

Human Population: History, Status, Trends

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History of global population

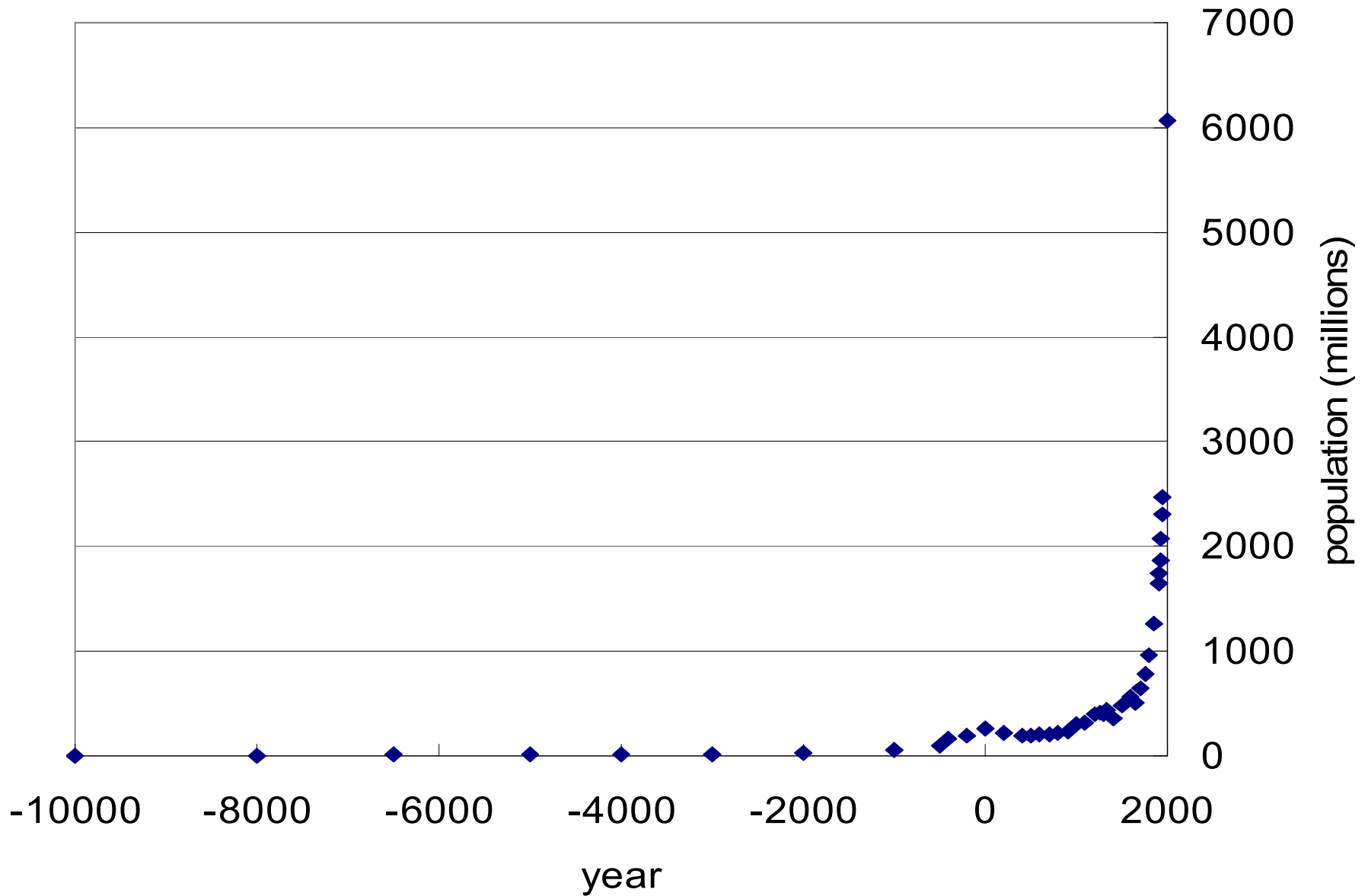


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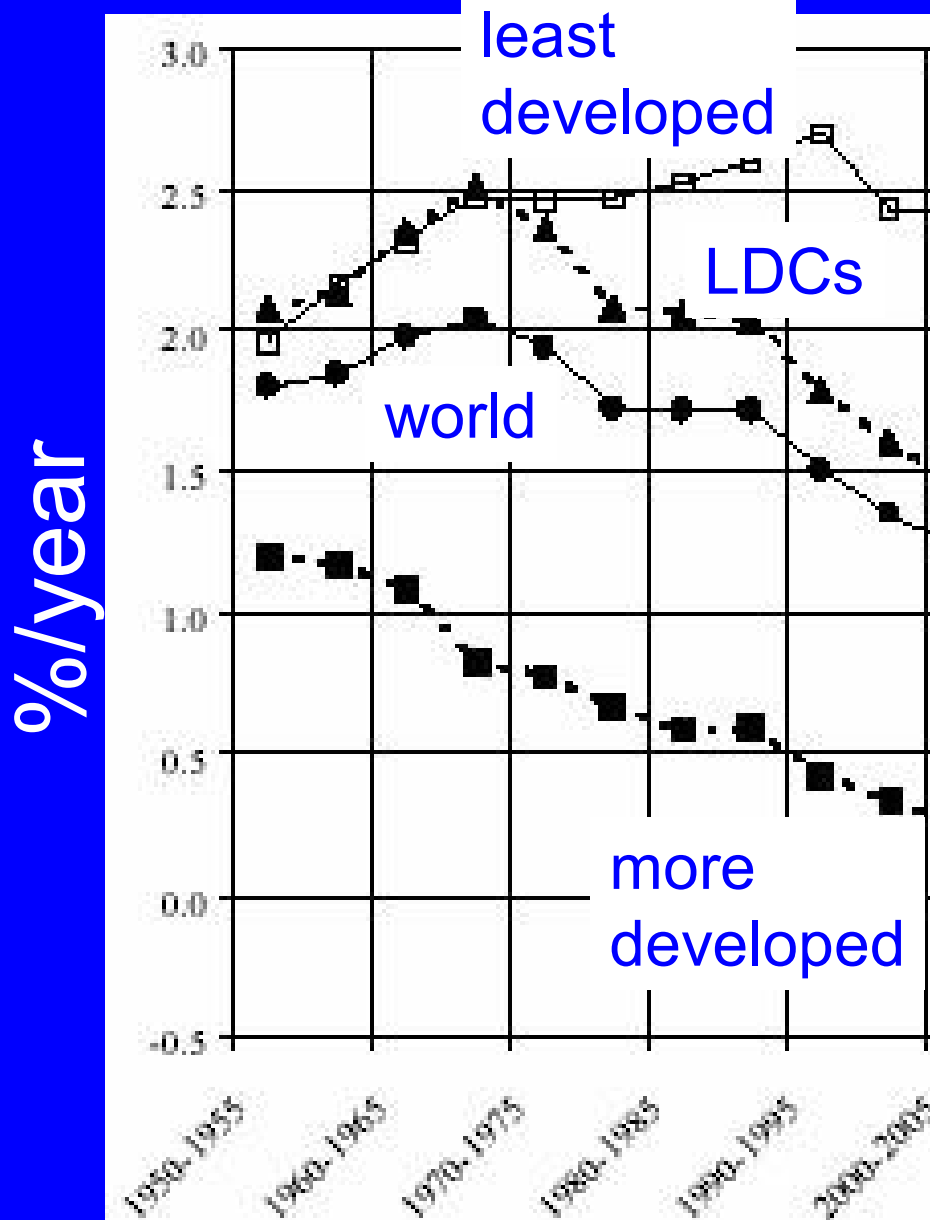
Milestones of population growth

