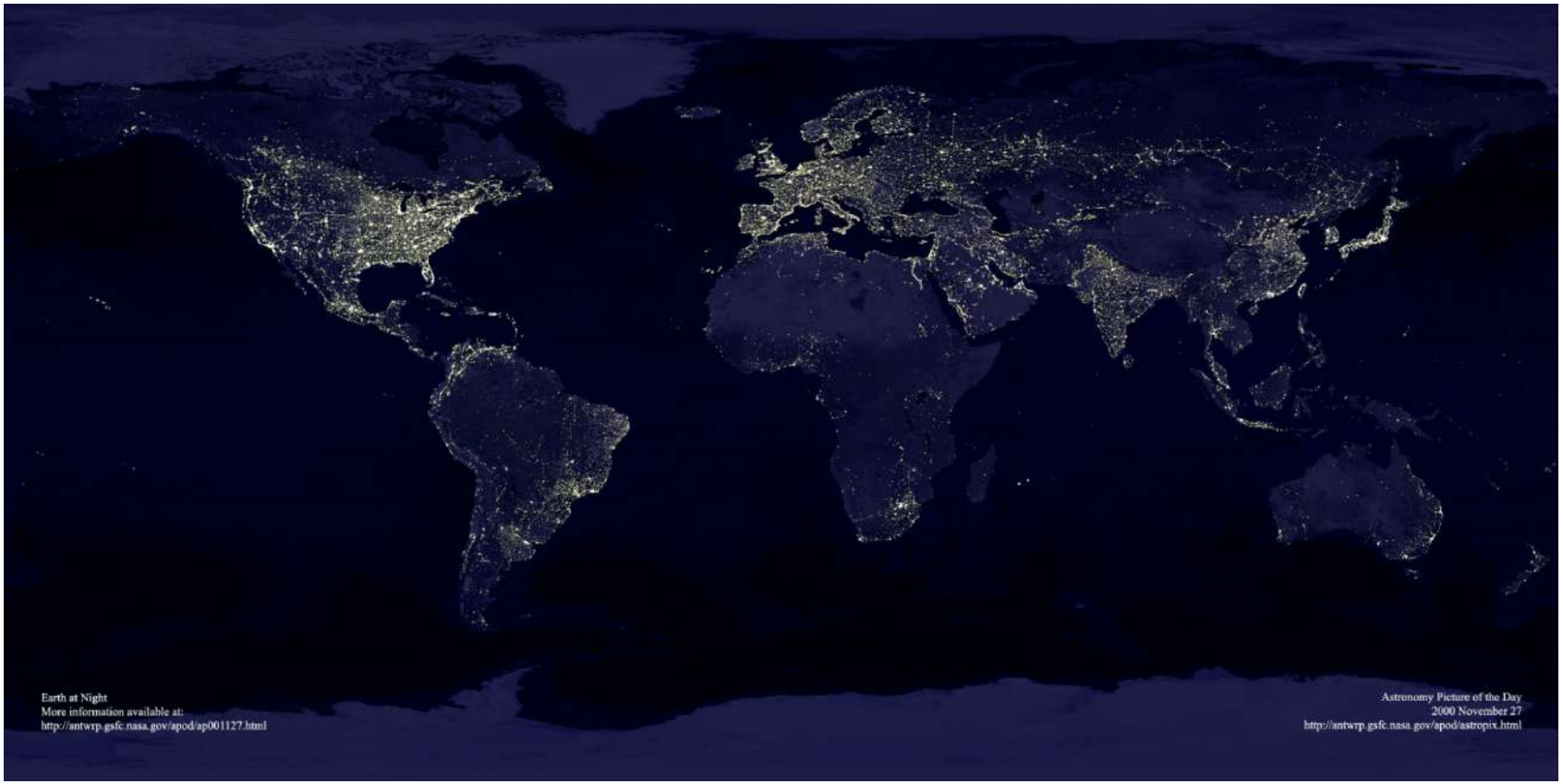
Chapter 2: Population



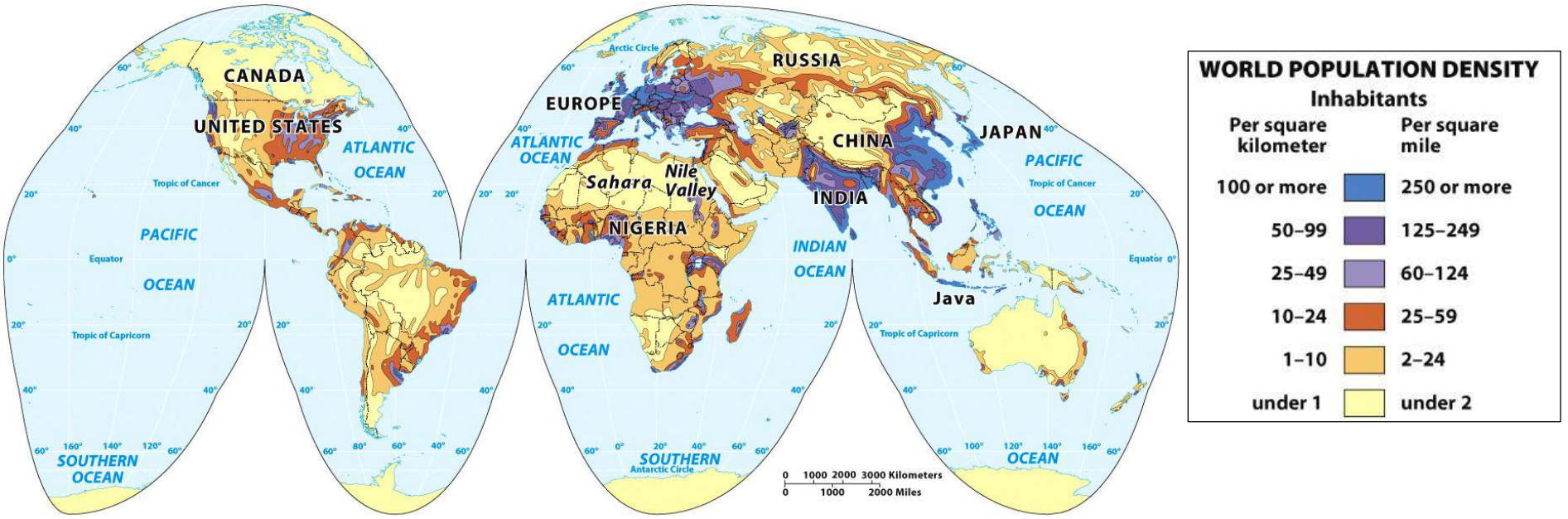
Courtesy of NASA

Key Question

Where in the world do people live and why?

Where in the World Do People Live and Why?

- Population density: a country's total population relative to land size
- Assumes an even distribution of population to the land



Arithmetic Density

- The total number of people in an area.
- Population divided by Land Area

Physiological Density

- The number of people supported by a unit area of arable land.
- Provides insights into the relationship between the size of a population and the availability of resources in a region.

Agricultural Density

- The ratio of the number of farmers to the amount of arable land.

Where in the World Do People Live and Why?

Population Distribution

- Descriptions of locations on the Earth's surface where individuals or groups (depending on the scale) live.
- Geographers often represent population distributions on dot maps, in which one dot represents a certain number of a population.

Human Population Growth

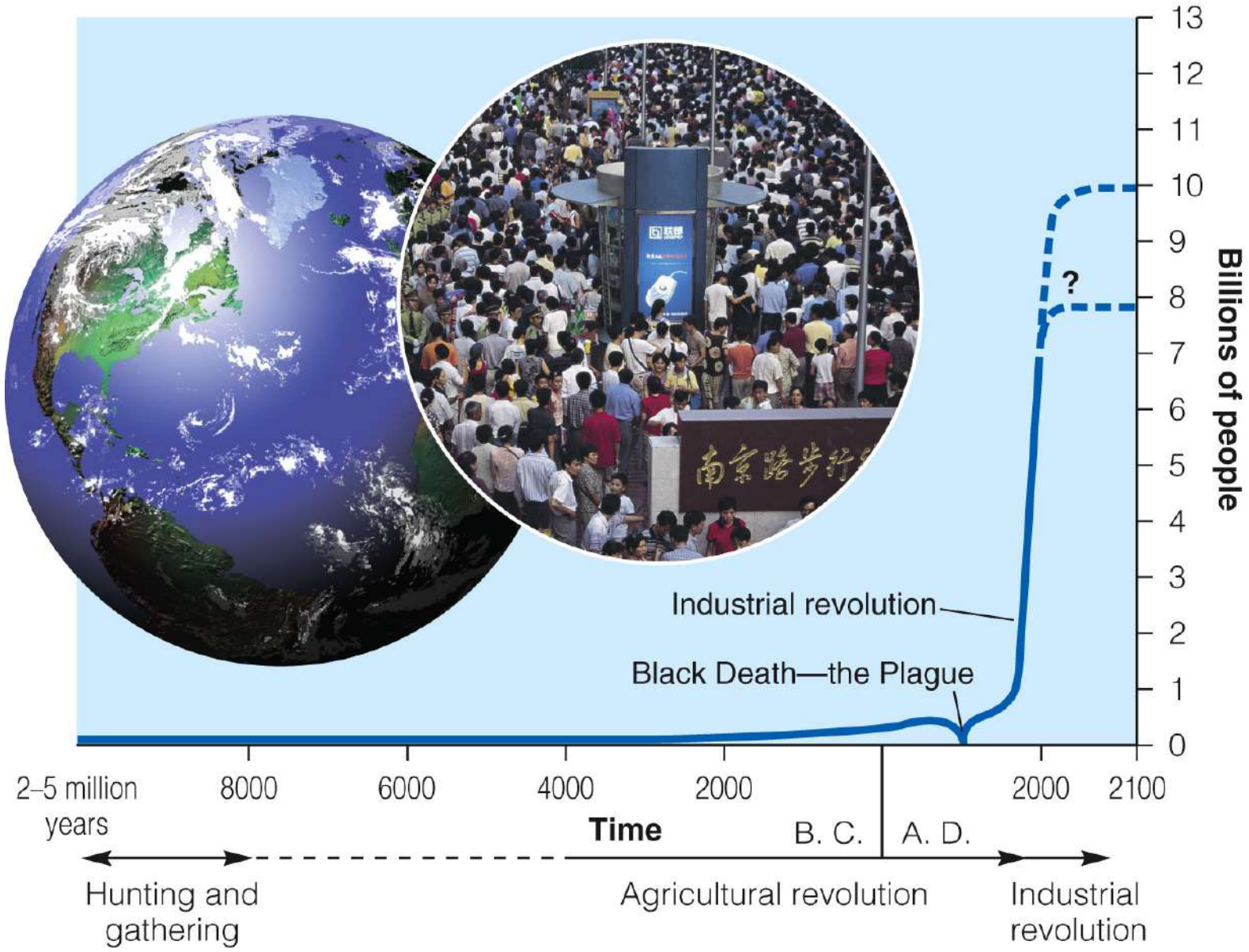


Fig. 1-18, p. 21

Population Time Line: 10,000 BC - 2042

Year	Event	Human population (approximate)
50,000 BC	Hunter-gatherer societies	1.2 million
10,000 BC	End of last Ice Age	4 million
8,000 BC	Agricultural Revolution	5 million
500 BC		100 million
1,000 AD		250 million
1347–1351	Black Death (Plague); 75 million people die	
1500		450 million
1750	Industrial Revolution begins in Europe	791 million
1800	Industrial Revolution begins in the United States	
1804		1 billion
1845–1849	Irish potato famine: 1 million people die	
1927		2 billion
1943	Penicillin used against infection helps decrease death rates	
1957	Great famine in China; 20 million die	
1961		3 billion
1974		4 billion
1984		5 billion
1987		6 billion
2011	Projected human population:	7 billion
2024	Projected human population:	8 billion
2042	Projected human population:	9 billion

