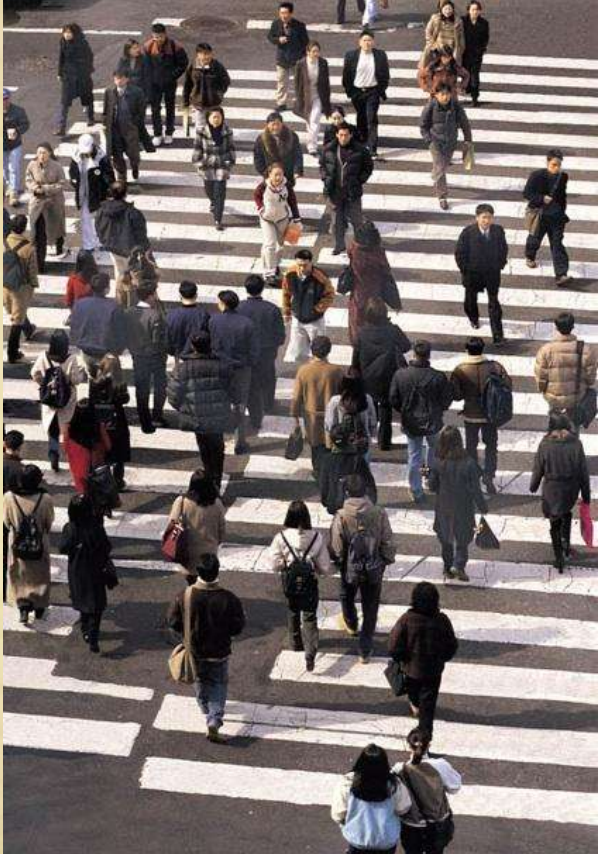


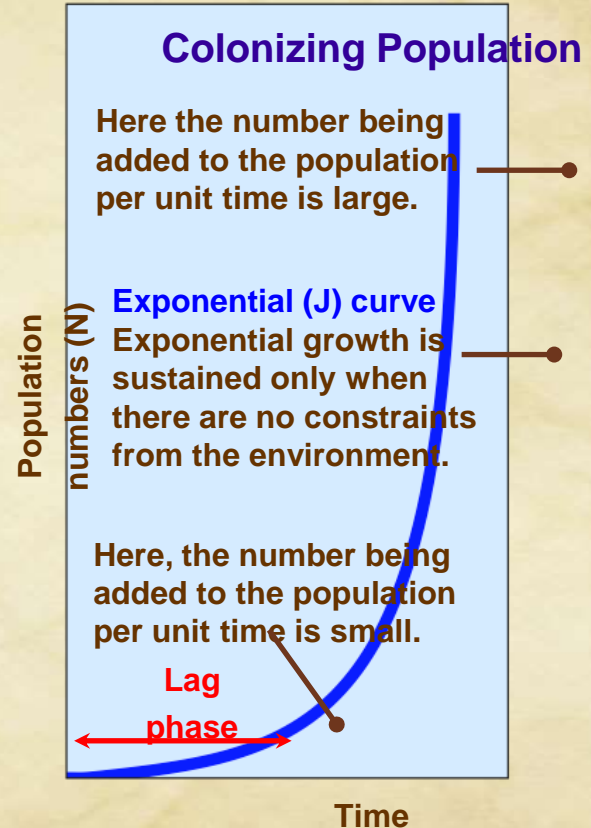
Human Population Growth



- ▶ The **world population**, now over 7.4 billion, is growing at the rate of about 80 million per year.
- ▶ Projections put the world population at between 8 and 12 billion in 2050, with nearly all of this growth expected in the developing world.
 - (LEDCs) Developing countries include: Africa, Asia (excluding Japan), Latin America and the Caribbean, and regions of Melanesia, Micronesia, and Polynesia.

