

Human Population Growth

{Human Population

This lecture will help you understand:

- Human population growth
- Demography
- Affluence, technology, the status of women, and the environment
- Population control programs
- Demographic transition theory
- Consumption and the ecological footprint
- HIV/AIDS and human population



HUMAN POPULATION GROWTH



ECOLOGY

Video Recap

- What is carrying capacity?
- What is Human Carrying capacity?
- Why is the human population growing at a slower rate?
- What is positive feedback loop?
- What is negative feedback loop?

Used to have the China's One-Child Policy

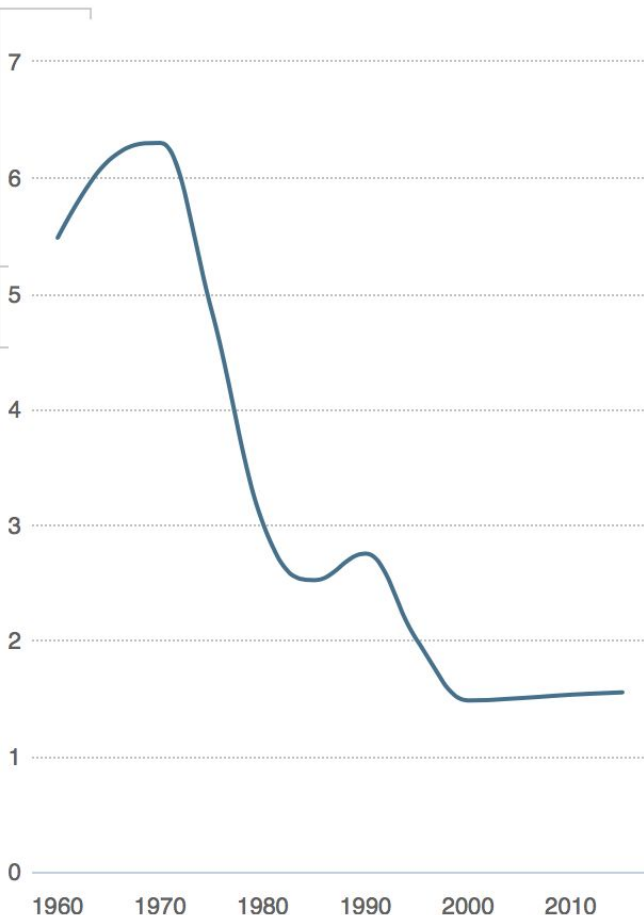


- From 1959 to 1961, the Great Chinese Famine killed an estimated 15 to 30 million people.
- China tried to control its growth with a system of rewards and punishments to encourage one-child families.
- The program decreased population growth, **but** it meant government intrusion in private reproductive choices.