Figure 3, Supplement 9

Annual Growth Rate of World Population, 1950-2010

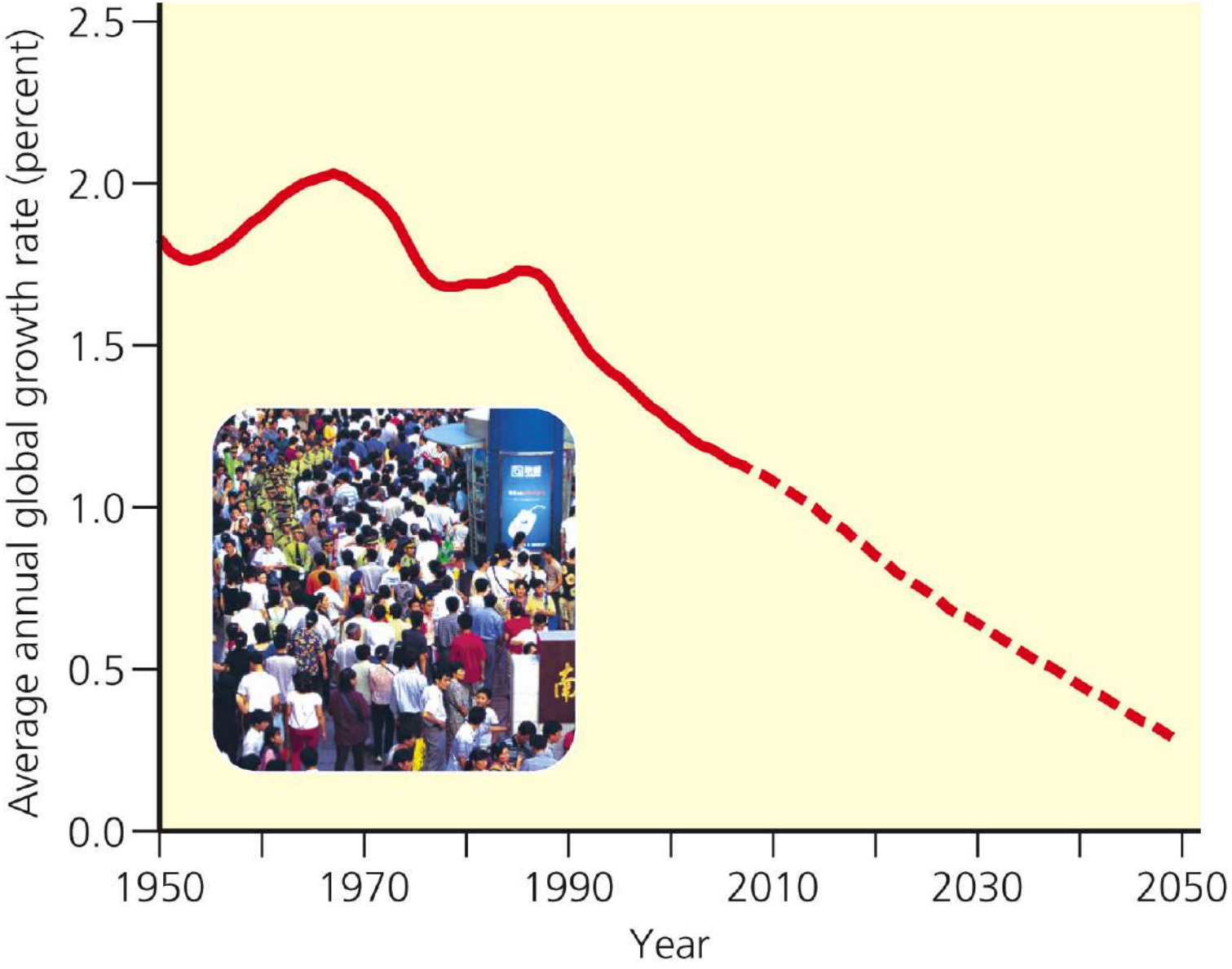


Fig. 6-2, p. 127

Where Population Growth Occurred, 1950-2010

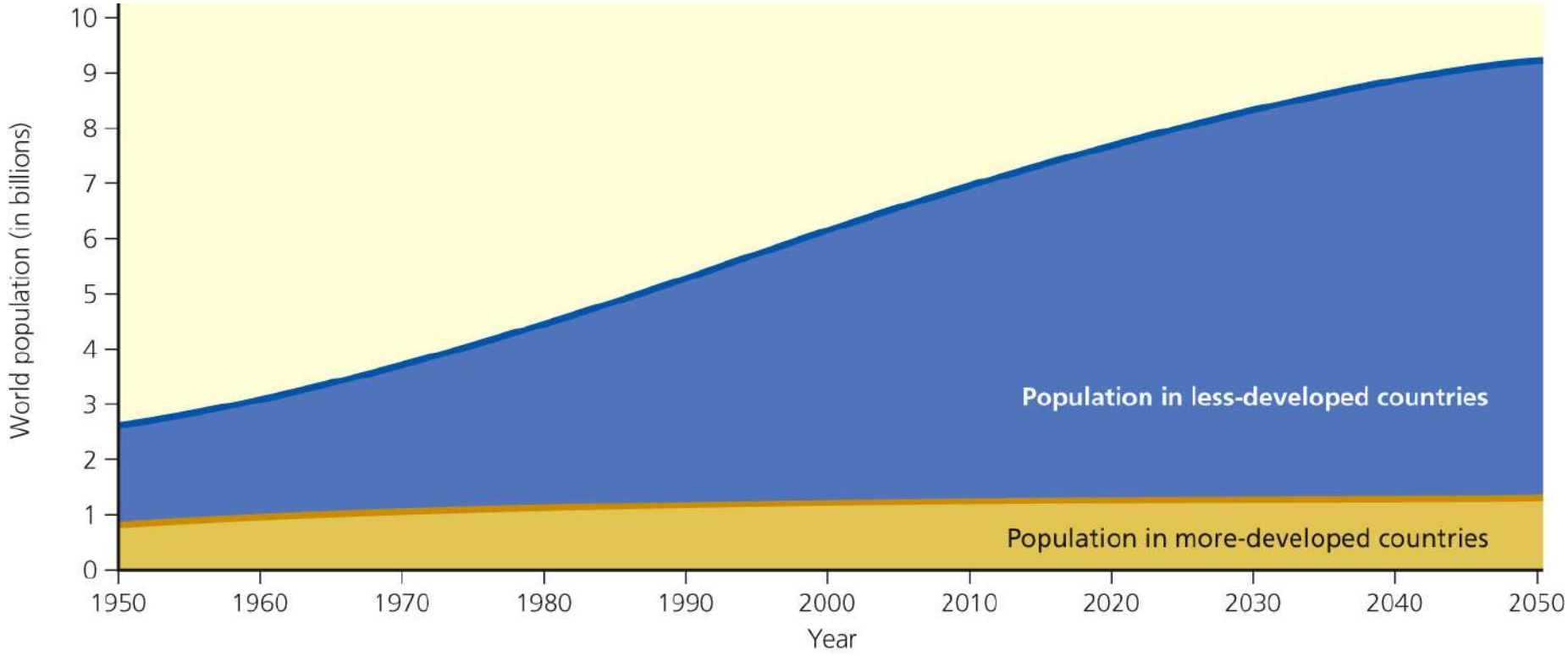


Fig. 6-3, p. 127

Five Most Populous Countries, 2010 and 2050

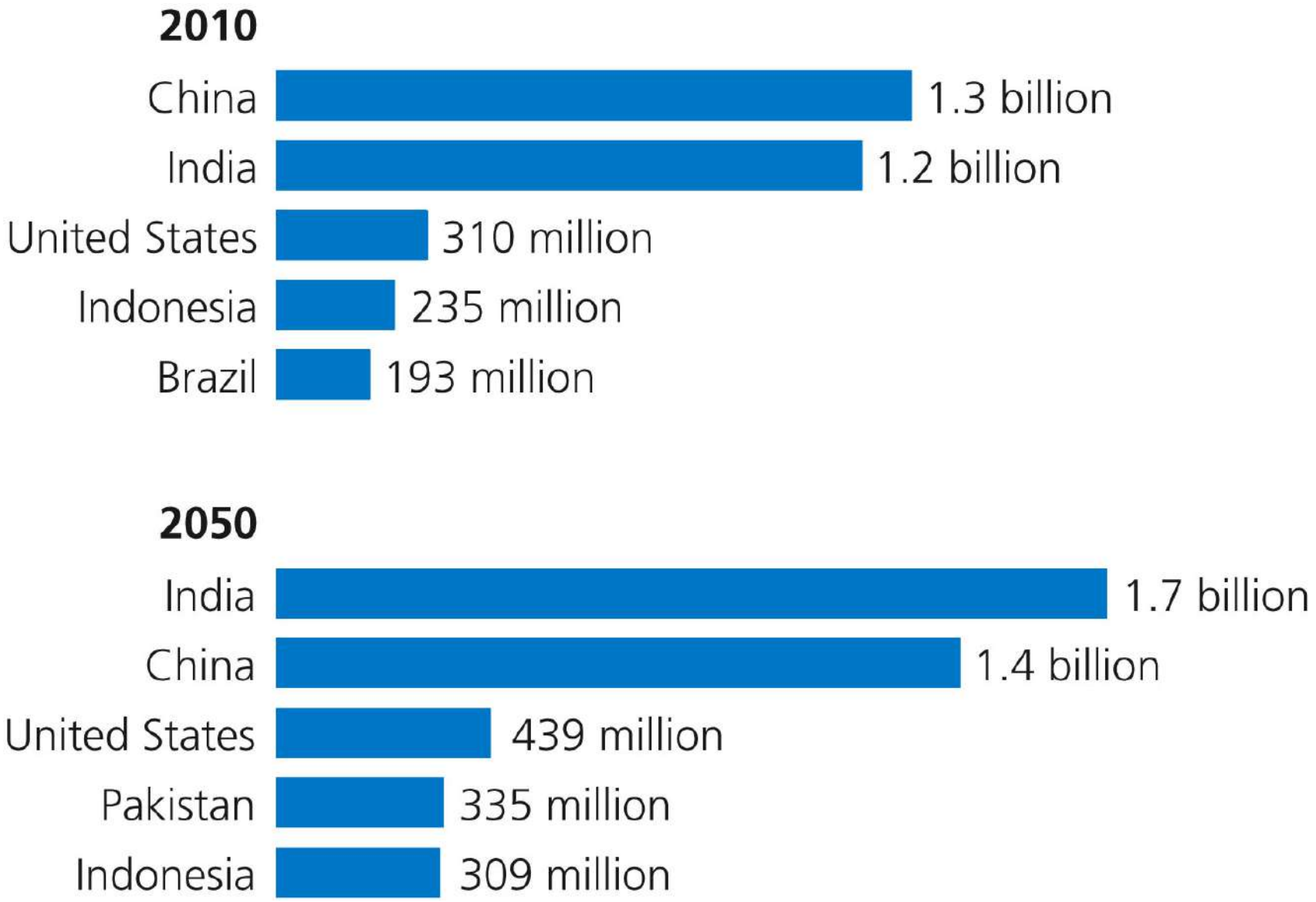
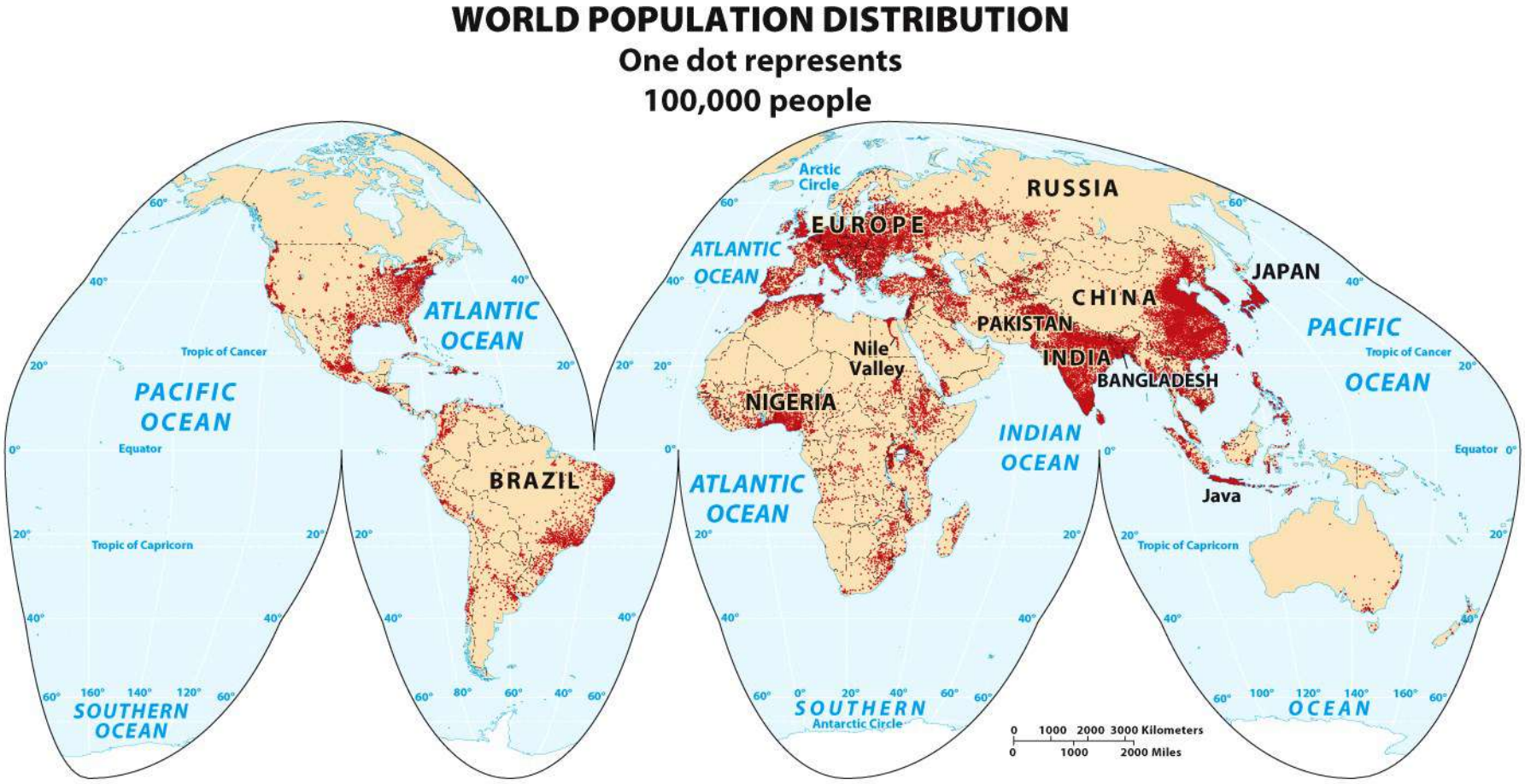


Fig. 6-4, p. 127

World Population Distribution



7 Billion, National Geographic Magazine

Where in the World Do People Live and Why?

Reliability of Population Data

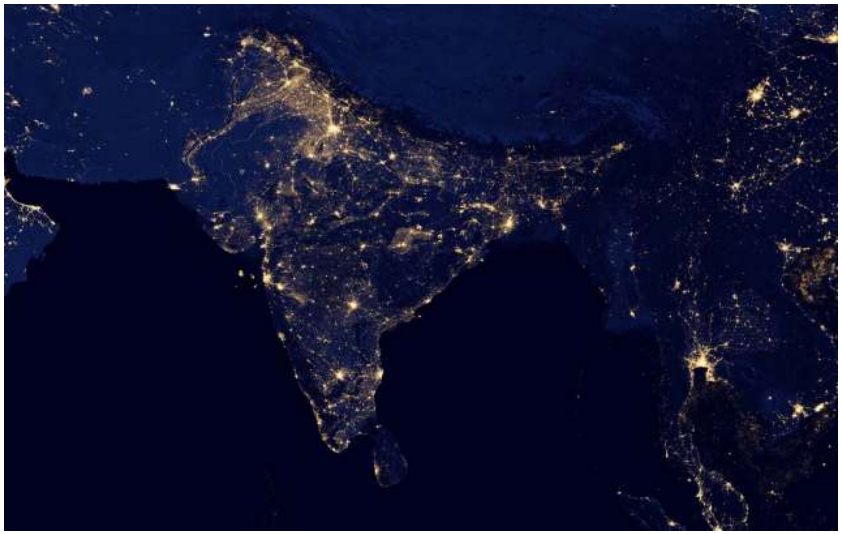
- Census: Federal government funding depends on population data.
- Political implications of under-representation of populations.
- United Nations, World Bank, and Population Reference Bureau collect data on world populations.
- How many people are there in the world at this very second? http://www.worldometers.info

East Asia

- Almost 25% of world's population
- Population concentrated in Korea, Japan, China
- Over 1.3 billion people in China

South Asia

- Physical barriers separate population clusters, such as the Himalaya Mountains and Indus River Valley
- Confined region with rapidly growing population
- Bangladesh: 152 million people in an area the size of Iowa



North America

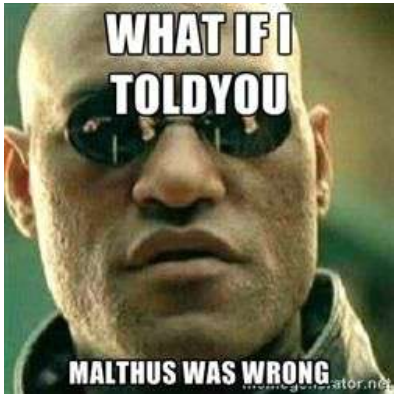
- Megalopolis
- Huge urban agglomerations; Boston, NYC, Philadelphia, Baltimore, Washington, D.C
- This accounts for more than 20% of US population

Key Question

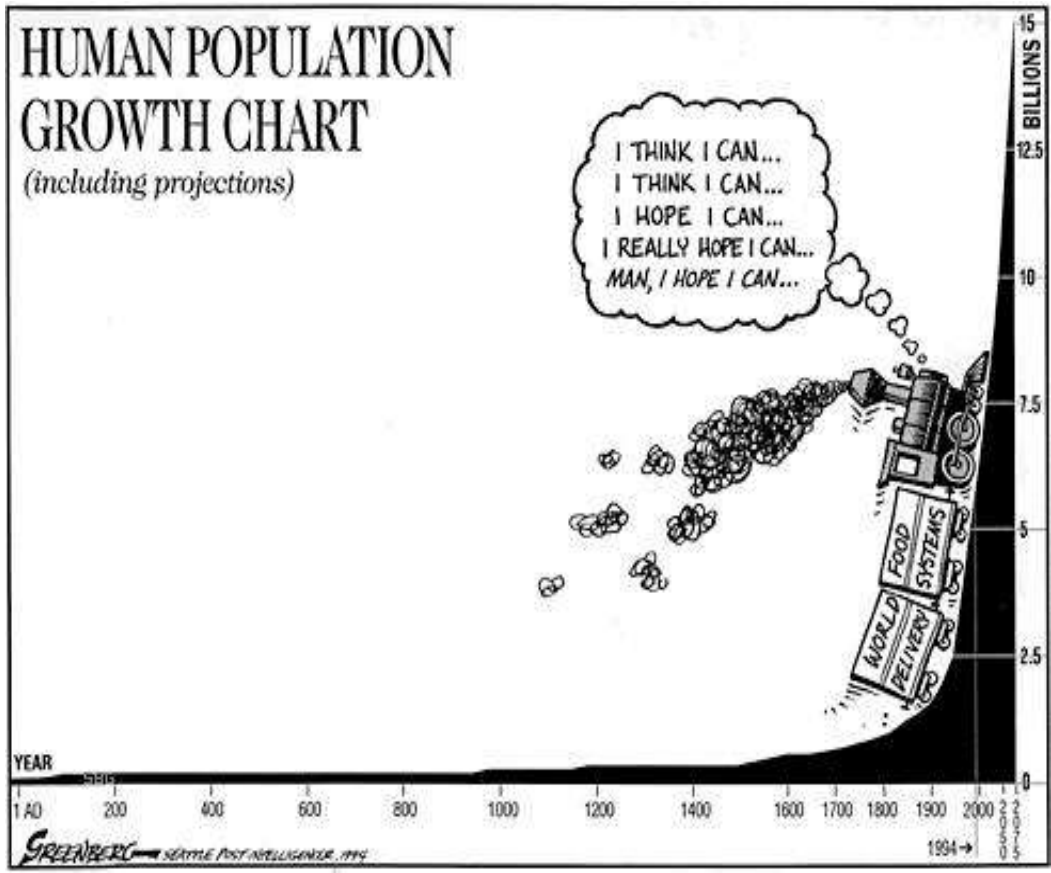
- Why Do Populations Rise and Fall in Particular Places?