Exponential Growth

- ▶ Populations becoming established in a new area for the first time are often termed **colonizing populations**.
 - They may undergo a rapid **exponential** (logarithmic) increase in numbers to produce a **J-shaped growth curve**.
- ▶ In natural populations, population growth rarely continues to increase at an exponential rate.
- ▶ **Factors in the environment, such as available food or space, act to slow population growth.**



Rates of Population Change

- ▶ **CRUDE BIRTH:** number births per thousand individuals per year (CBR)
- ▶ **CRUDE DEATH:** number deaths per thousand individuals per year (CDR)
- ▶ **NATURAL INCREASE RATE:** $(CBR - CDR) / 10$
- ▶ **DOUBLING TIME:** $70 / NIR$



Many invertebrate populations increase rapidly in the right conditions



Large mammalian carnivores have a lower innate capacity for increase

Population Growth

- ▶ **Population growth** depends on the number of individuals added to the population from births and immigration, minus the number lost through deaths and emigration. This can be expressed as a formula:

$$\text{Population growth} = \text{Births (B)} - \text{Deaths (D)} + \text{Immigration (I)} - \text{Emigration (E)}$$

- ▶ **Net migration** is the difference between immigration and emigration. (largely ignored)



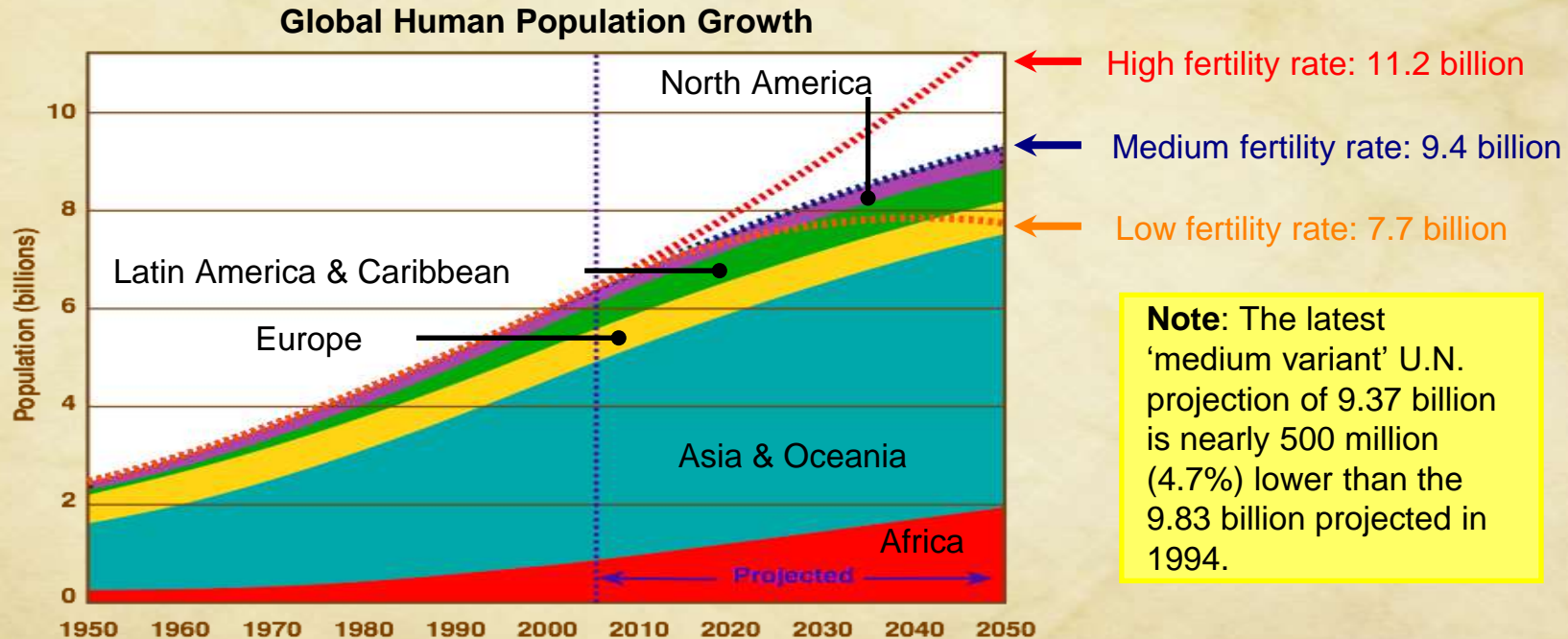
Industrial Development, GDP and Population Dynamics