China's two-child policy

Fertility Rate in China

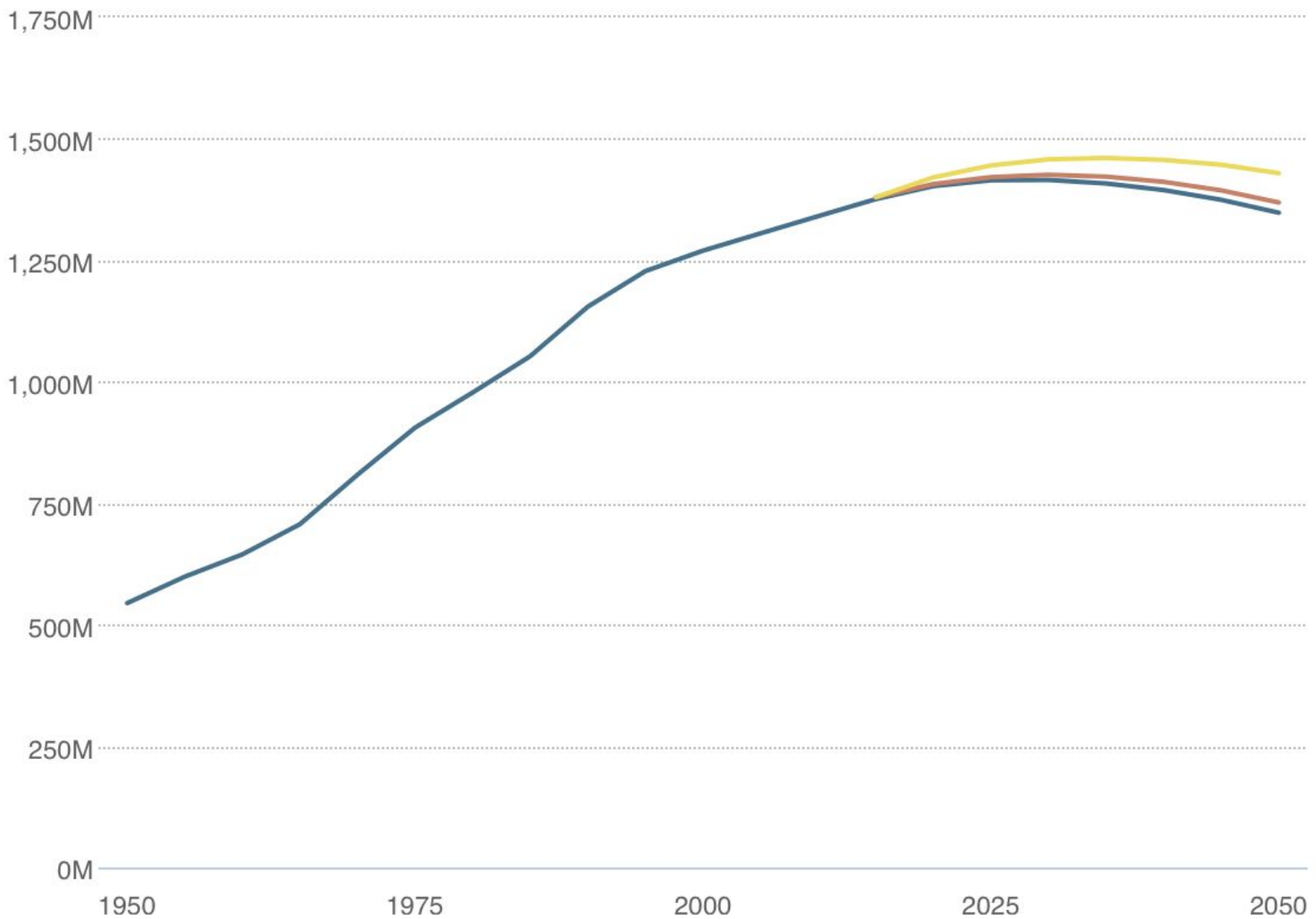
Number of births per woman



- China's decision to lift its one-child policy is expected to diversify the country's aging, increasingly male population. But the degree to which the policy has affected the country of more than 1.3 billion people is hard to imagine
- In 2013, a relaxation of policy allowed over 12 million couples to apply to have a second child. Only about 12 percent of eligible couples applied.

Chinese population projection

- One-child policy unchanged
- Two-child policy, gradual birthrate increase
- Fertility jumps to two births per woman in 2016

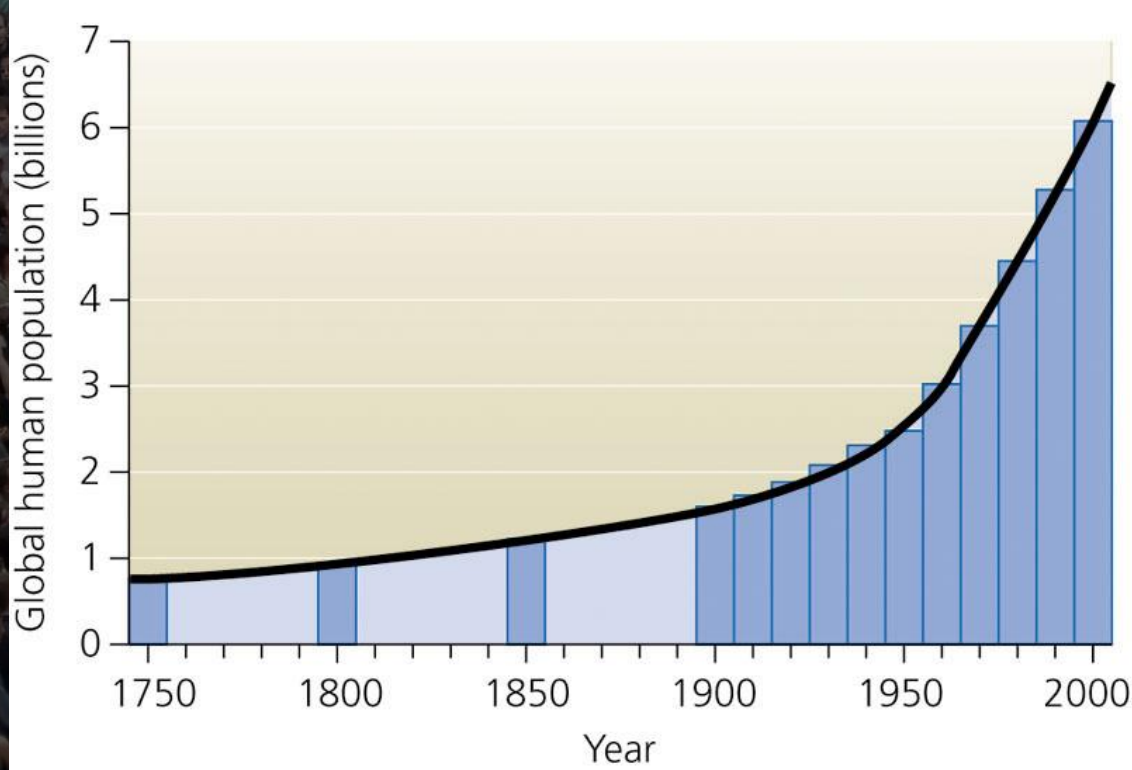


"Baby Seventh Billion"

- Weighing 2.5kg (5.5lb), Danica May Camacho was chosen by the United Nations to be one of several children around the world who will symbolically represent the global population milestone.