Population: Rise and Fall

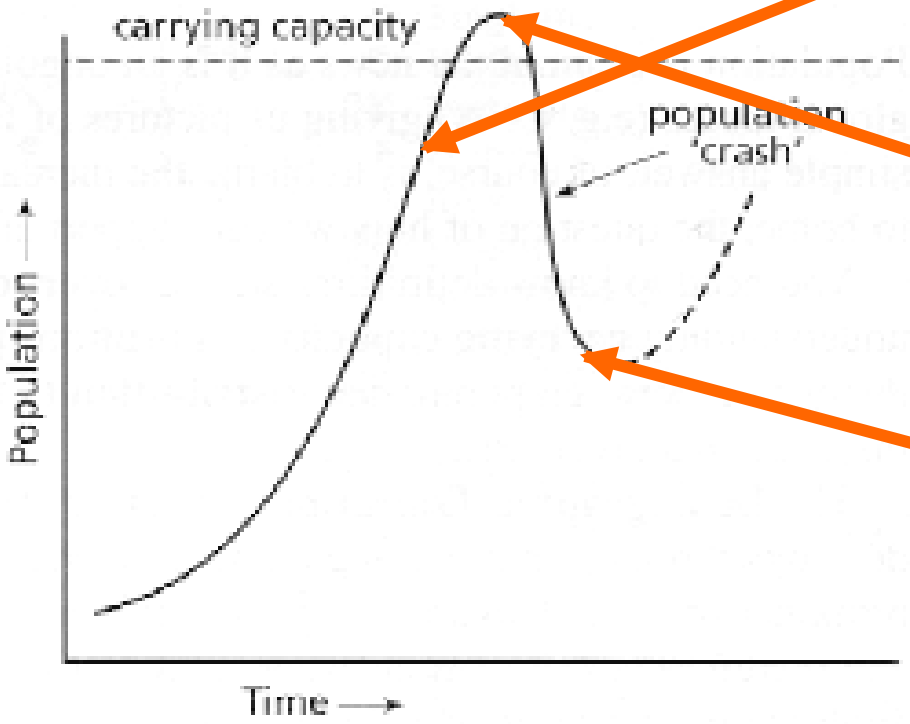
- Thomas Malthus: *An Essay on the Principles of Population*



- Population grows faster than food supply; food grows linearly, population grows exponentially



Malthus (cont.)



Population grows geometrically….

Population exceeds carrying capacity…

Population is kept in "check"– preventative (abstinence, birth control, marrying later)and/or positive checks (war, disease, famine, natural disasters)

Ester Boserup's Theory of Population Growth

- In contrast to Malthus, Boserup suggested that the more people there are, the more hands there are to work.
- She argued that as population increases, more pressure is placed on the existing agricultural system, which stimulates invention.
- Humans are smart = They will figure out ways of producing more food on the same amount of land rather than starve to death!

I did the 100 metre dash in a 90 metre gym!

- Crude Birth Rate (CBR)

  Number of births in a year per 1000

- Crude Death Rate (CDR)

  Number of deaths in a year per 1000

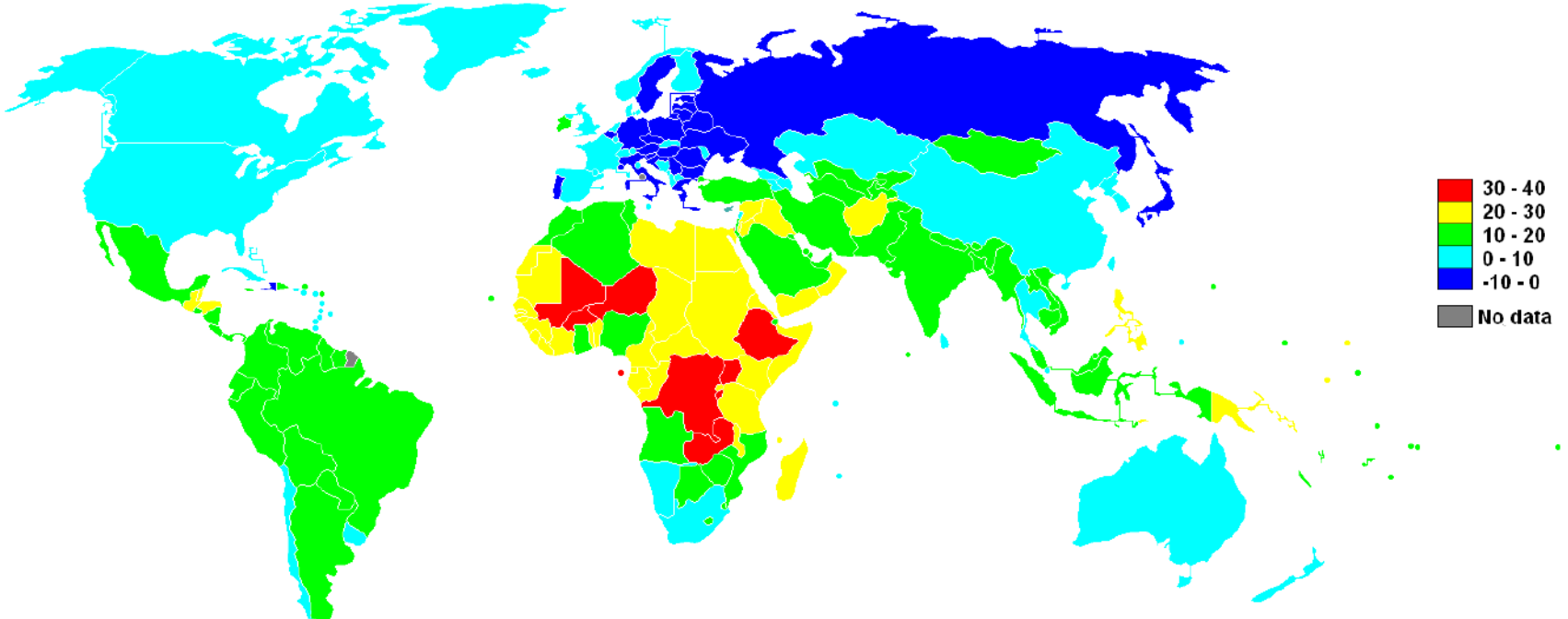
- Total Fertility Rate (TFR)

  Average number of children born to a woman of childbearing age (15-48)

(Births (CBR) – Deaths (CDR)) / 10 = Natural Increase (RNI)

Does not factor immigration (in-migration) or emigration (outmigration) into the equation

For example, Madagascar's CBR (37.89) minus the CDR (7.97) is 29.92; divide that by 10 and the result is 2.992%, its RNI.



Women Having Fewer Babies but Not Few Enough to Stabilize the World's Population

- **Replacement-level fertility rate**
  - Average number of children a couple must have to replace themselves
  - 2.1 in developed countries
  - Up to 2.5 in developing countries

Total fertility rate, 1955-2010

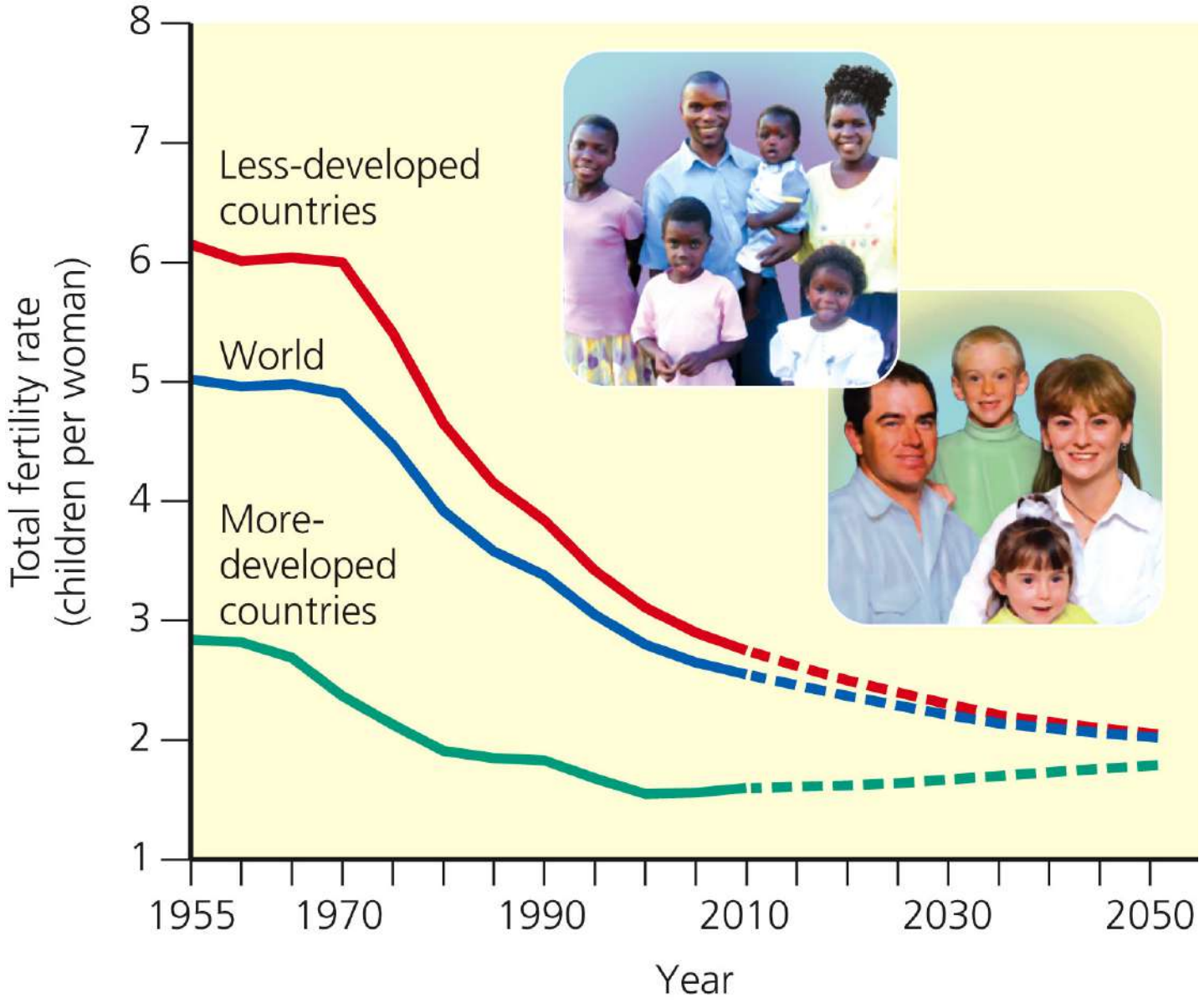
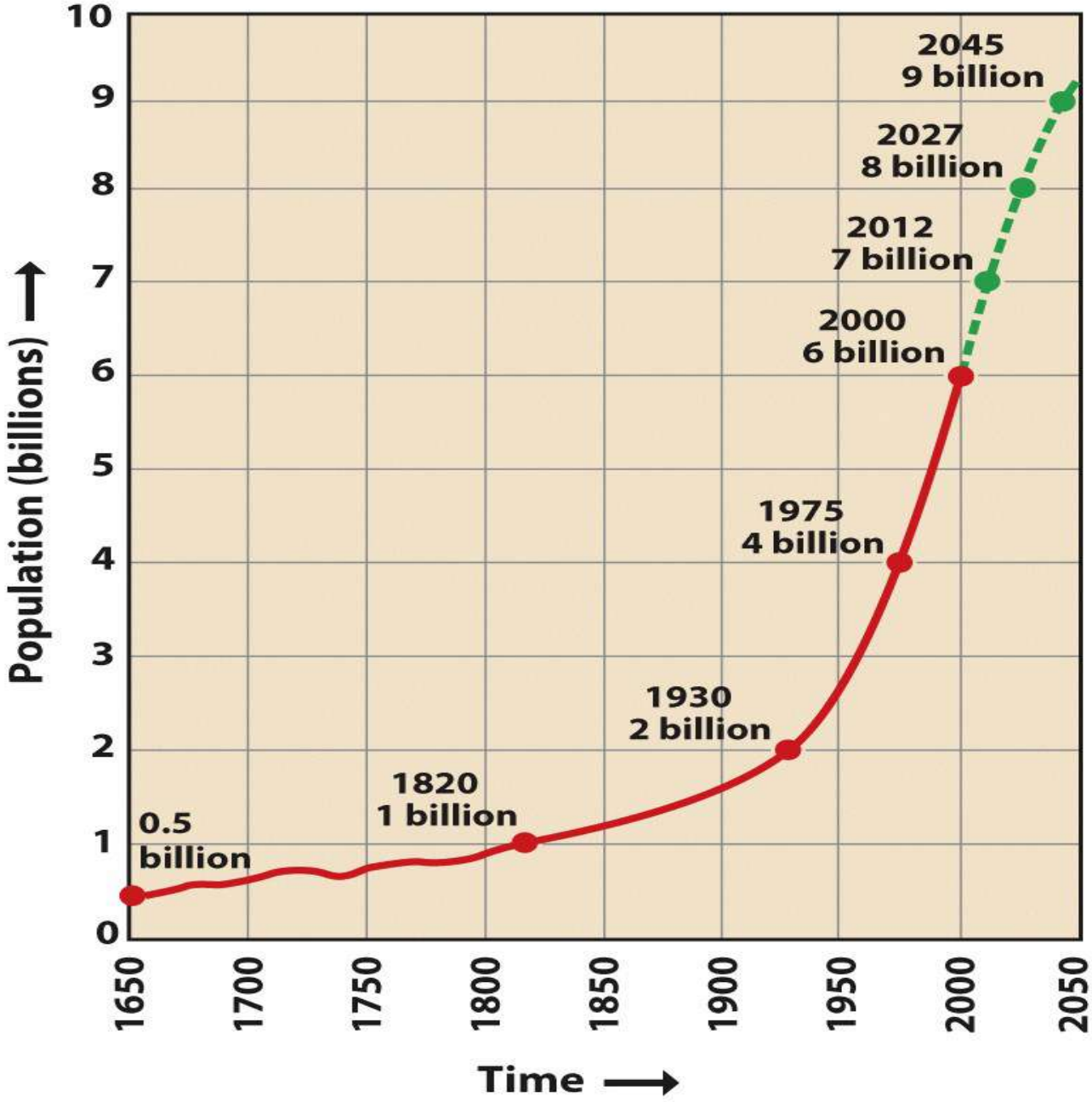
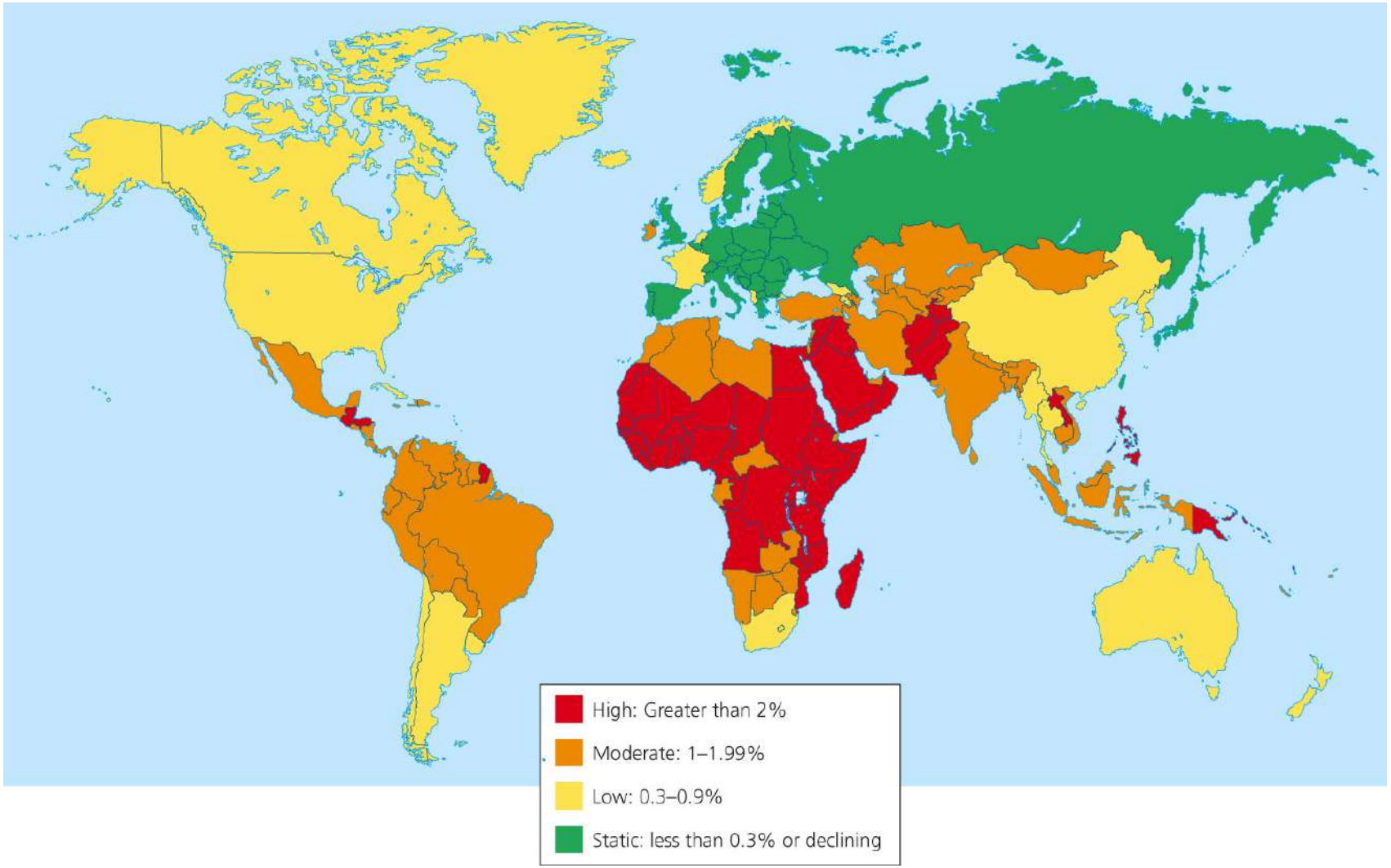