people	year	years to add latest billion
1-10 million	-10,000	
250 million	0	
500 million	1500	
1 billion	1800	>120,000
2	1930	130
3	1960	30
4	1974	14
5	1987	13
6	1999	12

12,000 years of population growth



Population growth rate



World population growth rate peaked at 2.1 percent per year in 1965-70 — the most important change in human demographic history.

20th century was unique demographically

- Highest population growth rate in human history
- Only century in which global population doubled (& tripled)
- Largest voluntary decline in fertility
- Last century with more young people than old people
- Last century with more rural people than urban people

Status

Demographic situation 2005

- 6.5 billion people in 2005 (± 0.2 billion).
- ~75 million people (1.2%) added per year.
- Average 2.6-2.7 children per woman in lifetime at current birth rates (total fertility rate, TFR).
 - TFR varies widely:
Europe TFR = 1.4, Africa TFR = 5.0
 - Replacement level TFR is 2.1 children.

Two worlds: 2003

	<i>rich</i>	<i>poor</i>
GNP PPP/person	\$22,030	\$3,660
population (billion)	1.2	5.1
% increase/year	0.1	1.6
% with HIV/AIDS	0.4	1.4
infant mortality rate	7/1000	61/1000
children/woman	1.5	3.1
life expectancy	76	65
% urban	75	40
people/km ²	23	59

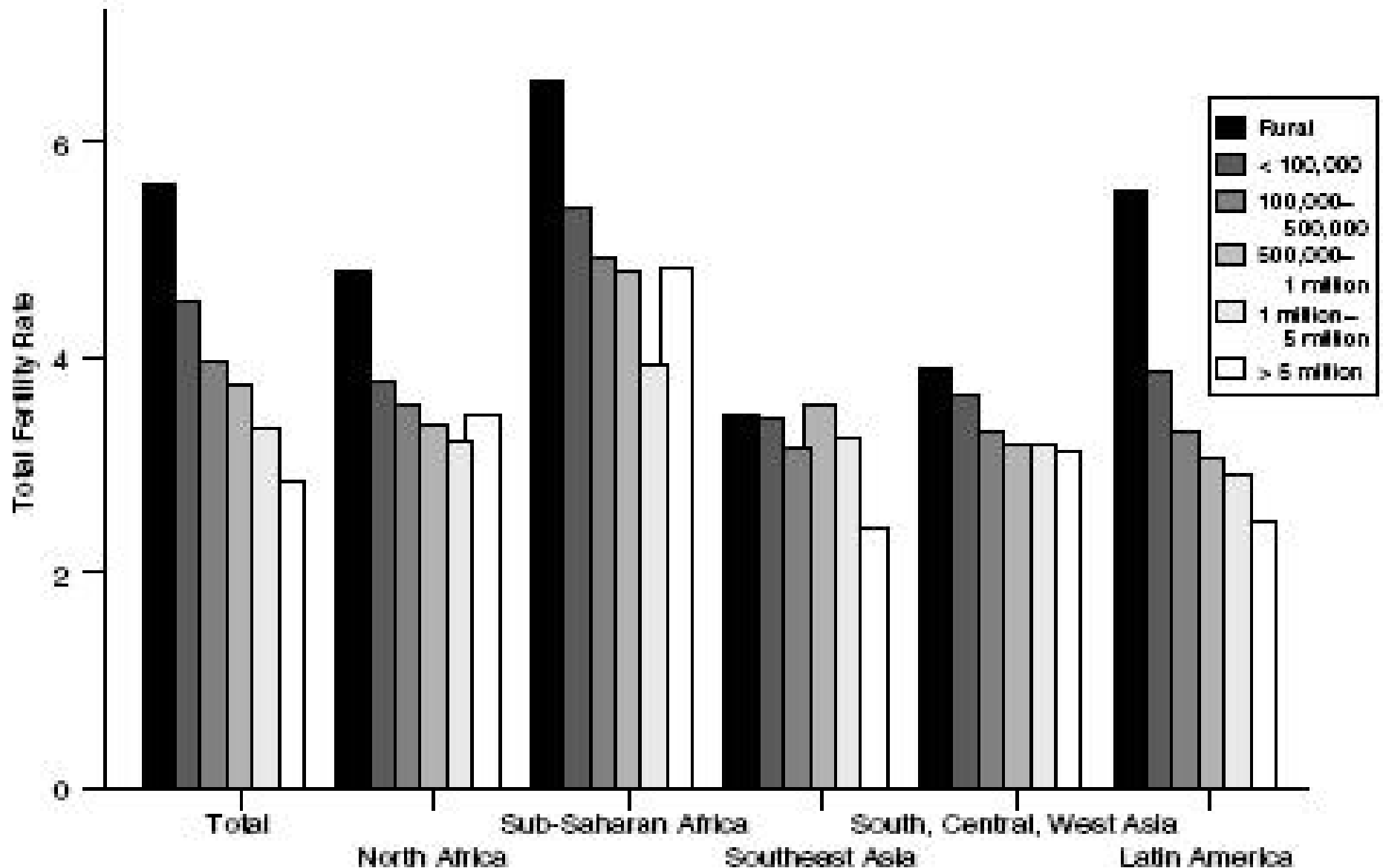
Where are people?

Least densely populated half of Earth's censused land area has <2% of people, <10 people/km².