World Population has Risen Sharply



- Global human population was <1 billion in 1800.
- Population has doubled just since 1963.
- We add 2.5 people every second (79 million/year).

Is population growth really a problem?

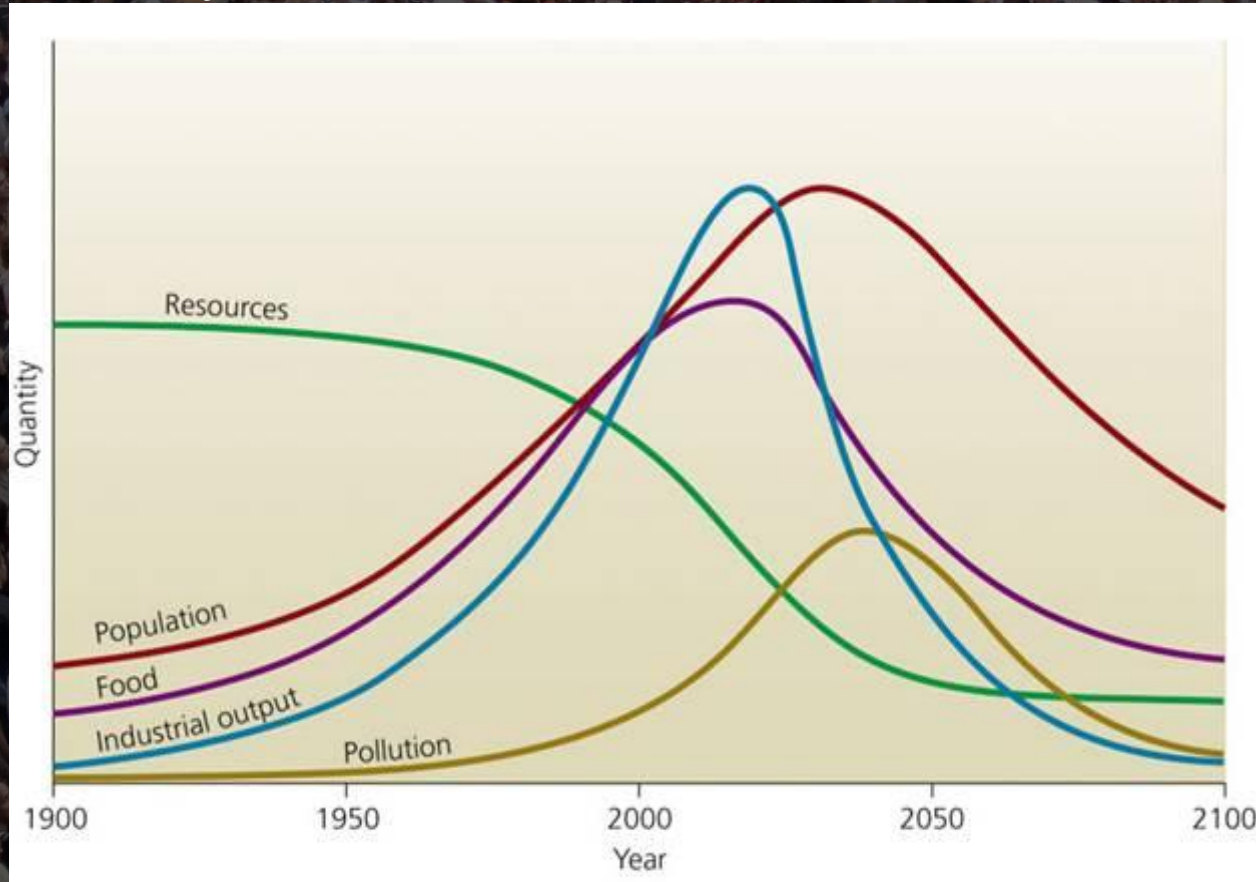
Some say **NO**:

- People can find or manufacture additional resources to keep pace with population growth.
- Nations become stronger as their populations grow.

Some say **YES**:

- Not all resources can be replaced.
- Even if they could, quality of life suffers.
- Nations do not become stronger as their populations grow.