Fig. 6-5, p. 130



Data from: US Census Bureau

2010 Rate of Population Increase



Future Population Growth

- Stationary Population Level (SPL)

  The level at which a national population ceases to grow

Anticipated dates for population stabilization are often moved back

Ex. Brazil and India

Infant Mortality Rates, 1950-2010

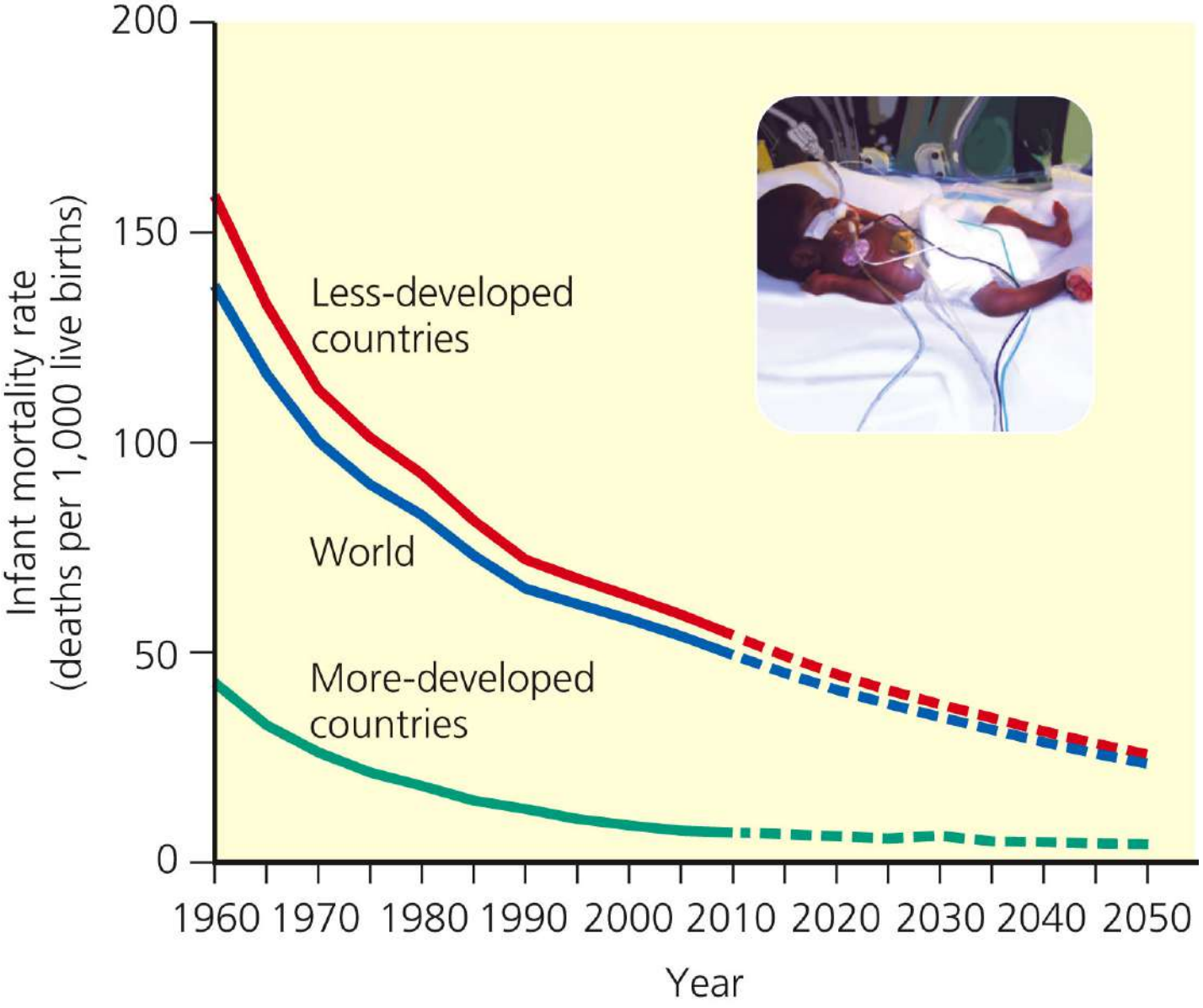


Fig. 6-10, p. 134

Infant Mortality Rates in 2010

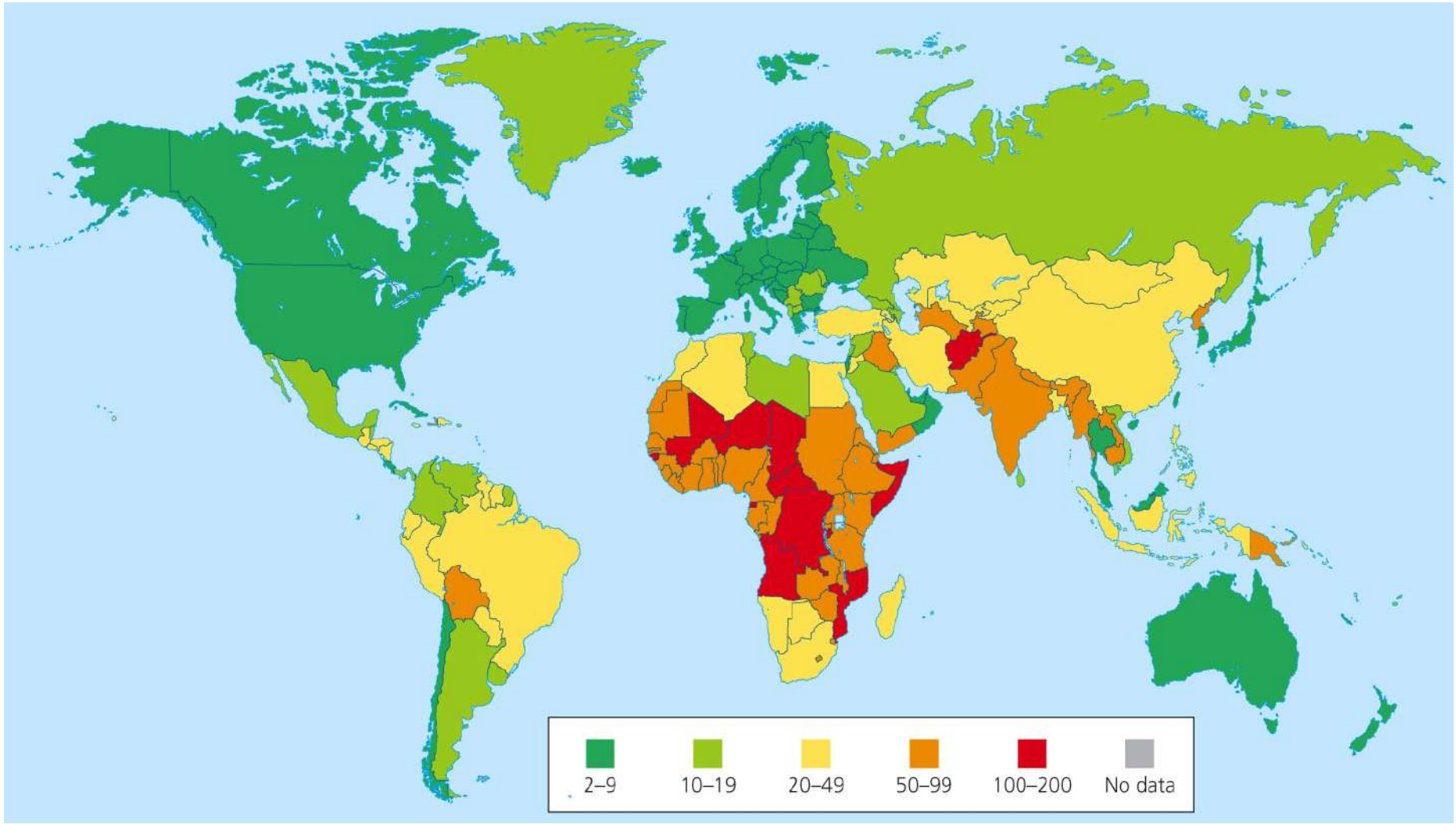
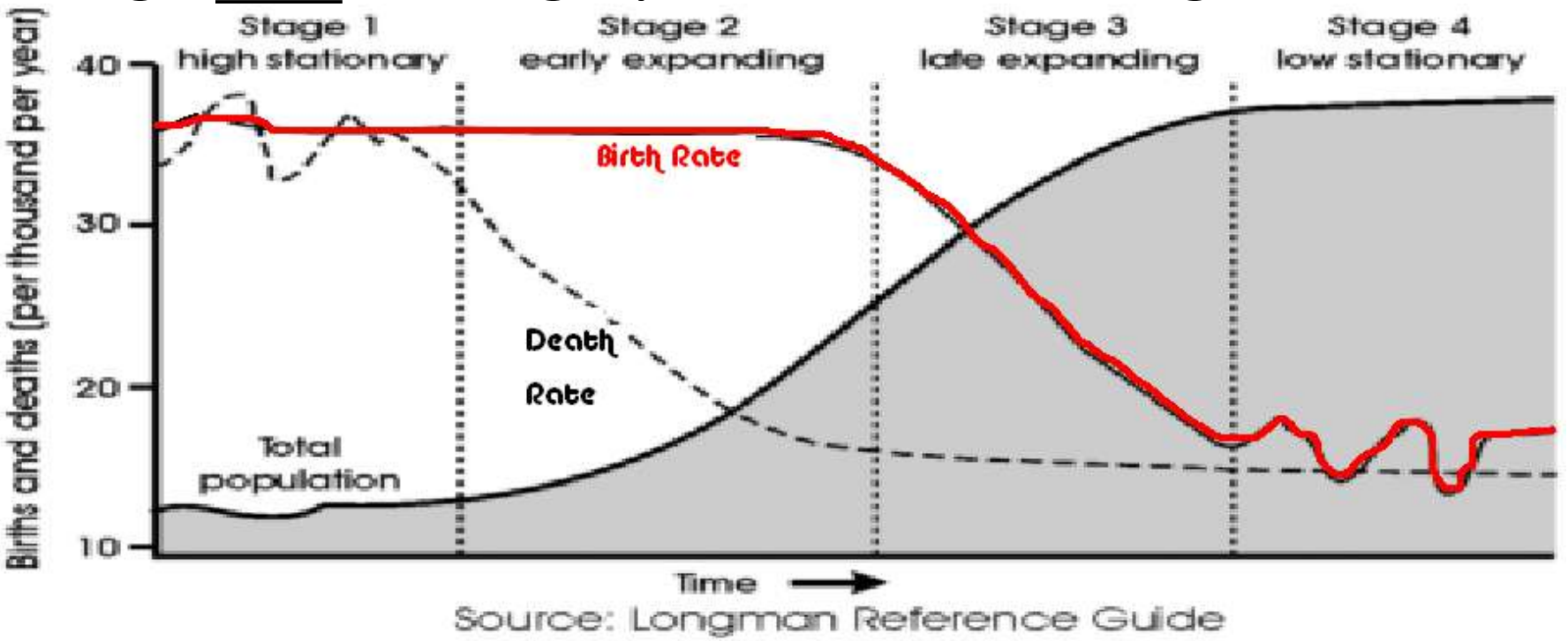