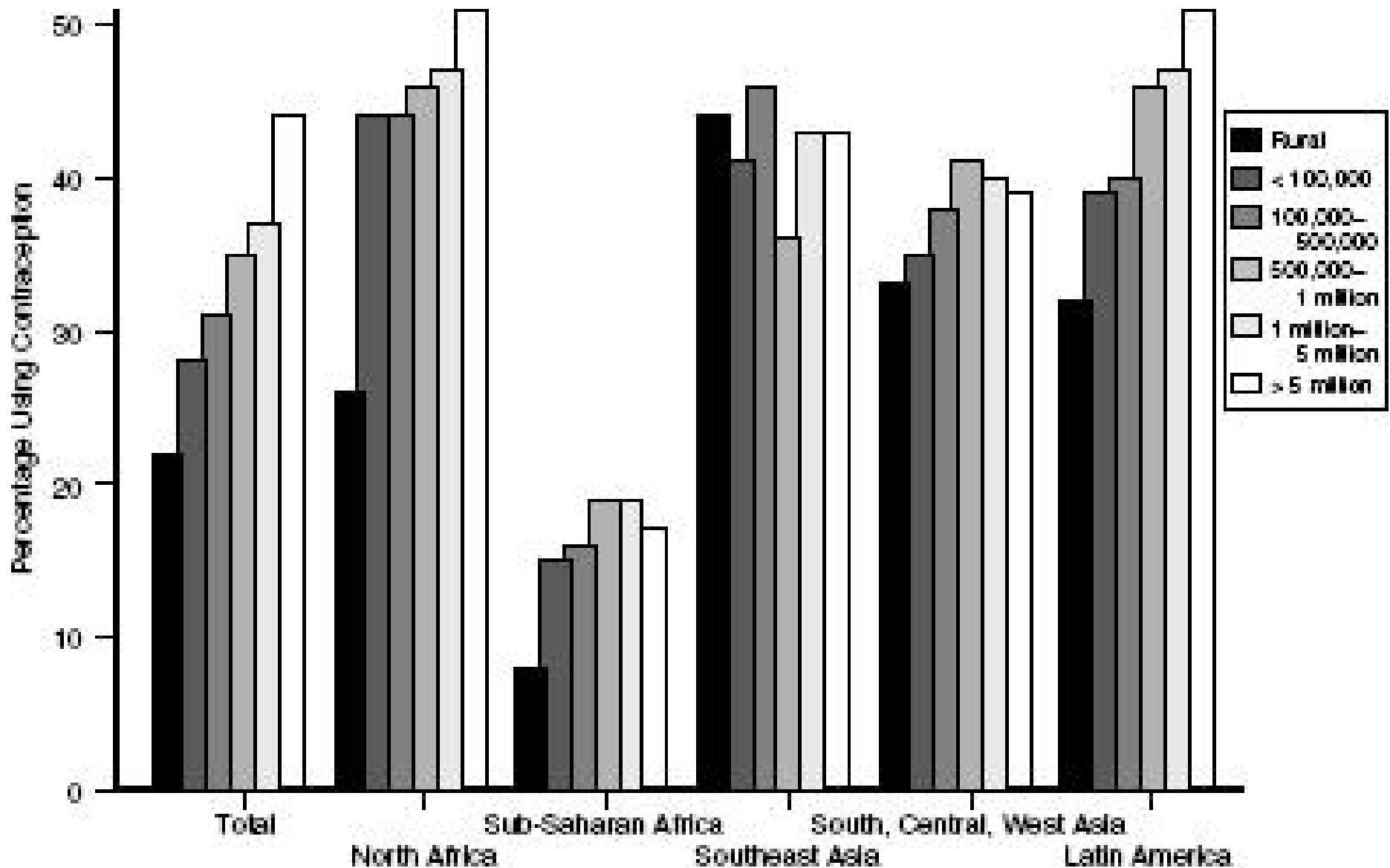
Half of all people (more than 3 billion) live in <3% of censused land area, >500 people/km²
>1 person/(45m x 45m).

Cities occupy 2-3% of censused land.

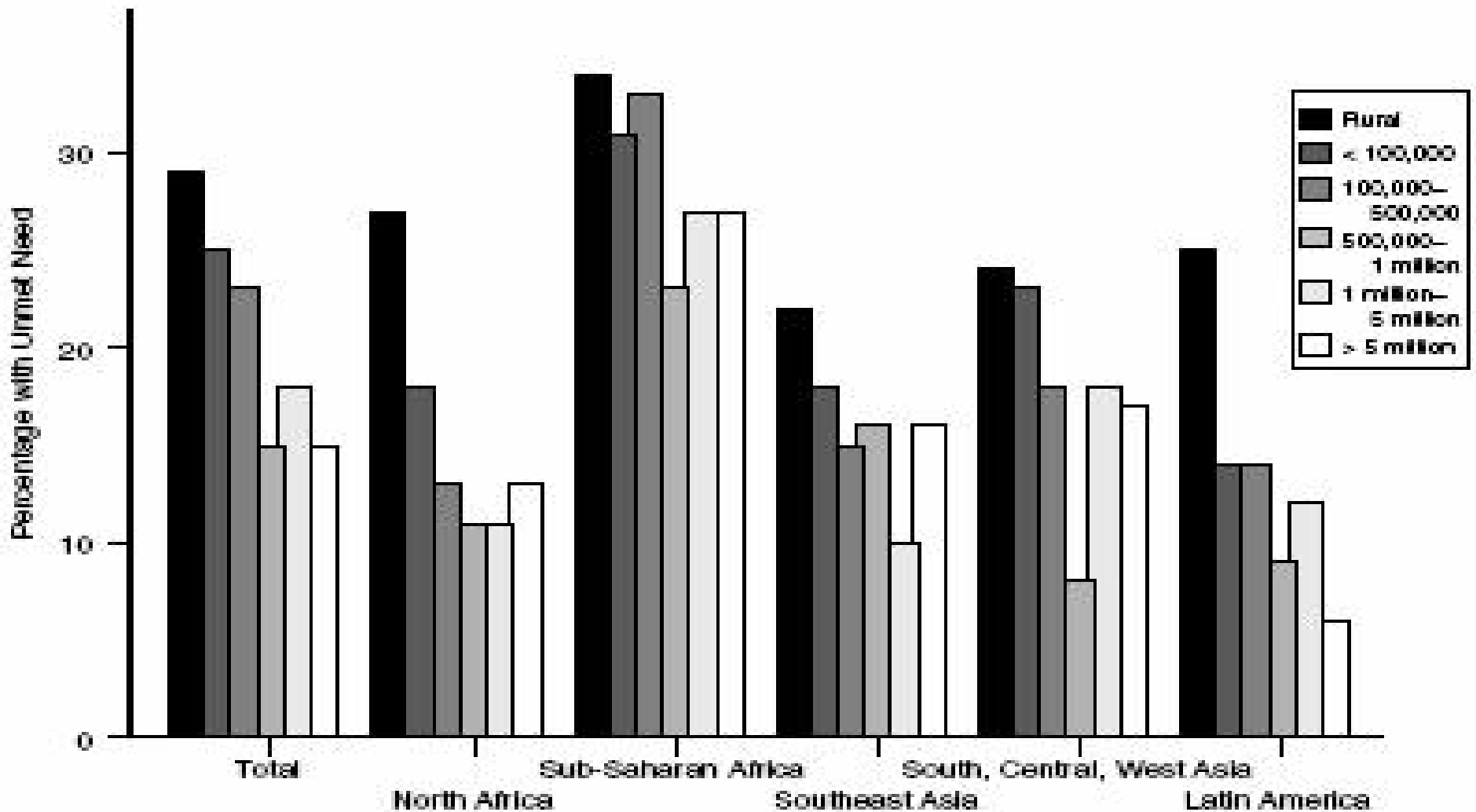
Total fertility rates decline from rural to increasingly urban areas in most regions