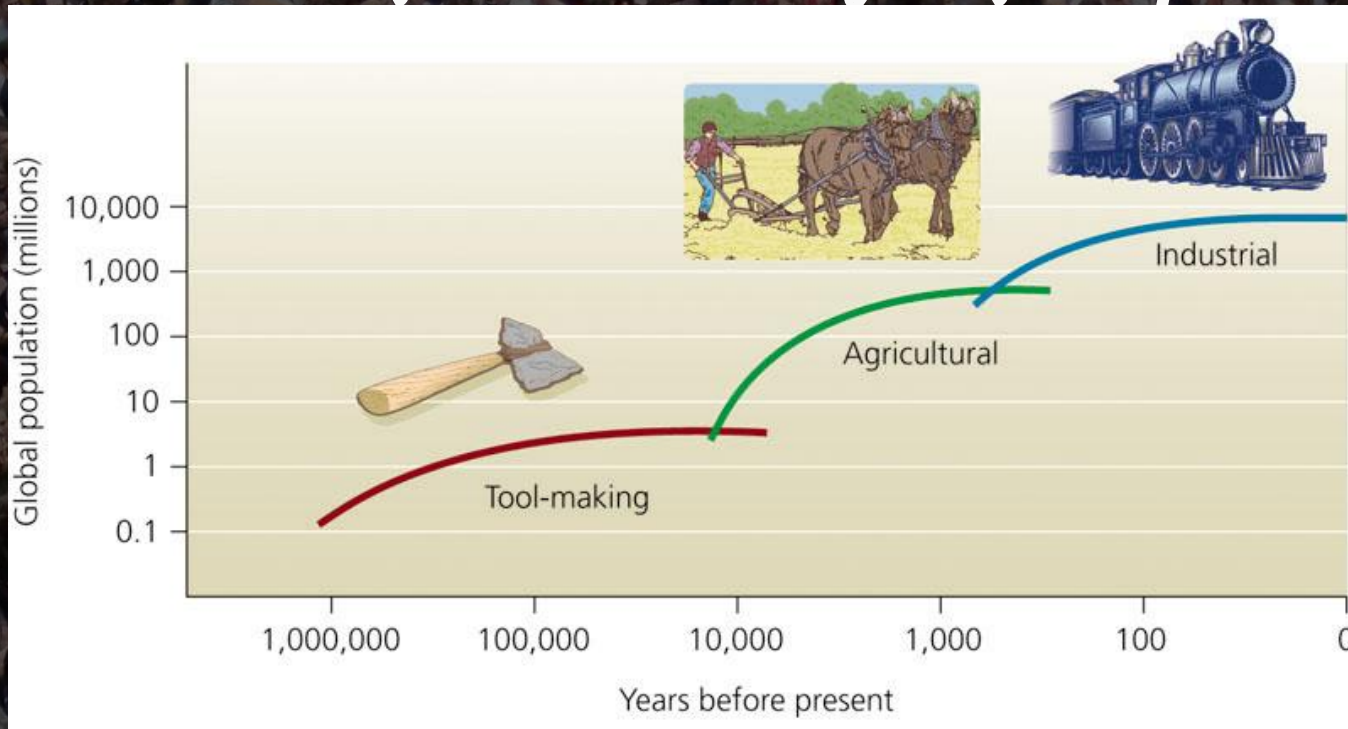
Modeling Population & Its Consequences



- Some models show population growth leading to resource depletion, which can result in declining food production, industrial output, and population.

Figure 7.4

Increasing our Carrying Capacity



- Technology has allowed us to raise Earth's carrying capacity for our species time and again.
- Tool-making, agriculture, and industrialization each enabled humans to sustain greater populations.

Demography

Demography is the study of human populations.

Human populations exhibit the same fundamental characteristics as do populations of all other organisms.