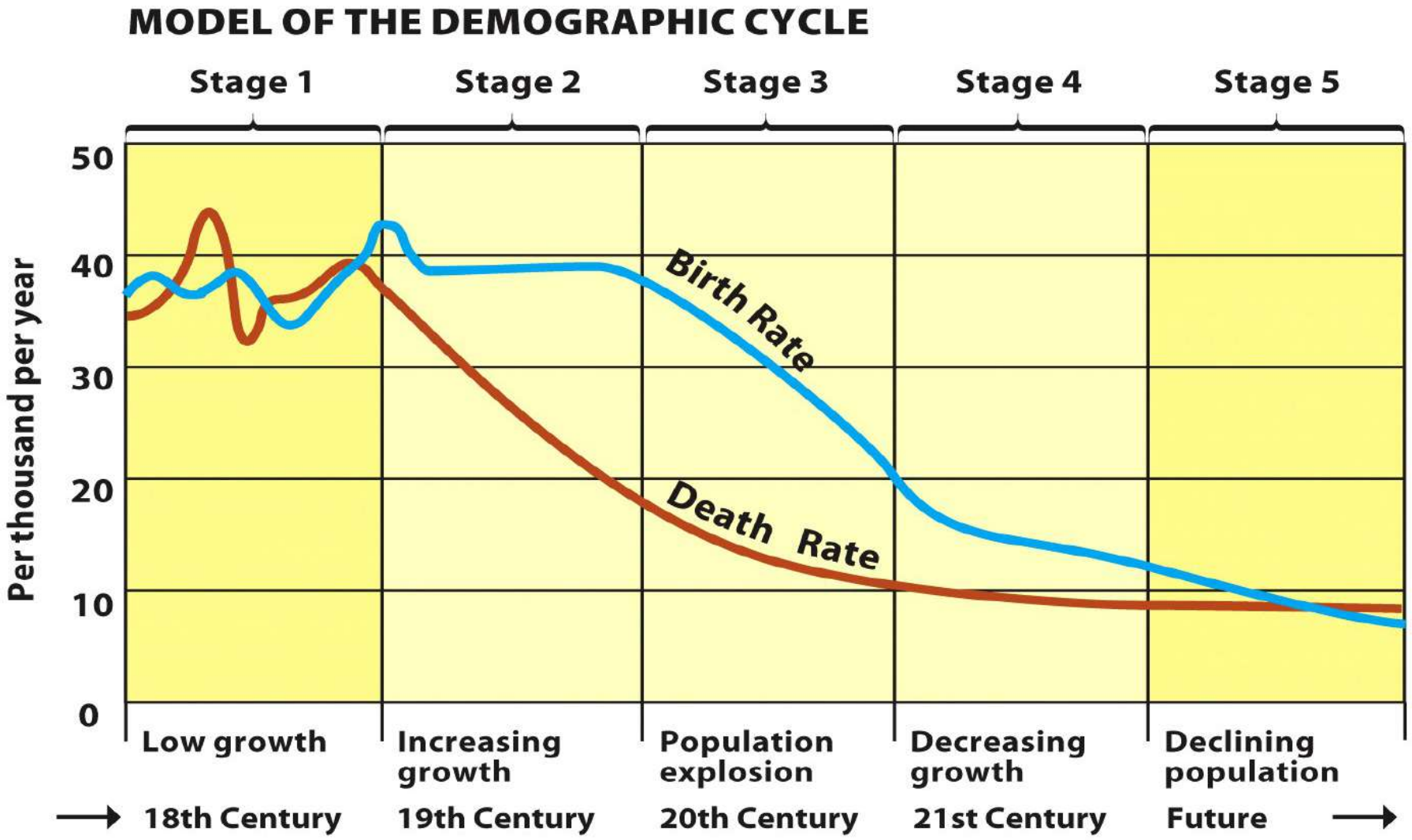
Figure 13, Supplement 8

The Demographic Transition Model

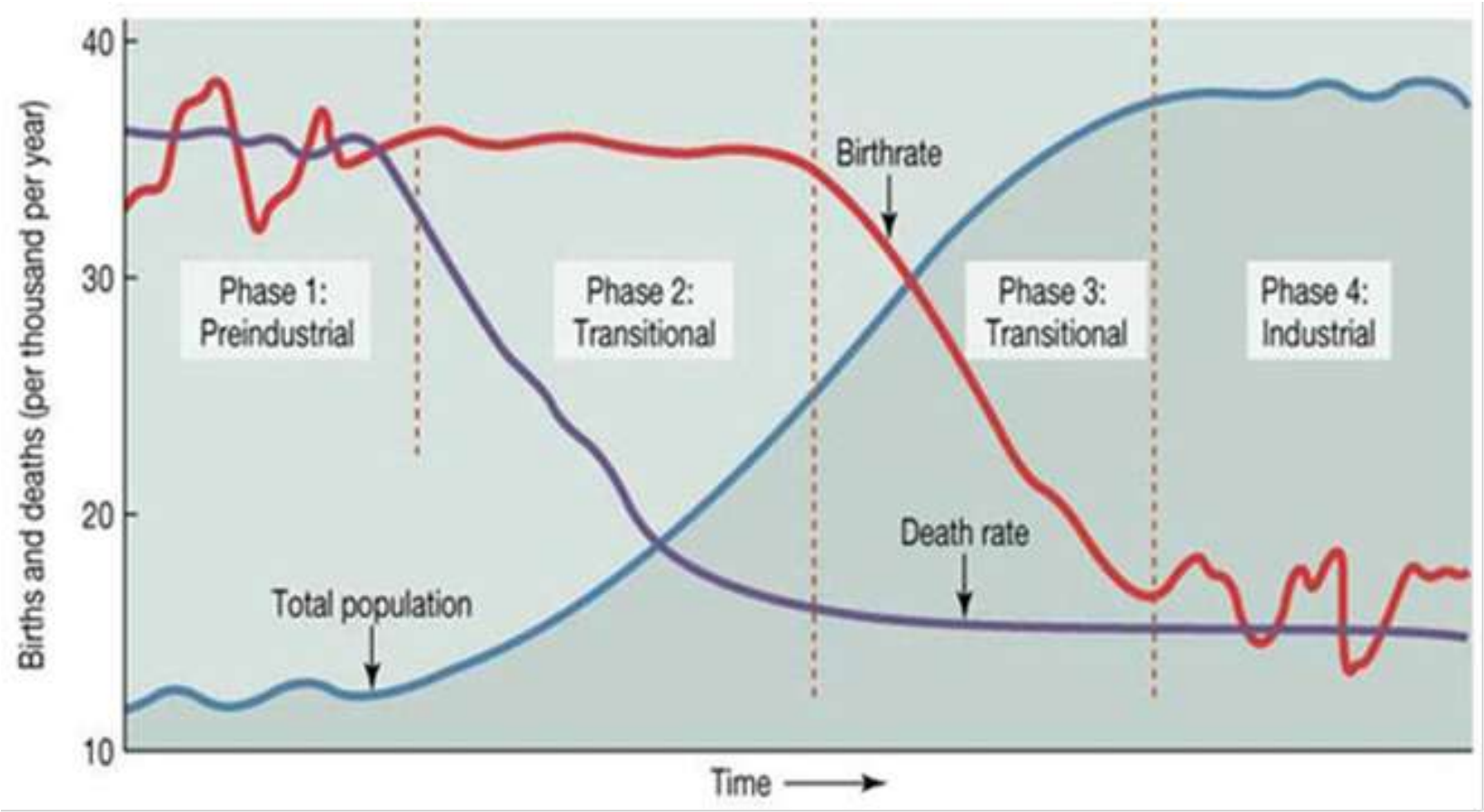
The model of demographic transition suggested that a population's mortality and fertility would decline as a result of social and economic development. It predicted that all countries would over time go through four demographic transition stages.



The Demographic Transition

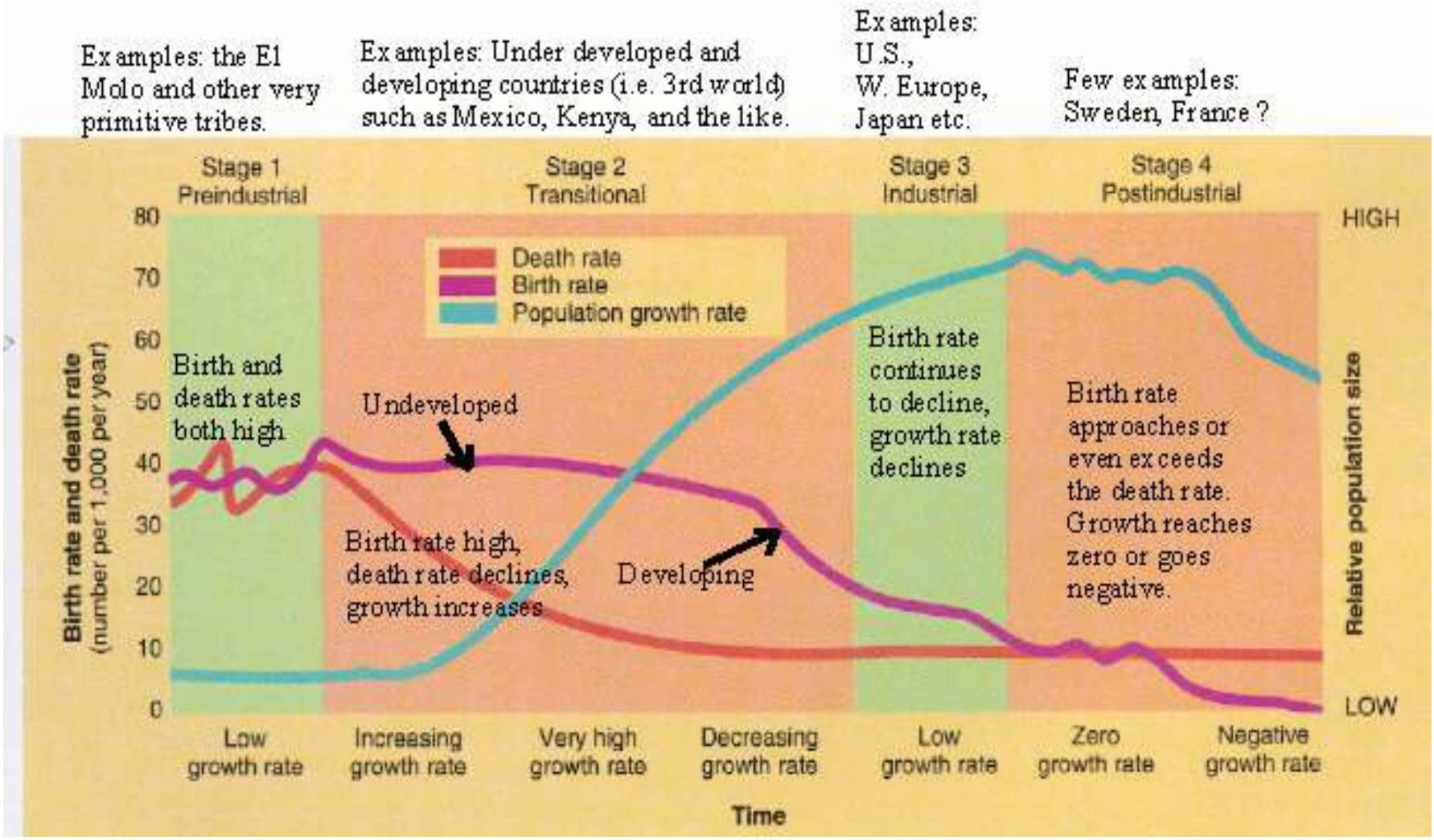


Demographic Transition Model



Demographic Transition

http://envirosci.net/111/population/demographic_phases.jpg



Demographic Transition

- Factors limiting population growth:

Famine, epidemics, plagues, wars

- Factors enhancing population growth:

Agricultural advances, Industrial Revolution, sanitation, vaccinations

- 7 Billion and Counting

STAGE 1– High Stationary, Pre-Industrial, Pre-Modern

- HIGH BIRTH RATES
  - Little or no family planning
  - Parents have many children because few survive
  - Many children are needed to work the land
  - Children are a sign of virility
  - Some religious beliefs and cultural traditions encourage large families
- HIGH DEATH RATES
  - Disease and plague (e.g. bubonic, cholera)
  - Famine , uncertain food supplies, and poor diet
  - Poor hygiene, no piped clean water or sewage disposal
  - War

- POPULATION GROWTH– SLOW

- No countries are in Stage 1. CDR drops before CBR does. Countries could move back in extreme situation.