More economically developed countries (MEDCs)	Less economically developed countries (LEDCs)
Most countries in Europe and North America, and South Africa, Israel and Japan	Most of the countries in sub-Saharan Africa, large areas of Asia and South America
Industrialized nations with high GDPs	Less industrialized or have hardly any industry at all
Population is relatively rich	May have raw materials (natural capital) but this tends to be exported and processed in MEDCs.
Individuals are unlikely to starve through poverty	Population has a lower GDP and higher poverty rates
Relatively high level of resource use per capita (per person)	More people are poor with low standards of living
Relatively low population growth rates largely due to low CBR but rising CDRs	High population growth rates largely due to rapidly falling CDRs
Have very high carbon and ecological footprints	Have lower carbon and ecological footprints

▲ Figure 8.1.4 Comparison of MEDCs and LEDCs

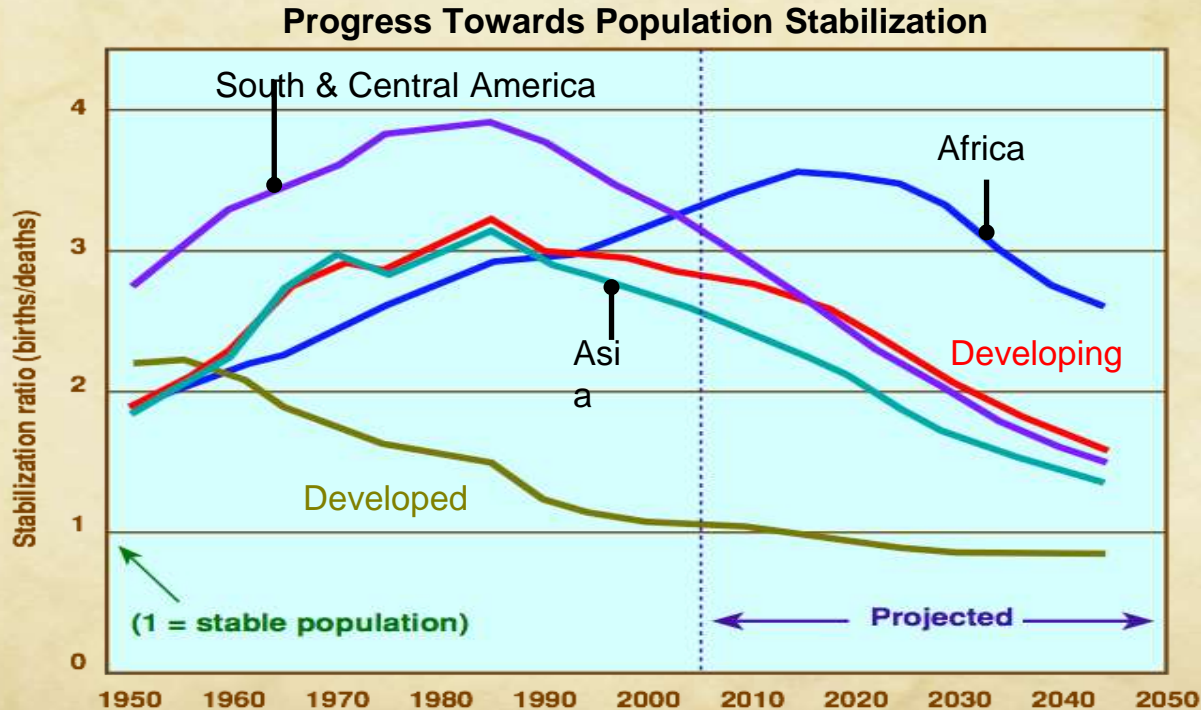
Global Population Growth

- ▶ Estimates of likely future growth of the world human population are highly uncertain and projections for 2050 range from a low of 7.7 billion to a high of 11.2 billion.