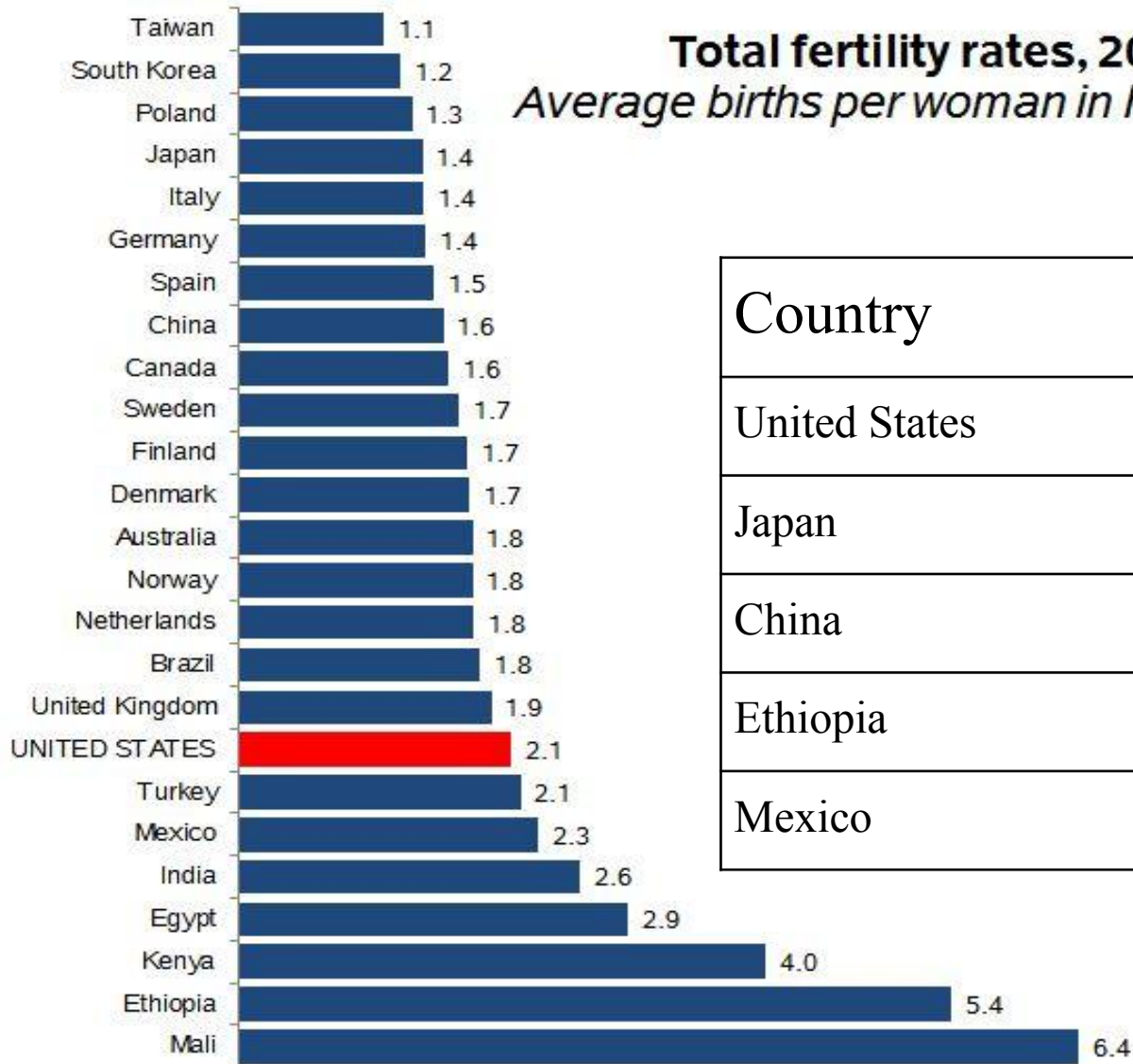


Population size: National populations

TOP 20 LARGEST COUNTRIES BY POPULATION (LIVE)

1		<u>China</u>	1,406,568,570	11		<u>Mexico</u>	126,098,853
2		<u>India</u>	1,291,335,619	12		<u>Philippines</u>	102,784,174
3		<u>United States</u>	323,050,792	13		<u>Ethiopia</u>	100,341,513
4		<u>Indonesia</u>	257,430,724	14		<u>Vietnam</u>	93,904,827
5		<u>Brazil</u>	204,642,571	15		<u>Egypt</u>	85,483,537
6		<u>Pakistan</u>	189,847,231	16		<u>Germany</u>	82,537,547
7		<u>Nigeria</u>	186,358,963	17		<u>Iran</u>	80,076,603
8		<u>Bangladesh</u>	161,519,914	18		<u>Turkey</u>	77,255,024
9		<u>Russia</u>	141,904,268	19		<u>Congo</u>	72,311,024
10		<u>Japan</u>	126,778,123	20		<u>Thailand</u>	67,552,386

Fertility Rate: Babies per Woman



Total fertility rates, 2012
Average births per woman in her lifetime

Country	Fertility Rate 2017
United States	1.78
Japan	0.8
China	1.6
Ethiopia	5.07
Mexico	2.25

Population size: Future projections

Demographers project population growth trends to estimate future population sizes.

Different fertility rate scenarios predict global population sizes in 2050 of 7.4 billion, 8.9 billion, or 10.6 billion.

All these projections assume fertility rates below today's; at today's rate, the population would reach 12.8 billion.