STAGE 1 (continued)

Birth RateHigh

Death RateHigh

Natural IncreaseLow

Fertility RateHigh

Infant Mortality RateHigh

Example RegionVarious isolated communities in the least

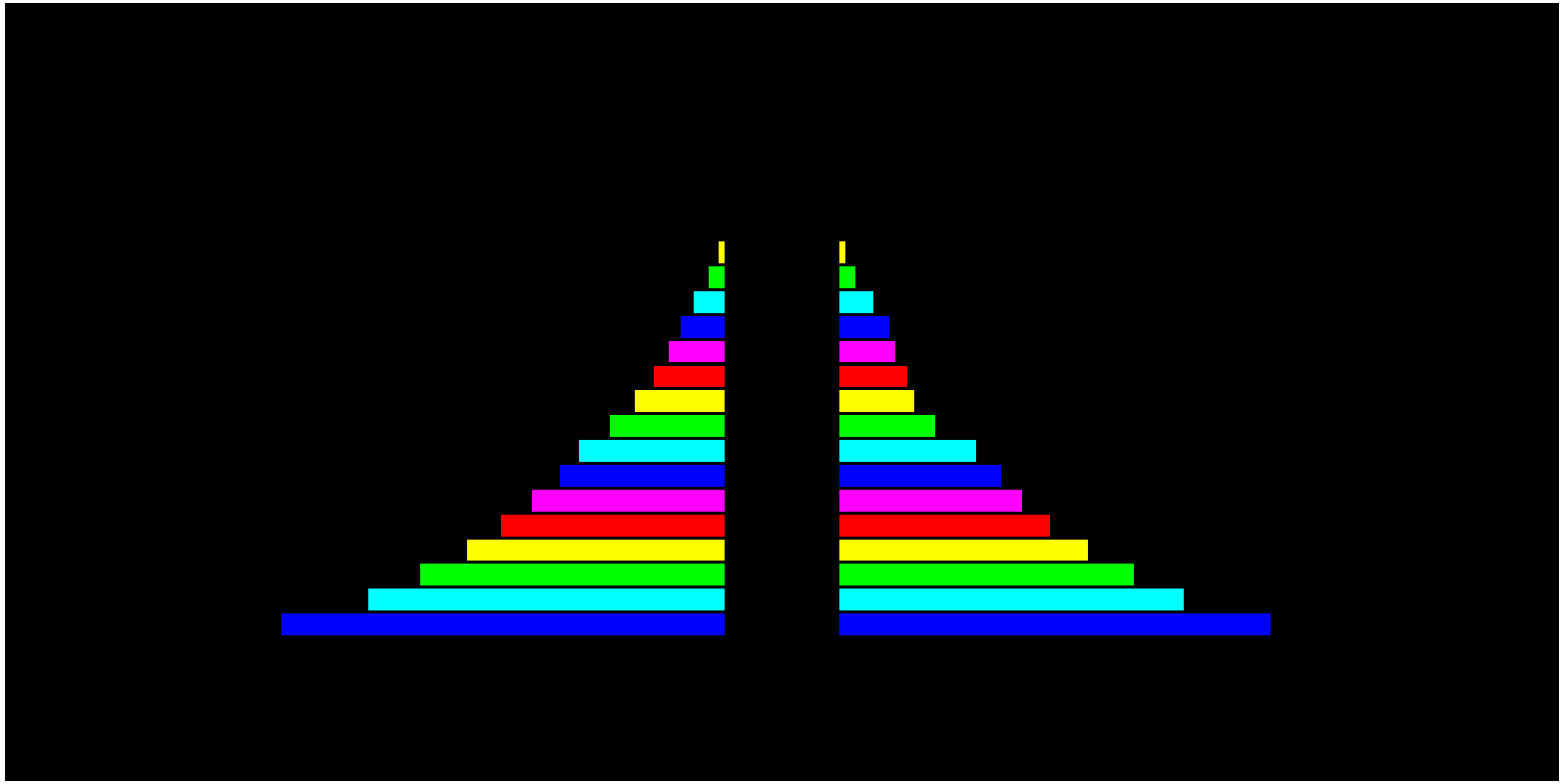
developed regions of Africa; war-torn

regions (eg Afghanistan, Sudan, Angola);

political hotspots (eg North Korea)

Other Characteristics:Characterizes pre-industrial societies. Most of the population is rural and involved in subsistence agriculture.

STAGE 1 Pyramid



- Due to high birth rates, the pyramid shape would have a wide base;
- Due to high death rates, the pyramid would be very short in height; concave shape indicates low life expectancy.

STAGE 2– Early Expanding, Early Industrial, Urbanizing, Industrializing (Rapid population growth)

- Ehrlich described this stage as the "population explosion"
- HIGH BIRTH RATES
  - As STAGE 1
- FALLING DEATH RATES
  - Improved medical care e.g. vaccinations , hospitals, doctors, new drugs, and scientific inventions, baths common
  - Improved sanitation and water supply (England building sewers)
  - Improvements in food production in terms of quality and quantity
  - Improved transport to move food and doctors
  - A decrease in child mortality
  - Around the time of the 2nd Agricultural Revolution

- POPULATION GROWTH-- RAPID

EARLY STAGE 2 (continued)

Birth RateHigh

Death RateDecreasing

Natural IncreaseIncreasing

Fertility RateHigh

Infant Mortality RateHigh

Example RegionSub-Saharan Africa

Other Characteristics:Characterizes post-industrial societies. Most of the population is rural, but urbanization is increasing rapidly. Dependency load begins to increase rapidly as the young cohort (%<15 yrs old) begins to dominate the proportion of the population.

LATE STAGE 2 (continued)

Birth RateHigh

Death RateLowered

Natural IncreaseIncreasing rapidly

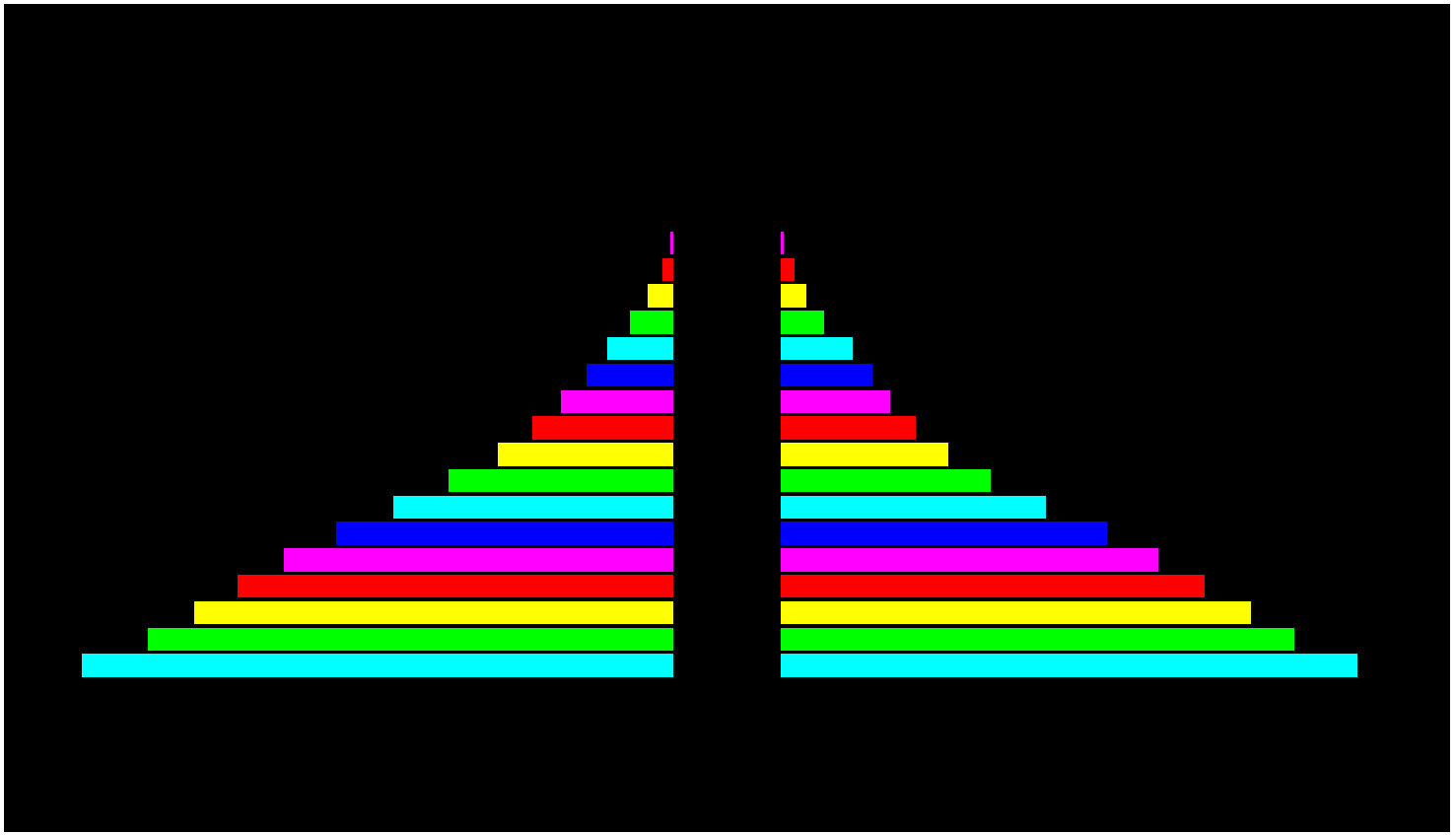
Fertility RateHigh

Infant Mortality RateDeclining

Example RegionMany African countries, Middle East

Other Characteristics:The beginning of the population “explosion”. Often, social and economic problems begin on a large scale. Urbanization continues to grow rapidly. Dependency load is huge due to a massive, young cohort (<15yrs old).

STAGE 2 Pyramid



- As death rates are addressed, the population explosion begins;
- The height of the pyramid grows to reflect the prevention of more deaths; shape becomes less concave as life expectancy increases;
- The width of the base remains large due to the ongoing high birth rates

STAGE 3– Late Expanding or Late Industrial

- FALLING BIRTH RATES (Big decline)
  - Family Planning utilized; contraceptives, abortions, sterilization, and other government incentives adopted
  - A lower infant mortality rates means less pressure to have children
  - Increased mechanization and industrialization means less need for labor
  - Increased desire for material possessions and less desire for large families
  - Emancipation of women
- DEATH RATES LOW
  - As Stage 2

- POPULATION GROWTH– STILL GROWING BUT SLOWING
- MDCs are in Stage 3, LDC are incoming within the last 20 years

EARLY STAGE 3 (continued)

Birth RateDecreasing

Death RateLow

Natural IncreaseHigh, but decreasing

Fertility RateDecreasing

Infant Mortality RateDecreasing

Example RegionSouth and East Asia

Other Characteristics:Birth control is introduced and begins wide social acceptance. Social and economic issues begin to be addressed. Dependency load is still large due to a large young cohort group (<15yrs old).

LATE STAGE 3 (continued)

Birth RateDecreasing to a manageable level

Death RateLow

Natural IncreaseDecreasing sharply

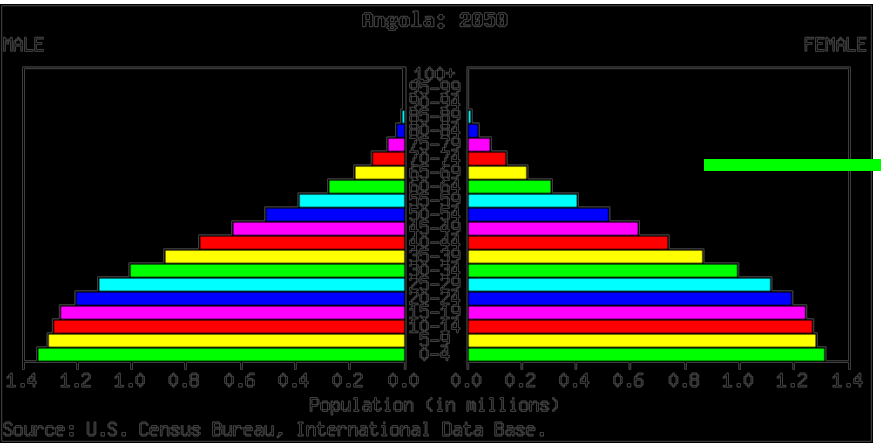
Fertility RateDecreasing sharply

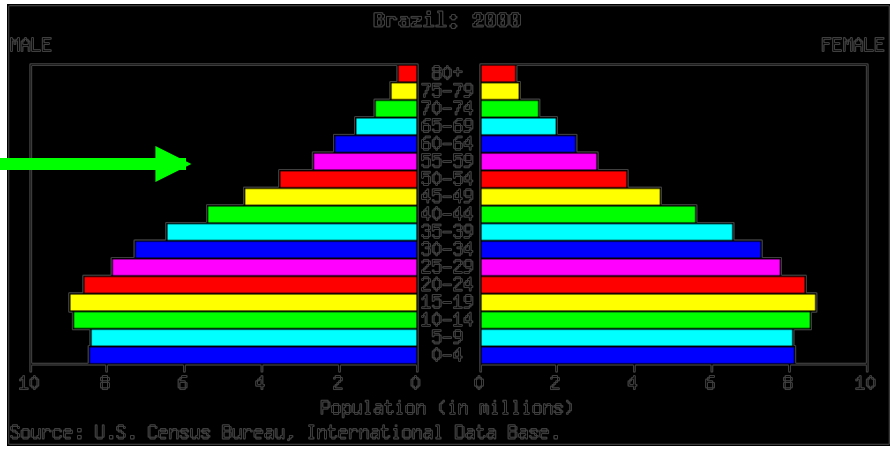
Infant Mortality RateLowered

Example RegionLatin America, Tiger Economies

Other Characteristics:Ends the population explosion. People choose smaller families due to many social and economic factors. Urbanization dominates. Population stabilization begins. Population continues to grow due to the large young population reaching childbearing age.

STAGE 3 Pyramid





- As birth rates begin to be addressed, the base begins to stabilize and eventually narrow;
- Death rates are low and stabilized, meaning that the pyramid continues to grow higher.

STAGE 4– Low Stationary or Low Fluctuating

- BIRTH RATES LOW
  - Fertility rates plunge to below replacement rate (2.1 children per woman) because:
    - Valuation of women beyond childbearing and motherhood becomes important
    - Increasing value is placed on material goods over family size in modern industrialized society; DINKs
    - Widespread choice of contraception by families
- DEATH RATES LOW
  - Child mortality reduced and life expectancy increased due to:
    - Capital ($$$) investment in medical technology
    - Widespread knowledge of healthy diet and lifestyle
- POPULATION GROWTH– SLOW OR DECLINING (due to aging societies)

STAGE 4 (continued)

Birth RateLow

Death RateLow with spurts as a result of an aging

society

Natural IncreaseLow or negative

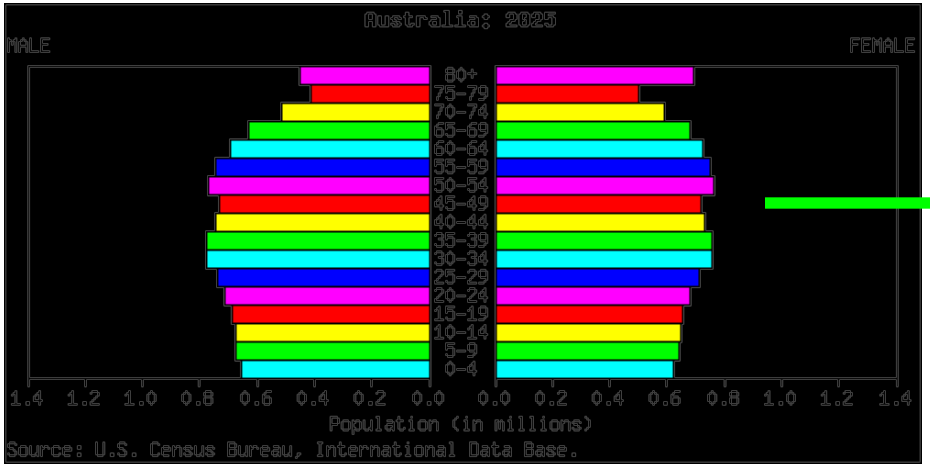
Fertility RateNear or below replacement rate

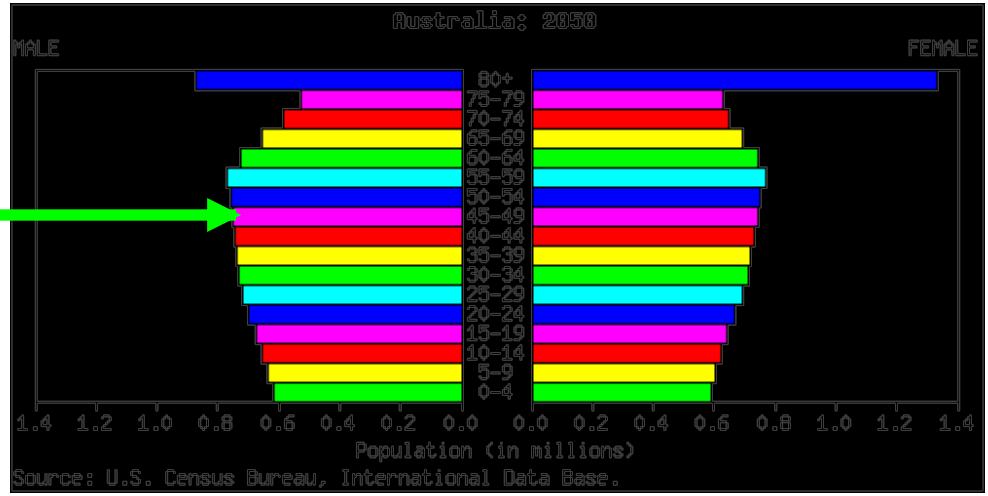
Infant Mortality RateLow

Example RegionMDC's, China

Other Characteristics:Population growth no longer a social and economic issue. Birth and death rates fluctuate minimally and natural increase stops. An overwhelmingly urban society. Dependency load is small (large working age group).