Modern contraceptive use increases from rural to increasingly urban areas in most regions



Unmet need for contraception is greatest in rural & small urban areas in most regions



Future population trends to 2050

Population from now to 2050

Bigger: 2-4 billion more people by 2050

Growth in poor countries, not rich.

Slower: population growth could end before doubling, depending on choices made now.

Older: people 60+ years will outnumber children 0-4 years.

More urban: virtually all population growth will be in cities of poor countries.

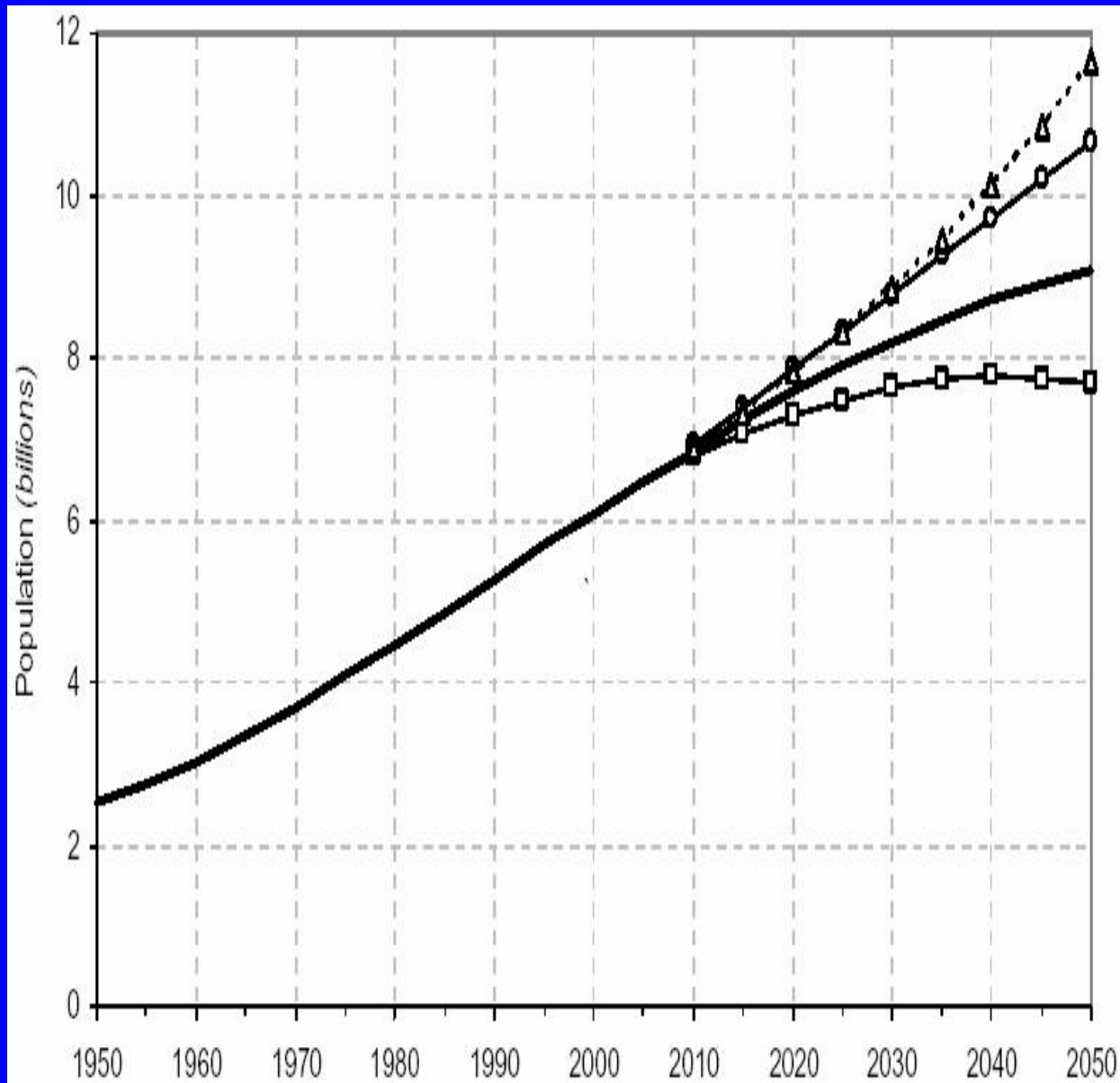
Rural population will hold steady at 3 billion.

Unpredictable: migration, families

Bigger

The 21st century will probably see billions more people than ever before.

World population 1950-2050



11.7
10.6
9.1
7.7
bln.

More people, but not uniformly

Estimated 2.6 billion increase 2005-2050 exceeds 2.5 billion world population in 1950.

At least 95% of population increase will be in poor countries.

Relatively more growth will be in poorest countries than in poor.

Population shift in 100 years (millions)

	EU	N.Afr, W.As
1950	350	163
2000	451	587
2050	401	1,298

Slower

The 20th century will be the only century with a doubling or tripling of human population.

Slower growth, slow decline

Today, 95% of all population growth is absorbed by developing world & 5% by developed world.

By 2050, according to 2004 UN medium variant, developed countries will decrease by 1 million persons / year, developing world will add 35 million / year.