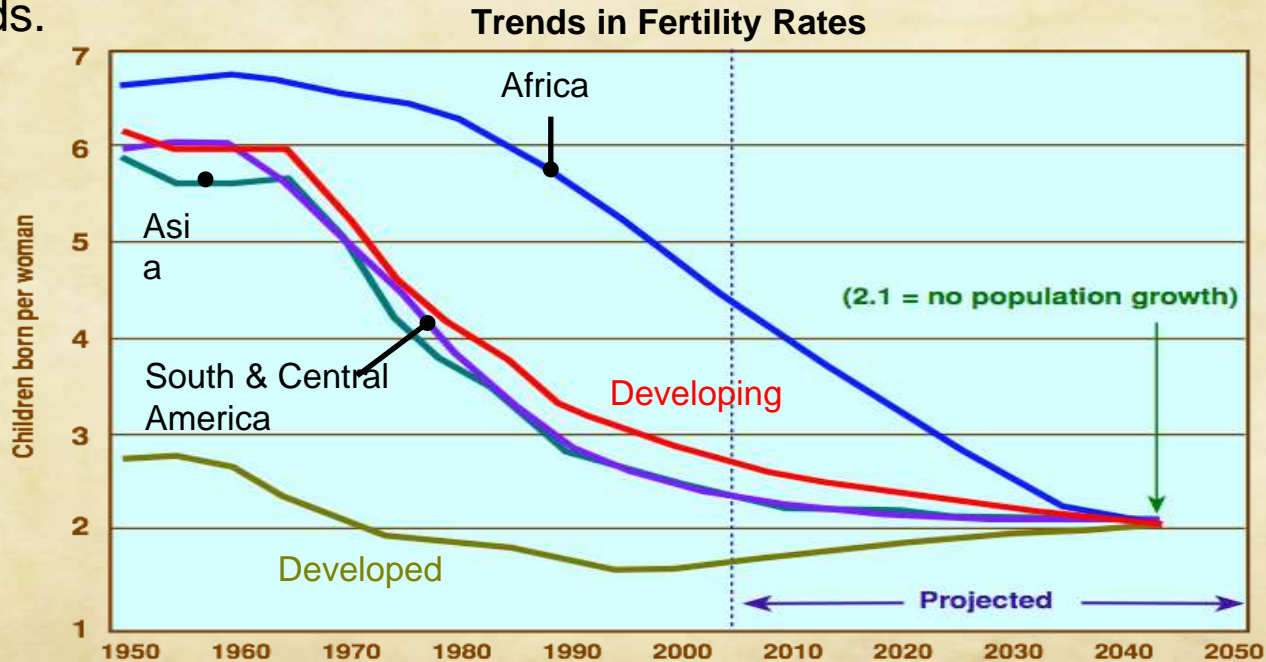
Population Stabilization

- ▶ Human population growth is slower than predicted but because of the large and increasing population size the world population is still expected to increase substantially before stabilizing.



Fertility Rates

- ▶ Based on current trends, it is assumed that human **fertility rates** will continue to decline and life expectancy will continue to increase. Developing countries are expected to broadly follow these demographic trends.



Life Tables

- ▶ Numerical data collected during a population study can be presented as a table of figures called a **life table**.
- ▶ **Life tables** provide a summary of **mortality** for a population. The basic data are the number of individuals surviving to each age interval. This gives the ages at which most mortality occurs in a population.