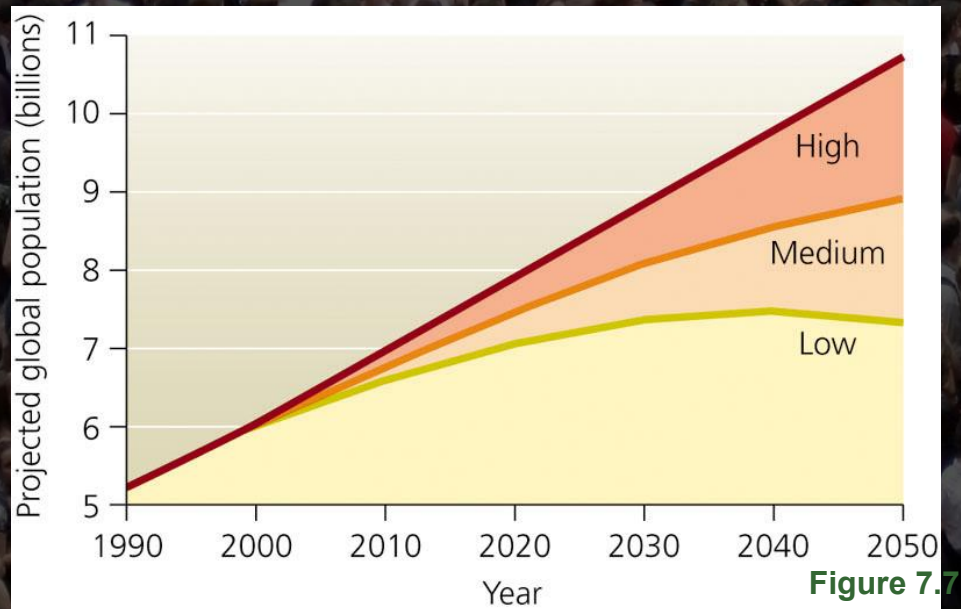
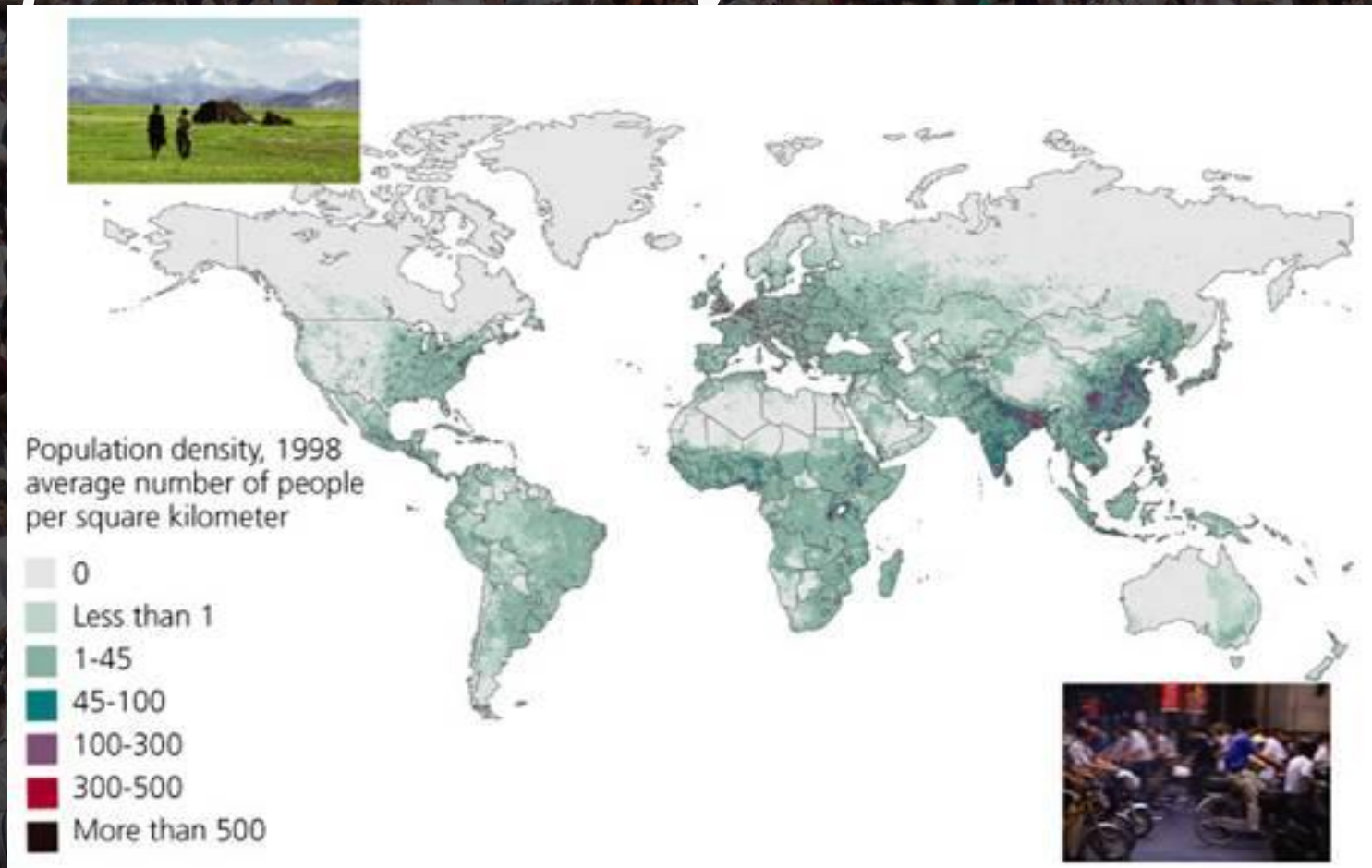


Figure 7.7

Population Density & Distribution



Humans are unevenly distributed, living at different densities from region to region.

Factors Affecting Population Growth Rates

Population growth depends on rates of birth, death, immigration, and emigration.

$$\begin{aligned} &(\text{birth rate} + \text{immigration rate}) \\ &- (\text{death rate} + \text{emigration rate}) \\ &= \text{population growth rate} \end{aligned}$$

Migration Can Have Environmental Effects

Immigration and emigration play larger roles today.

Refugees from the 1994 Rwandan genocide endured great hardship, and deforested large areas near refugee camps.