STAGE 4 Pyramid

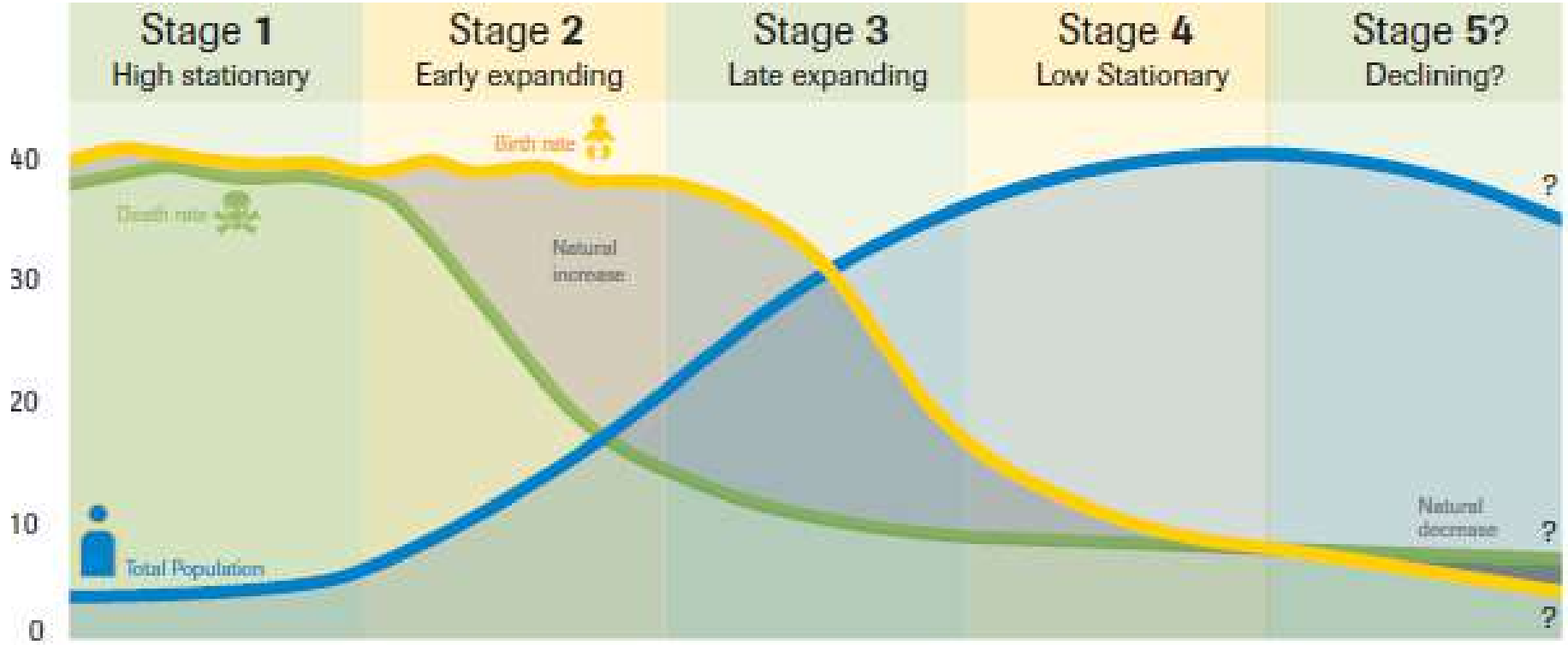


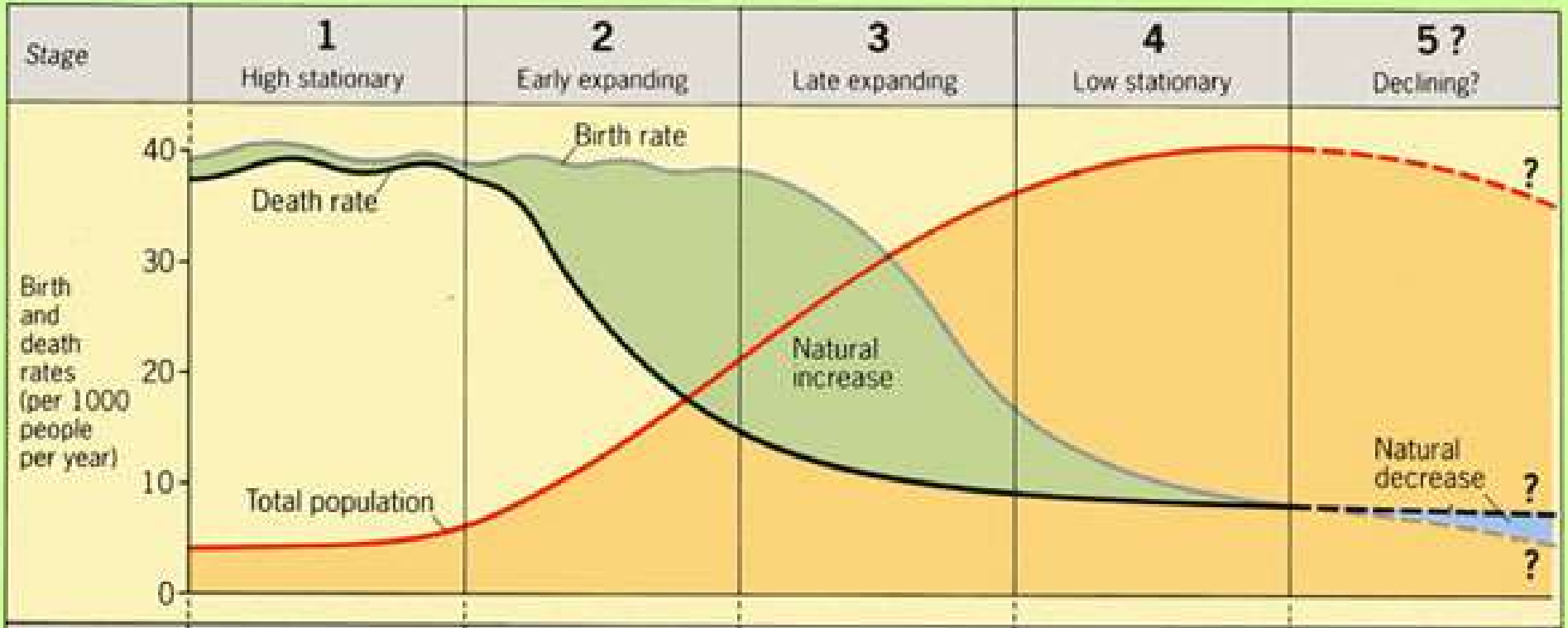


- Birth rates and death rates are low; as fertility continues to decline, an AGING SOCIETY emerges.
- Pyramid seems to “invert”…

Is there a Stage 5 on the DTM?

- At the end of Stage 4, CDR begins to exceed CBR. Places like Bosnia and Serbia have an aging population and the outlook is bleak. It is not officially part of the DTM but discussed and supported.





Stage	1 High stationary	2 Early expanding	3 Late expanding	4 Low stationary	5 ? Declining?
Examples	A few remote groups	Egypt, Kenya, India	Brazil	USA, Japan France, UK	Germany
Birth rate	High	High	Falling	Low	Very low
Death rate	High	Falls rapidly	Falls more slowly	Low	Low
Natural increase	Stable or slow increase	Very rapid increase	Increase slows down	Stable or slow increase	Slow decrease
Reasons for changes in birth rate	Many children needed for farming. Many children die at an early age. Religious/social encouragement. No family planning.		Improved medical care and diet. Fewer children needed.	Family planning. Good health. Improving status of women. Later marriages.	
Reasons for changes in death rate	Disease, famine. Poor medical knowledge so many children die.	Improvements in medical care, water supply and sanitation. Fewer children die.		Good health care. Reliable food supply.	

Key Question

- Why Does Population Composition Matter?

Population Composition

- The composition is the structure of a population in terms of age, sex, and other properties such as marital status and education.

- Age and sex are key indicators of population composition, and demographers and geographers use population pyramids to represent these traits visually.

Population Composition (cont'd)

- Young vs. elderly in any population will determine different social needs

- Geographers are concerned with both spatial distribution and population composition

Generalized Population Age-Structure Diagrams

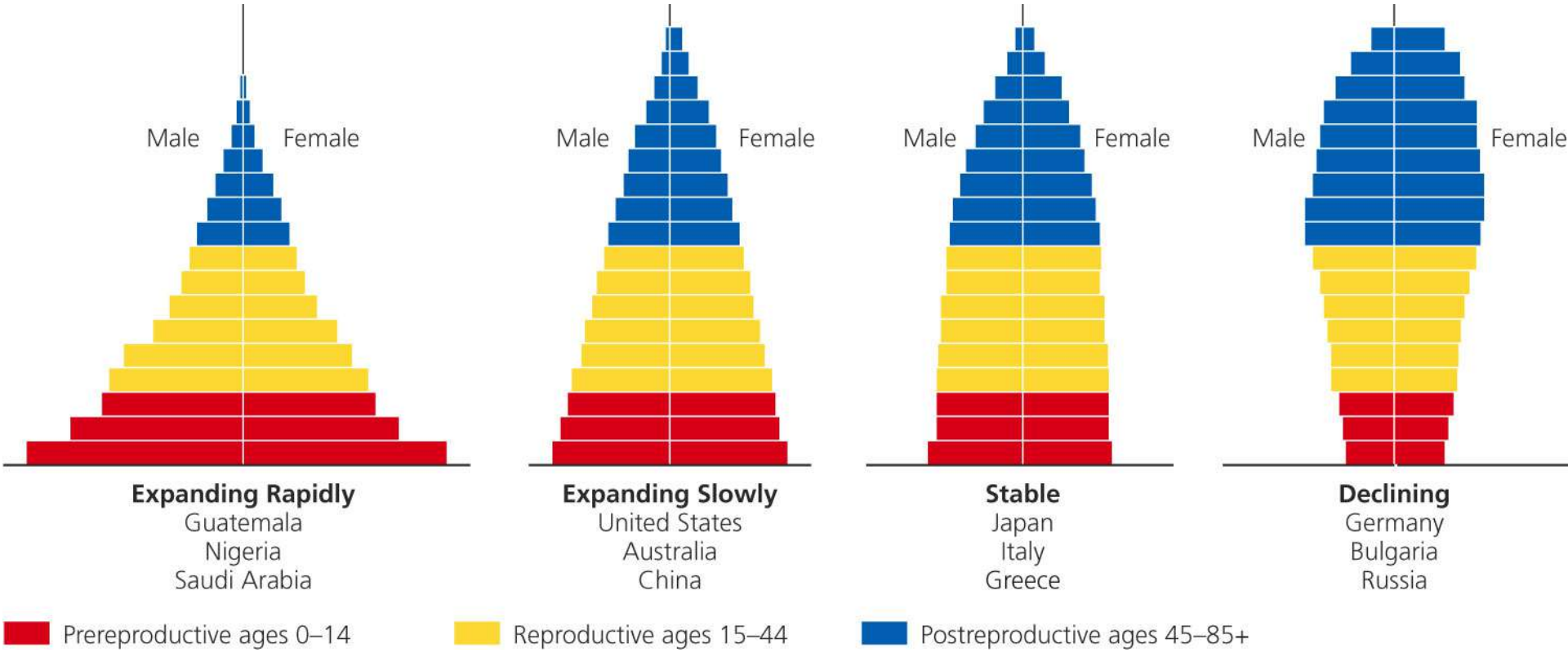


Fig. 6-12, p. 136

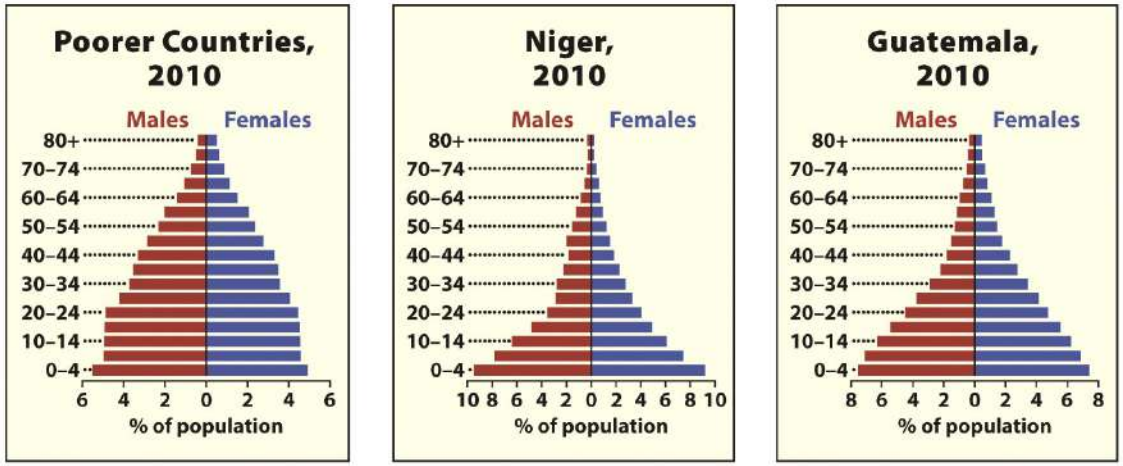


Figure 2.16
Age–Sex Population Pyramids for Countries with High Population Growth Rates.
Countries with high total fertility rates, high infant mortality rates and low life expectancies will have population pyramids with wide bases and narrow tops.

Data from: UN, World Population Prospects

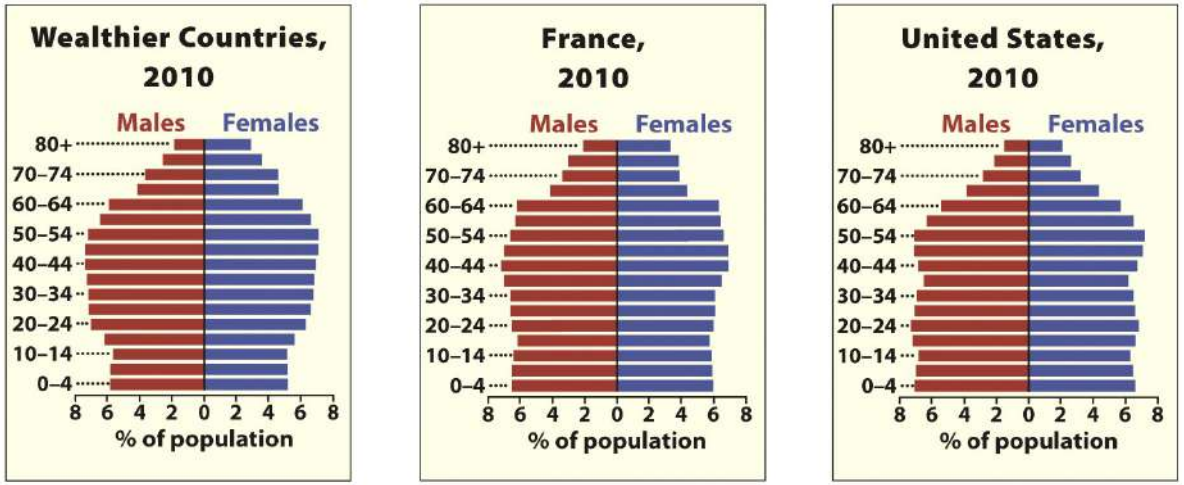


Figure 2.17
Age–Sex Population Pyramids for Countries with Low Population Growth Rates.
Countries with lower total fertility rates and longer life expectancies have population pyramids shaped more uniformly throughout.