Life table for a population of the barnacle *Balanus*

Age (yr)	No. alive at the start of the age interval	Proportion of original no. surviving at the start of the age interval	No. dying during the age interval	Mortality (d)
0	142	1.000	80	0.563
1	62	0.437	28	0.452
2	34	0.239	14	0.412
3	20	0.141	5	0.250
4	15	0.106	4	0.267
5	11	0.078	5	0.454
6	6	0.042	4	0.667
7	2	0.014	0	0.000
8	2	0.014	2	1.000
9	0	0.0	–	–



Demographic Transition Model

Pattern of decline in mortality and fertility/natality of a nation as a result of social and economic development

STAGE 1 High Stationary, pre-industrial

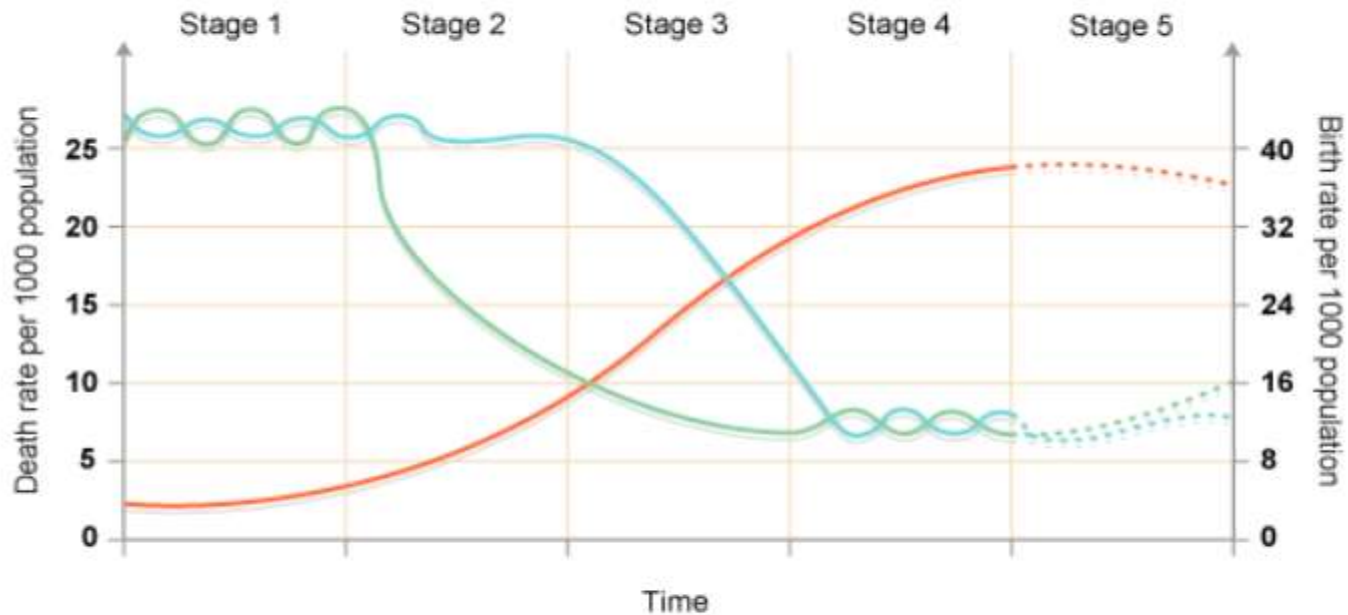
STAGE 2 Early Expanding, LEDCs

STAGE 3 Late Expanding, wealthier LEDCs

STAGE 4 Low Stationary, MEDCs

STAGE 5 Declining, MEDCs

THE DEMOGRAPHIC TRANSITION MODEL



Human Age Structure

▶ Human age structure varies from country to country.

- In developing countries age structure tends to be in favour of younger individuals with a large proportion being under 15.
- In developed nations, age structure is relatively even throughout the age groups.

Age Structure in Human Populations