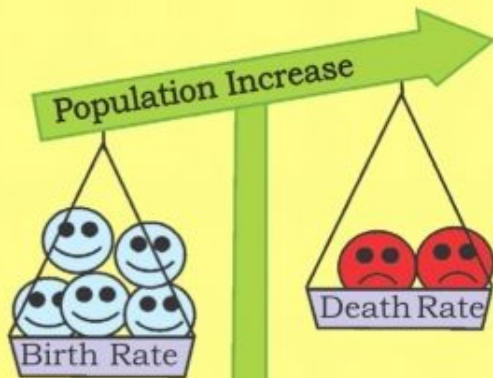


Figure 7.14

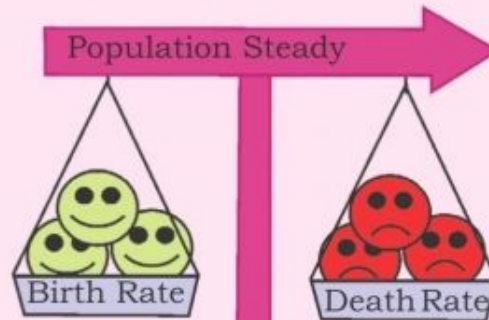
Natural Rate of Population Change

Change due to birth and death rates alone, excluding migration

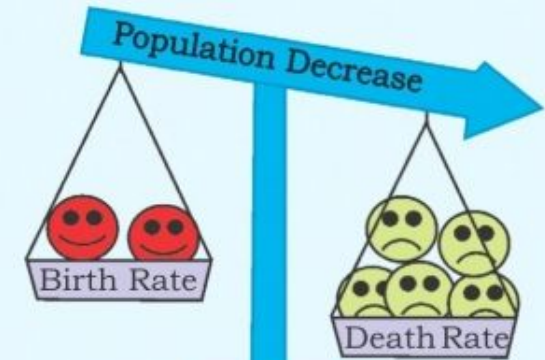
Is often expressed in % per year



Birth rate more than death rate: population increase



Birth rate and death rate same: population stays the same



Death rate more than birth rate: population decreases

China's natural rate of change has fallen

China's rate has fallen with fertility rates. It now takes the population 4 times as long to double as it did 25 years ago.

Table 7.1 Recent Trends in China's Population Growth

	1970	1993	2002
Total fertility rate	5.8	2.0	1.8
Rate of natural population increase (% per year)	2.6	1.2	0.7
Doubling time (years)	26.9	58.3	100.0

Global growth rates have fallen

The annual growth rate of the world population has declined since the 1960s.

(But the population size is still rising!)

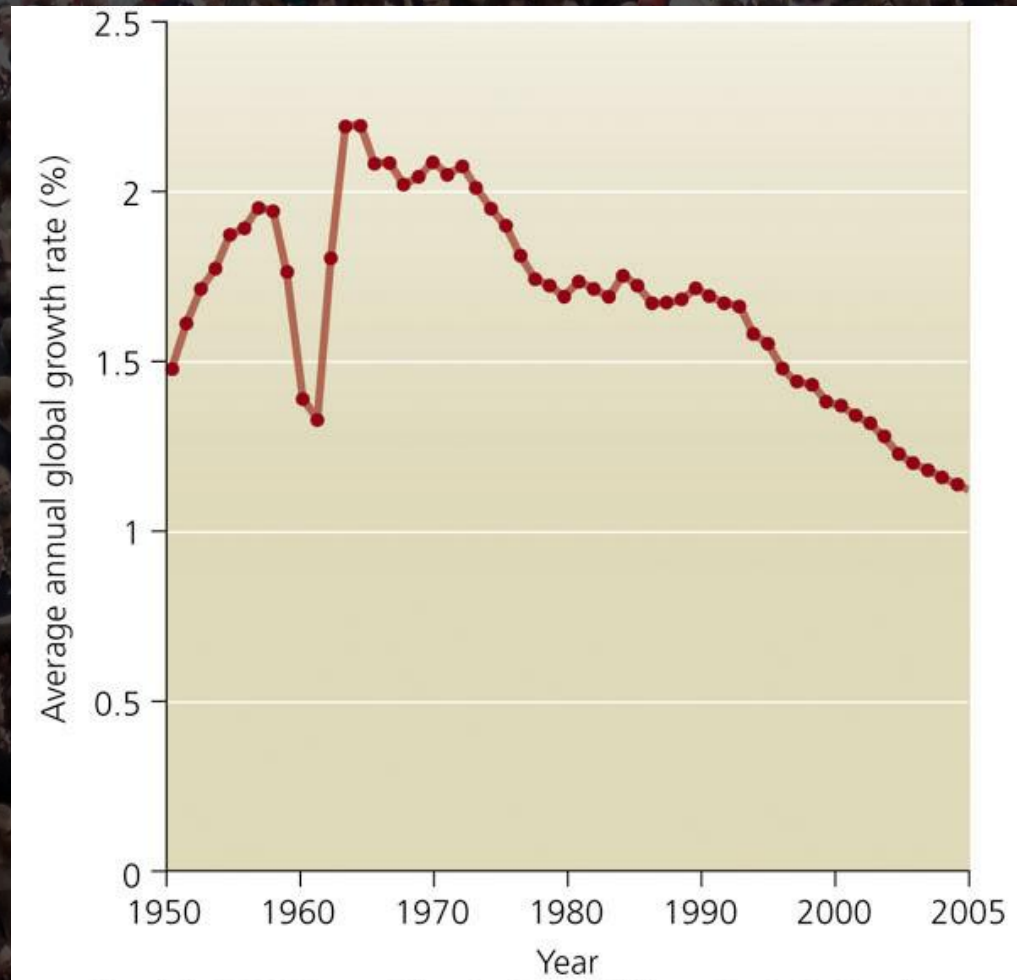


Figure 7.15

fertility rates affect population growth rates

Total fertility rate (TFR) = average number of children born per woman during her lifetime

Replacement fertility = the TFR that keeps population size stable

For humans, replacement fertility is about 2.1.