Slower population growth

Fertility began to fall in France ~1750

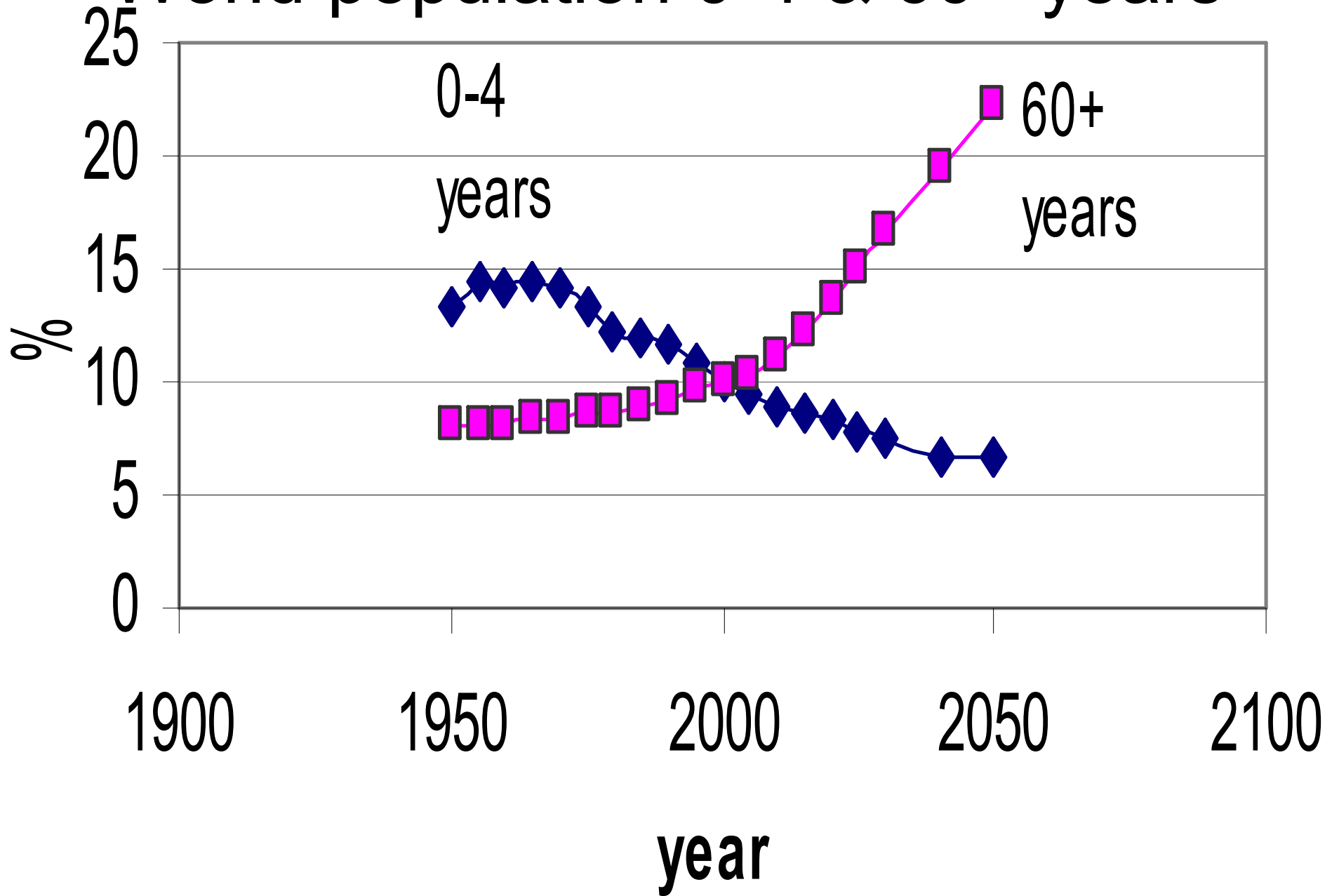
- Before industrial revolution
- Before modern contraception
- Before widespread literacy
- Before civil rights for women

Reasons for fertility decline vary, and are not fully understood

Older

Starting now, the world
will have fewer young
than old people.

World population 0-4 & 60+ years



Ageing results from 2 successes

1. Lower fertility, worldwide

Came later and slower in some regions

2. Longer life, worldwide

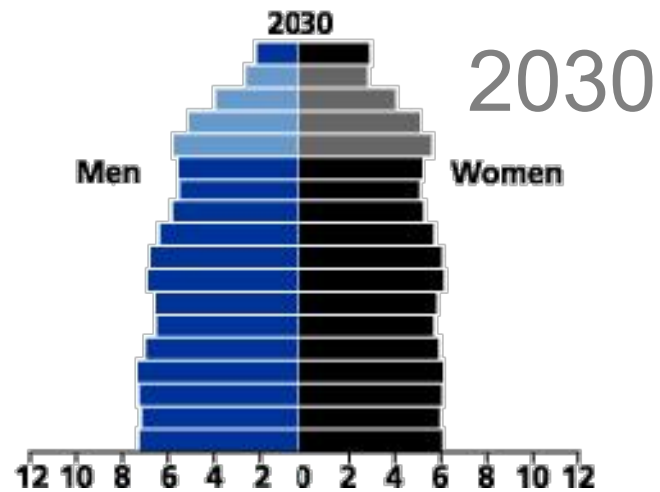
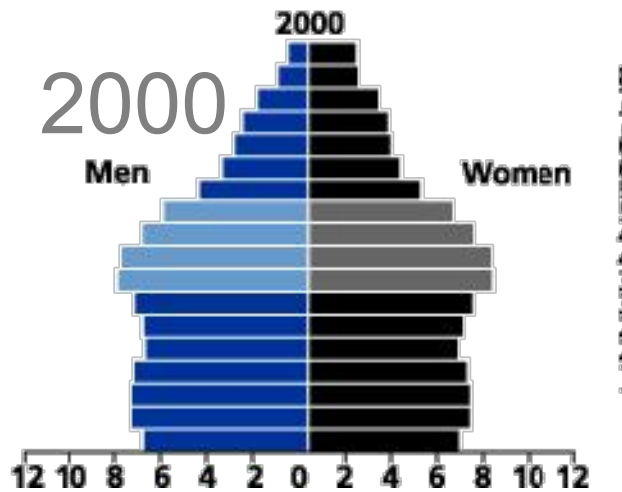
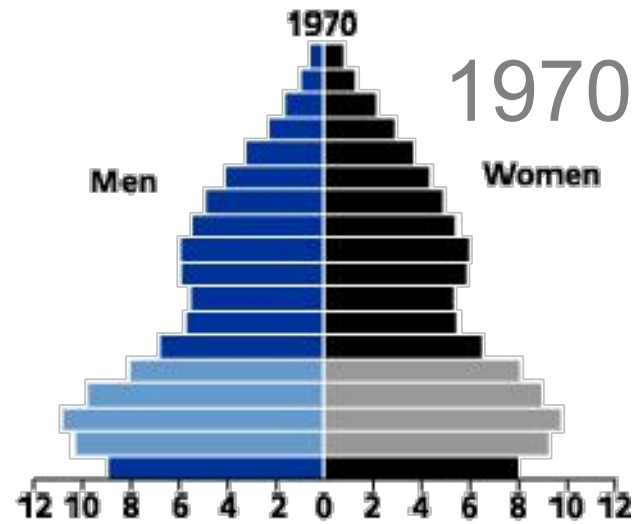
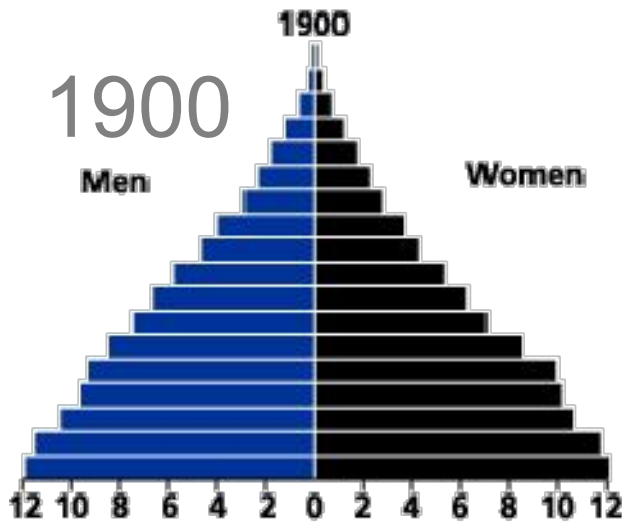
Came later and slower in some regions