Data from: UN, World Population Prospects

Population Structure by Age and Sex in Developing and Developed Countries

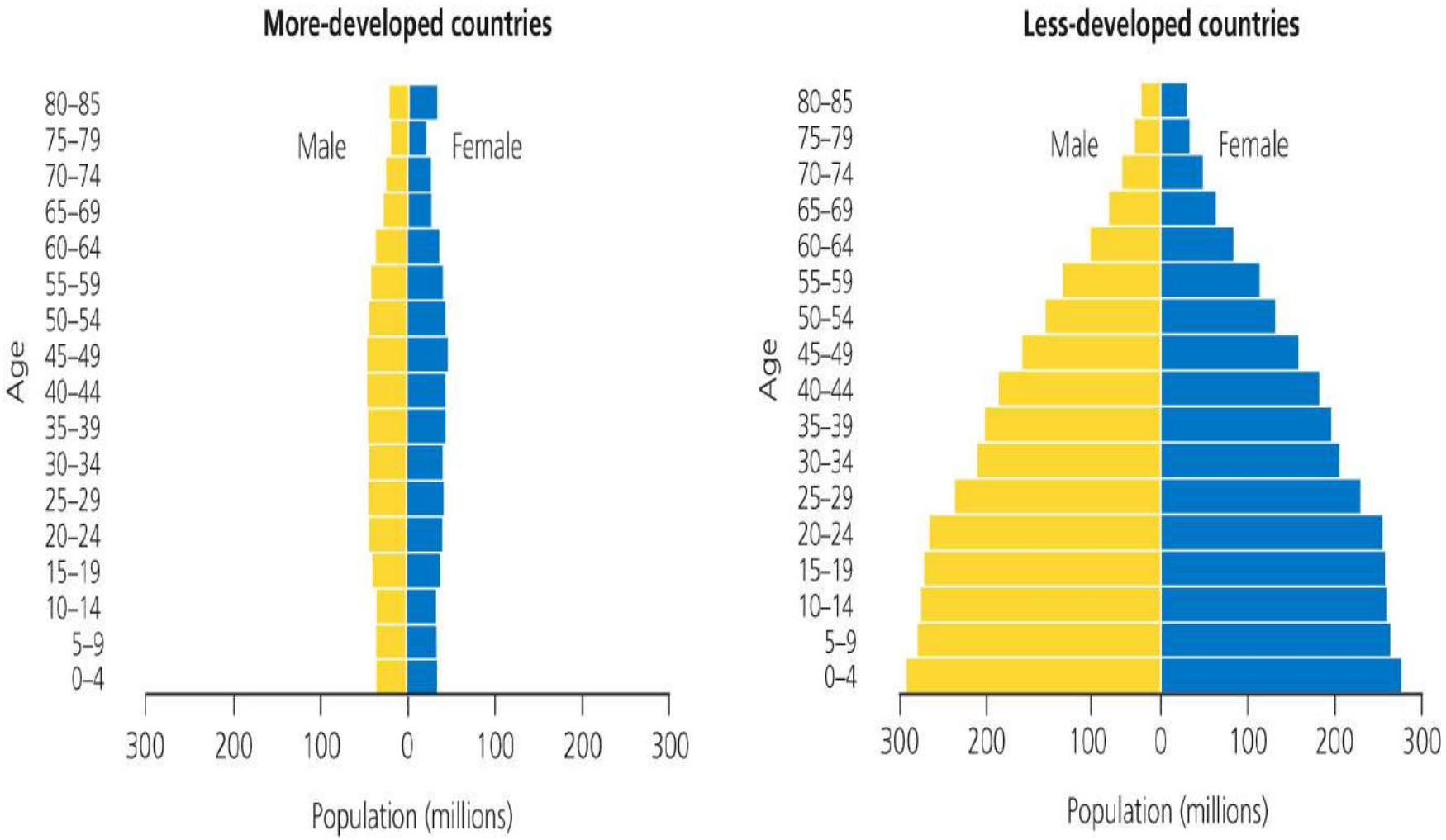


Fig. 6-13, p. 136

Key Question

- How Does the Geography of Health Influence Population Dynamics?

Geographies of Health

- Infant Mortality
- Child Mortality
- Life Expectancy

Influence on Health and Well-Being

- Health is closely related to location and environment
- When an outbreak of a particular disease occurs its source and diffusion are studied by specialists in medical geography
- Medical geographers study diseases, and they also use locational analysis to predict diffusion and prescribe prevention strategies

Infectious Diseases

- 65% of all diseases are infectious
- Malaria - *Vectored*
- HIV/AIDS- *Nonvectored*

Chronic and Genetic Diseases

- Also called degenerative diseases
- Afflict middle and old age populations
- 100 years ago in the United States: tuberculosis, pneumonia, and heart diseases
- Today: Cancer, heart disease, stroke and accidents are the leading causes of death in the United States

Key Question

How Do Governments Affect Population Change?

Population and Government

- Expansive (Pro-natalist) population policies:

Encourage large families and raise the rate of natural increase

- Eugenic population policies:

Designed to favor one racial or cultural sector of the population over others

Why would a country want a pro-natalist policy ?

replaces those lost in war and civil unrest

build up the military

replace retiring folks in the workforce

support the increasing number of seniors

occupy parts of a country that are virtually empty

help develop the resources of a state

lead to economic growth

increase majority/minority percentages

gain more influence internationally

Examples: of Pro-natalist Policies

Past and Present

http://www.imb.org/southern-africa/images/Malagasy_children.jpg

U.S.S.R.

1944 – 1992

awarded medals to women in order to encourage a high fertility rate.

Why ?

3 Categories of Medals were Presented

- Motherhood Medals

- Order of the Glory of Motherhood
  or
  Order of Maternal Glory

- Order of Mother Heroine

Motherhood Medals

2nd Class

5 children 8,000,000 awarded

1st Class

6 children 4,000,000 awarded

Order of Maternal Glory

3rd Class

7 children - 2,000,000 awarded

2nd Class

8 children - 1,000,000 awarded

1st Class

9 children - 500,000 awarded

Order Mother Heroine

10 children

200,000 awarded

Ulyanovsk Oblast, Russia - Family Contact Day (Conception Day)

Grand Prize winners of “Give Birth to a Patriot on Russia’s Independence Day” Contest

Do It For Denmark

Population and Government (cont'd)

Chengdu, China

- Restrictive (Anti-natalist) population policies

e.g., One-Child Policy in China

- Limitations: Sweden
- Contradictions: Roman Catholic doctrine

Why would a country want an anti-natalist policy ?

cannot afford to provide for them

overpopulation concerns - limited available resources
local, national, international SCALE

allow more women in the workforce and boost economy

repress a group of people
separate policy for certain groups
or
different applications of the policy (see 2nd last slide)

China

2 different programs in recent years

- Later, Longer, Fewer Policy 1971
- One Child Policy 1979

One Child Policy 1979

- rewards start once 1 child contract is signed

Rewards

- free medical care
- free daycare and schooling
- guaranteed job for child
- bonuses for parents
- extra maternity leave
- better housing
- bigger old age pension

Penalties

- must repay financial benefits
- educational, medical benefits, & guaranteed jobs are withdrawn
- parents' wages reduced

How did the government persuade its citizens to cooperate ?

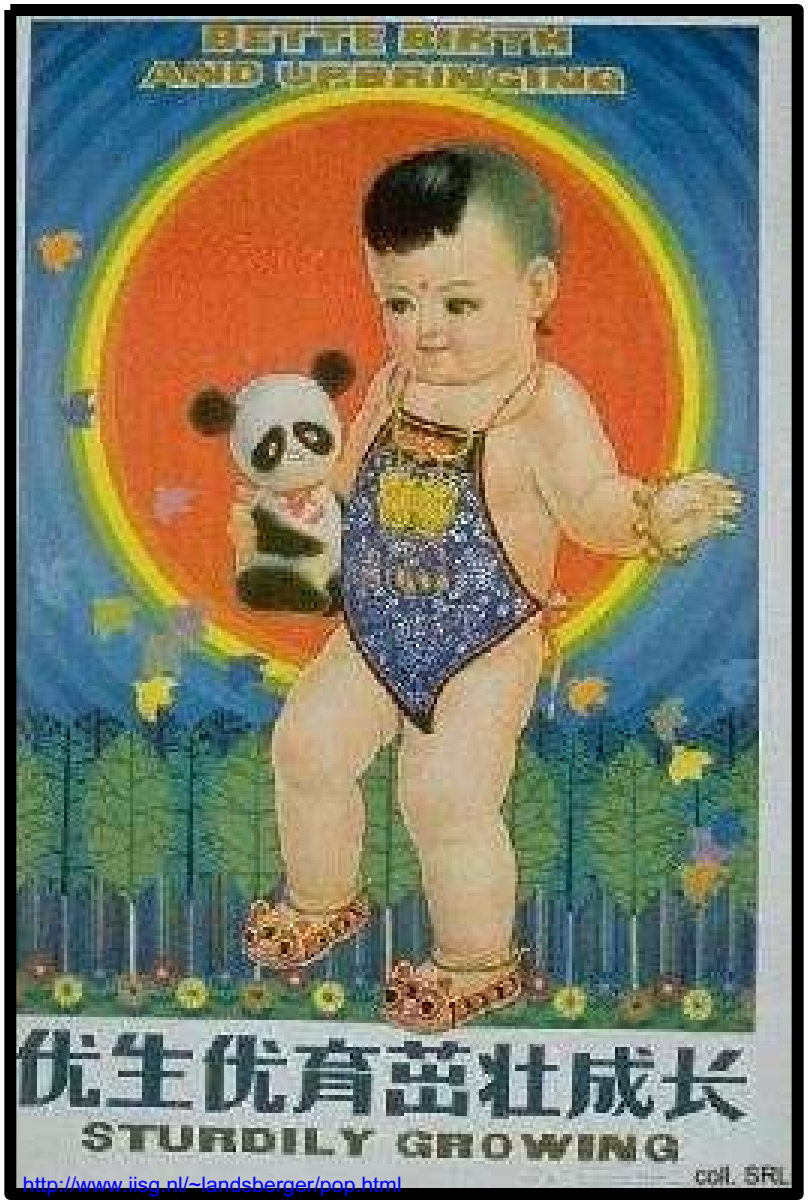
80,000 Family Planning Workers

Advertising

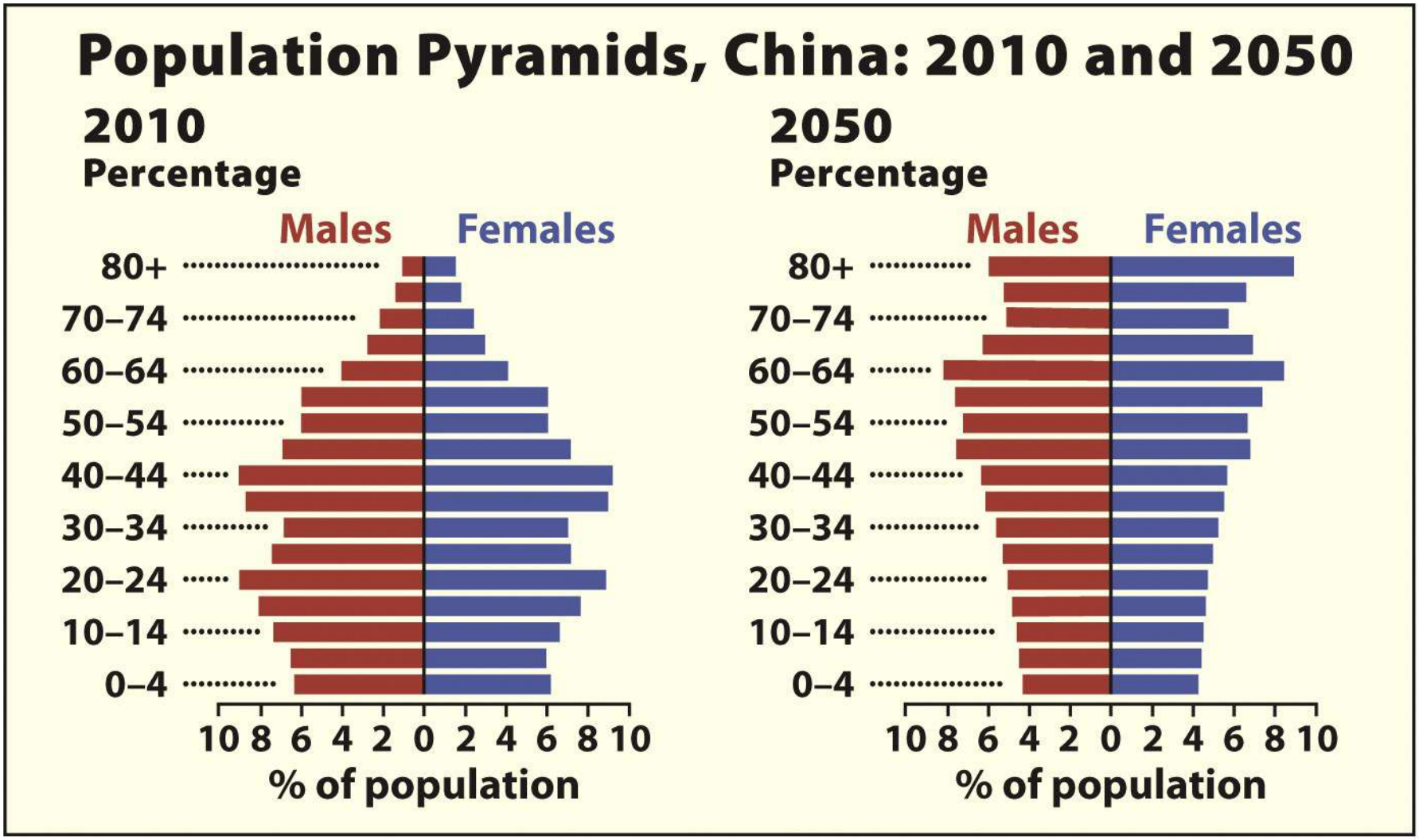
http://www.iisg.nl/~landsberger/pop1.html

Clever and pretty
healthy and lovely

http://www.iisg.nl/~landsberger/pop1.html



http://www.iisg.nl/~landsberger/pop.html



Data from: Population Reference Bureau

Maintenance or Stability

http://www.yooj.co.uk/test_page_1.html

2 .1 babies maintain current population

+

http://www.visualphotos.com/image/2x4628085/russian_babys_feet_sticking_out_from_blanket