Total fertility rates by region

African nations have the highest TFRs.

European nations have the lowest TFRs.

Table 7.2 Total Fertility Rates for Major Continental Regions

Region	Total fertility rate (TFR)
Africa	5.2
Latin America and Caribbean	2.7
Asia	2.6
Oceania	2.5
North America	2.1
Europe	1.4

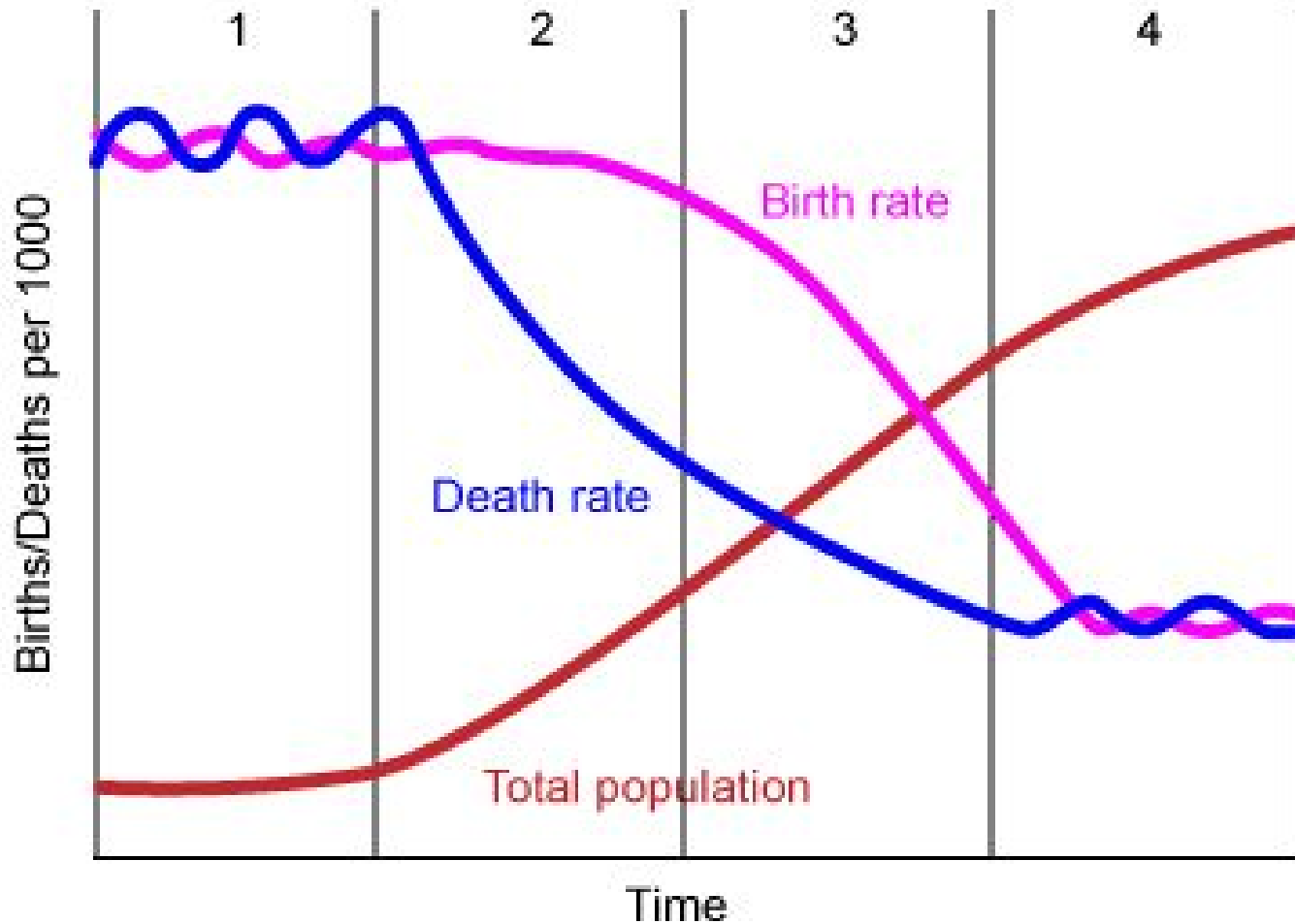
Demographic Transition Theory

Demographic transition = model of economic and cultural change to explain declining death rates, declining birth rates, and rising life expectancies in Western nations as they became industrialized

Proposed by F. Notestein in the 1940s-1950s



Example of Demographic Transition



Example of Demographic Transition