With significant reversals in Eastern Europe
and sub-Saharan Africa

Fall in fertility contributes more to
population aging than increasing
length of life.

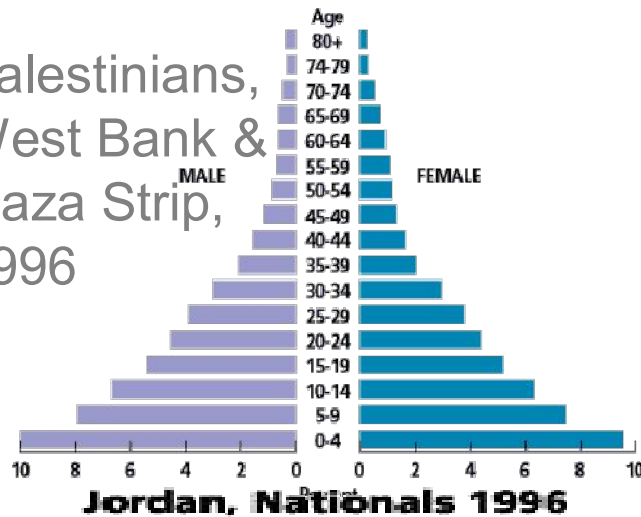
U.S. age structure

Percent of population
 Baby-boom generation: ■ Men ■ Women

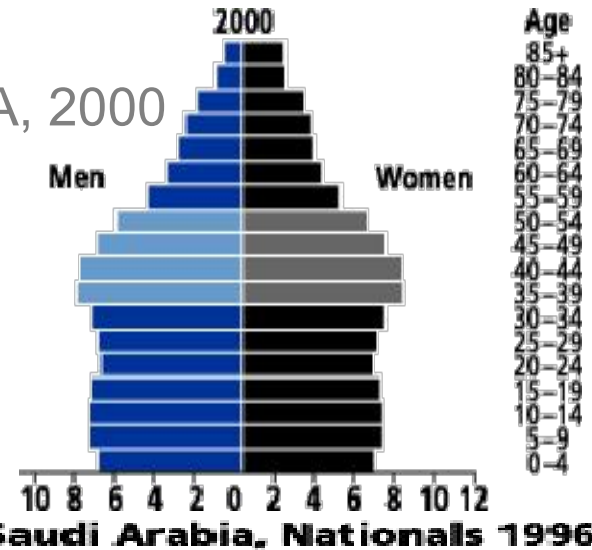


Age structures, Middle East, USA

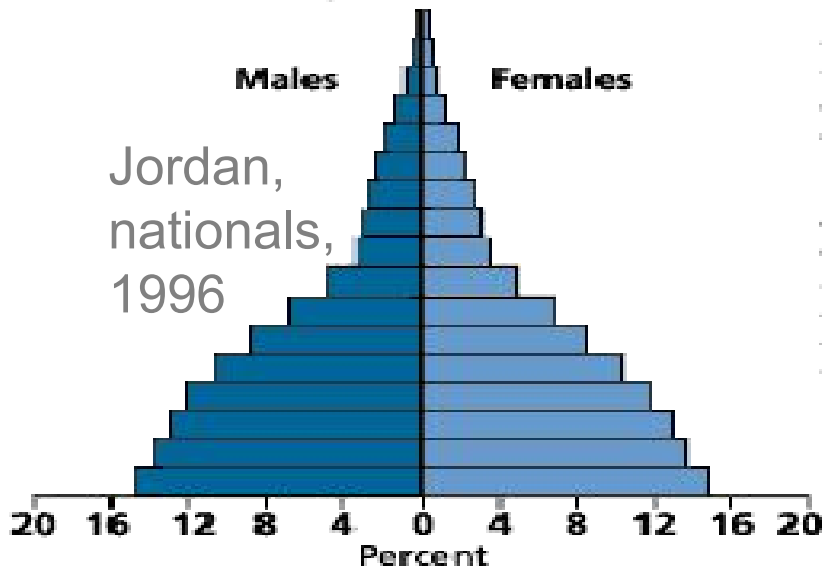
Palestinians,
West Bank &
Gaza Strip,
1996



