NY, NJ and TX. (90% with illegal immigrants)
- Immigrants
 - provide _____.
 - Immigrants _____
 - Immigrants increase _____
 - Immigrants increase _____
 - Immigrants have children who are _____

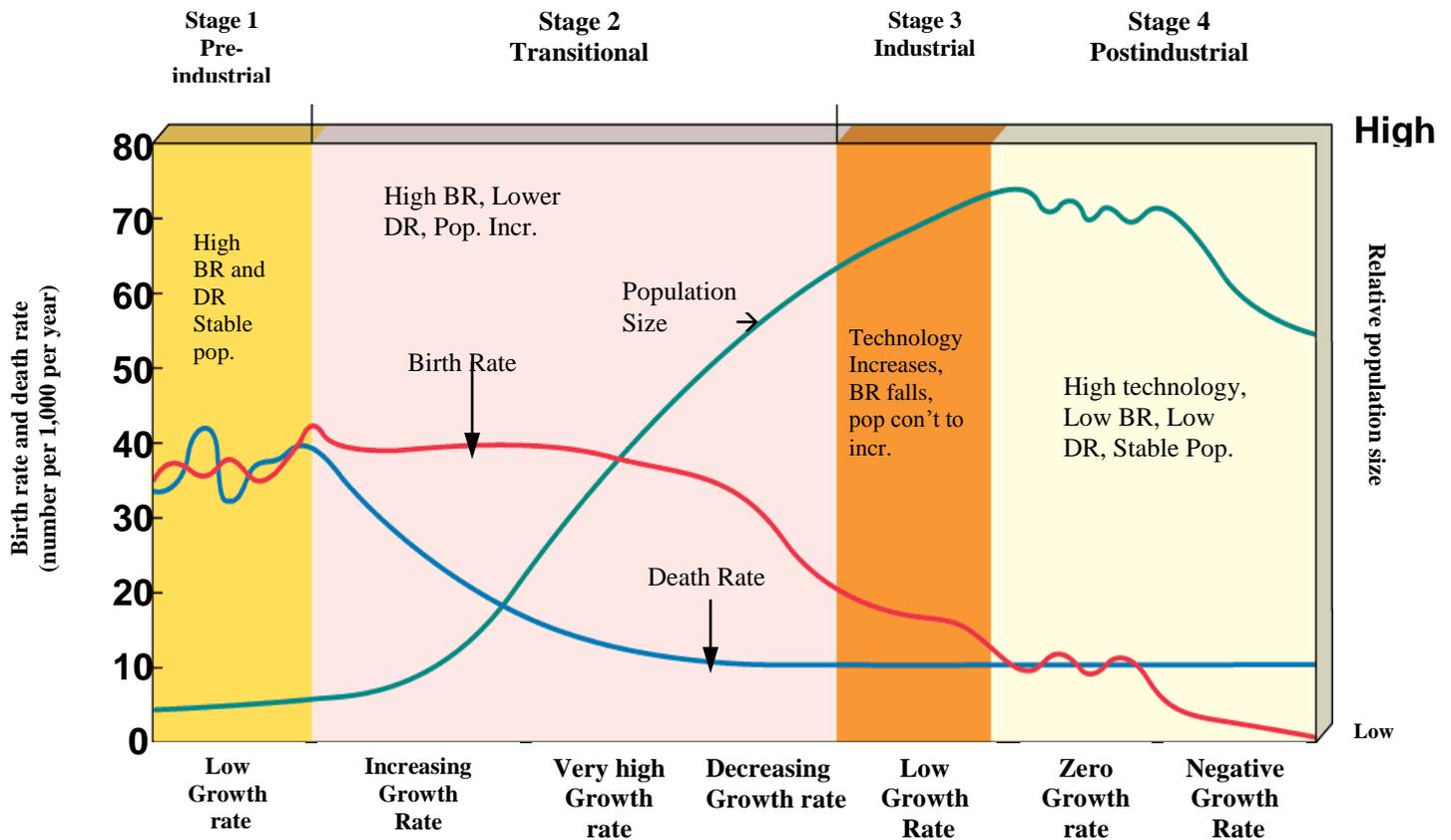
What are the Pros and Cons about Reducing Births?

- Can we provide enough food, energy, water, sanitation, education, health care, and housing for twice as many people if the world pop. continues to grow?
- Can we provide adequate standard of living for twice as many people without causing massive environmental damage?
- Some say the Earth is already _____.
- Others say the Earth could support _____ people if everyone existed at a _____ survival level (grain diet only, cultivate all arable land, mine the Earth's crust to a depth of 1 mile).

Computer Models

- *System dynamics computer modeling*
 - mimics the behavior of _____ and makes _____.
 - Uses mathematical equations to represent interactions of key variables: feedback loops, time delays, synergistic interactions and other properties of complex systems.
- Models are
 - no better than the _____ built into them and the _____ of the data used.

- very useful for evaluating possible implications of current trends and proposed changes in environmental and economic policies.
- *The Limits of Growth* (1972) by Forrester *et al.*: projected economic and ecological collapse if pop. trends and resource use continued unchanged from 1970s.
- *Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future*. Forrester *et al.*: updated their projections saying the world already overshoot some limits. We face global economic and environmental collapse during the 21st century.



How Can Economic Development Help Reduce Births?

- **Demographic Transition** (a hypothesis of population change):

- _____

- This Transition takes place in four stages:
 1. **Pre-industrial stage** –
 2. **Transitional stage** –
 3. **Industrial stage** –
 4. **Post-industrial stage** –
- Developing countries are still in the transitional stage. Pop. growth in many developing countries will still outstrip economic growth leading to a demographic trap (this is happening esp. in Africa).
- A poor country with a pop. growth rate of _____/year needs an economic growth rate of _____/year to achieve the _____% per capita economic growth regarded as the minimum req'd to make the demographic transition.
- Developing countries do not have enough skilled workers to produce _____. Many low- to middle-income countries lack the capital and resources for rapid economic development. The amount of economic assistance from developed countries has been on the decrease since 1980.

Family Planning

- Family planning provides _____ and _____ services to help couples choose how many children to have and when to have them.
- _____ women die from pregnancy-related causes each year
- Modern contraception: _____ worldwide (2000) in developing nations.
- Responsible for 55% of the drop in TFR in developing countries from 6 (1960) to 3.2 (2000).
- Two major factors for this reduced TFR:
 - 1.
 - 2.
- Moderate to poor results in the more populous developing countries of India, Egypt, Pakistan and Nigeria (and in 79 less populous developing countries – Africa, Latin America).

How can Economic Rewards and Penalties be used to Help Reduce Births?

- Family planning alone cannot curb pop. growth enough in developing countries. _____ and _____ are needed.
- **Penalties** (China):
- Economic rewards and penalties designed to lower birth rates work best if _____
_____.
- A population out of control may be forced to use _____ methods to prevent mass starvation and hardship.

Three Ways Empowering Women to Help Reduce Births

- 1.
- 2.
- 3.

Cutting Global Population Growth and Sustainability

- We are exceeding the carrying capacity for humans in parts of the world and eventually for the entire world. Our goals should be _____ and stabilize it.
- Replacement-level fertility can be reached in 15-30 years. And the best way to achieve that goal is _____, _____ and _____. Devise government policies to minimize environmental impact of population growth in efforts to achieve sustainability.

How are Governments Planning to Reduce Population Growth?

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.