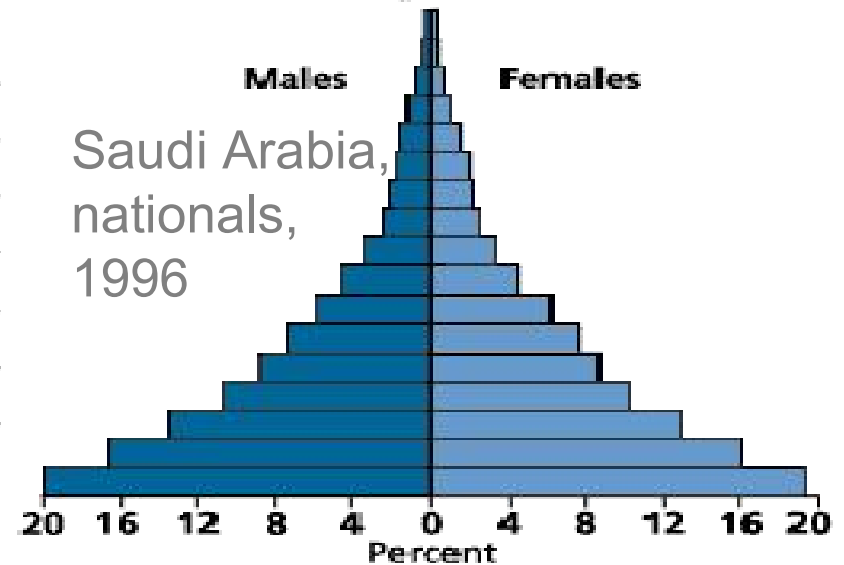
USA, 2000



Jordan,
nationals,
1996



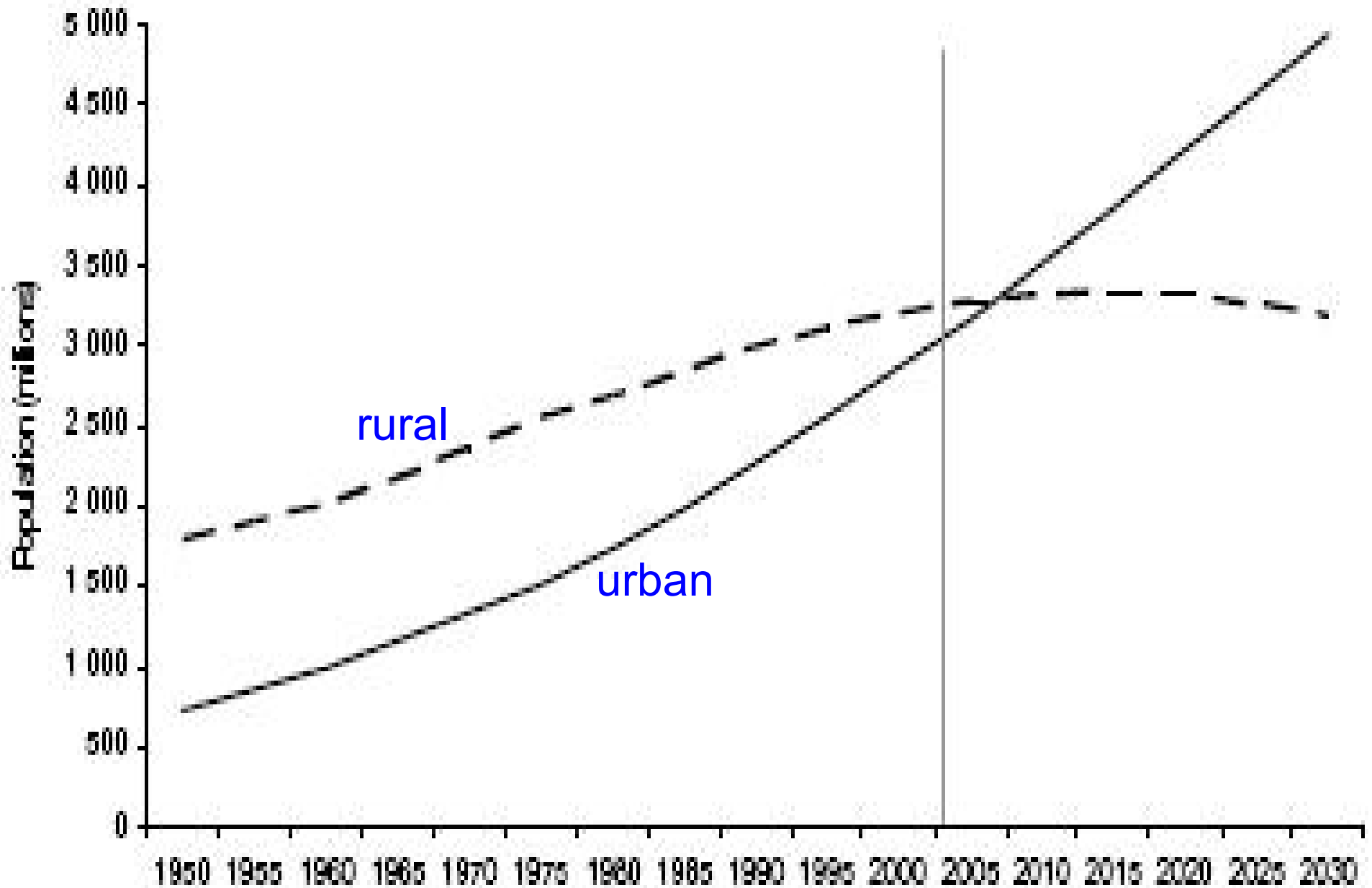
Saudi Arabia,
nationals,
1996



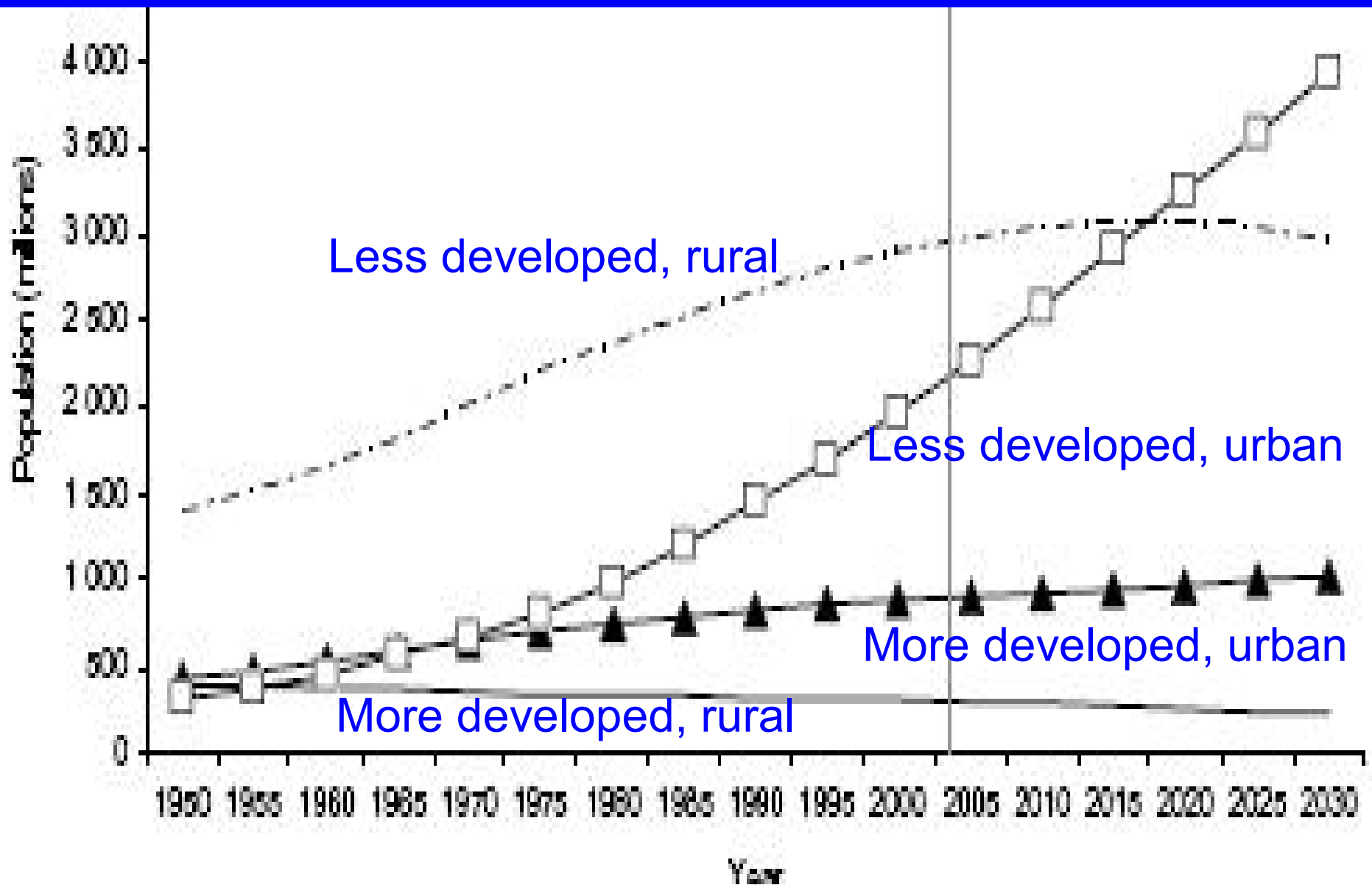
More urban

Starting ~2007, the world
will have more urban
people than rural.

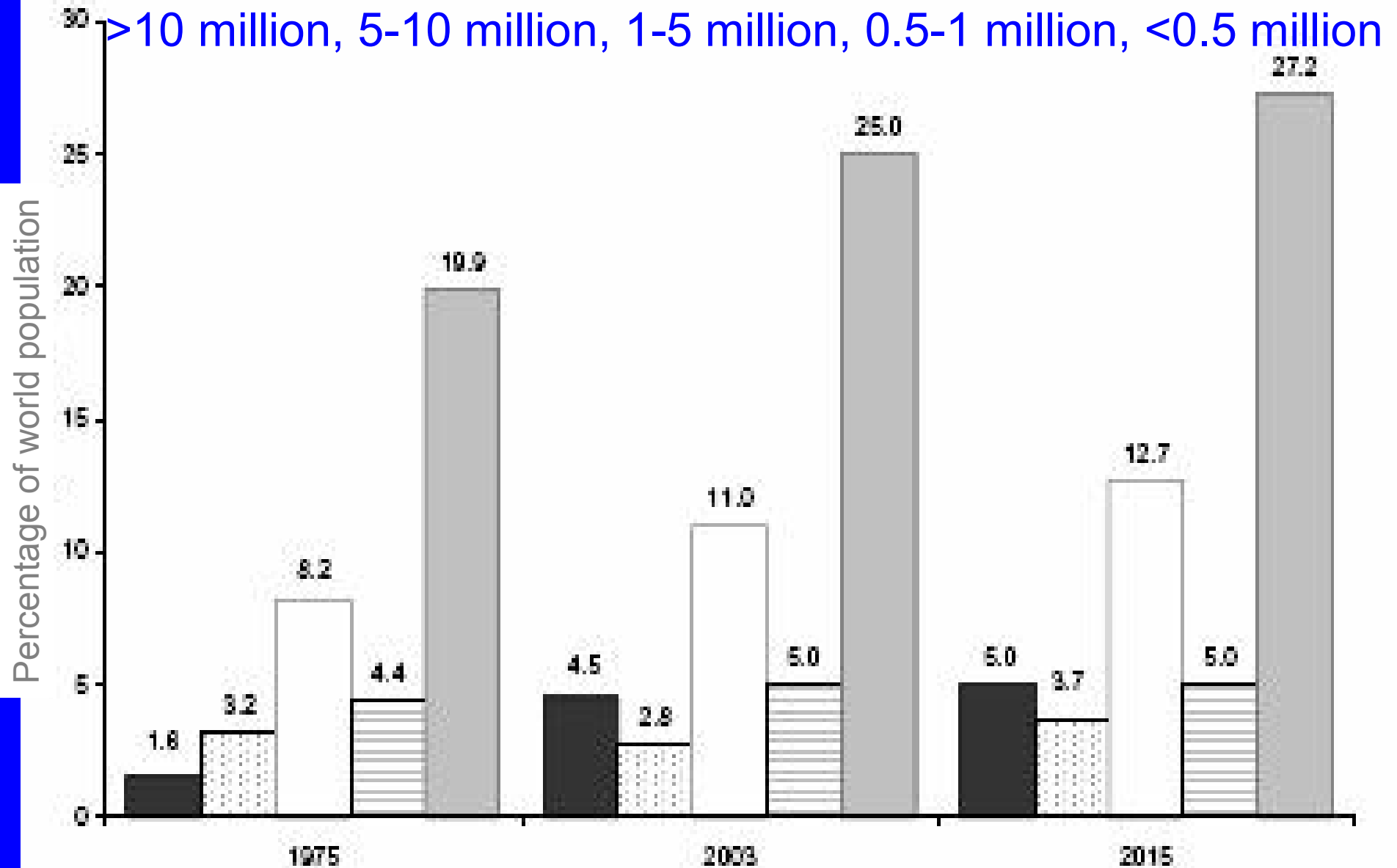
Urban population will surpass rural around 2007



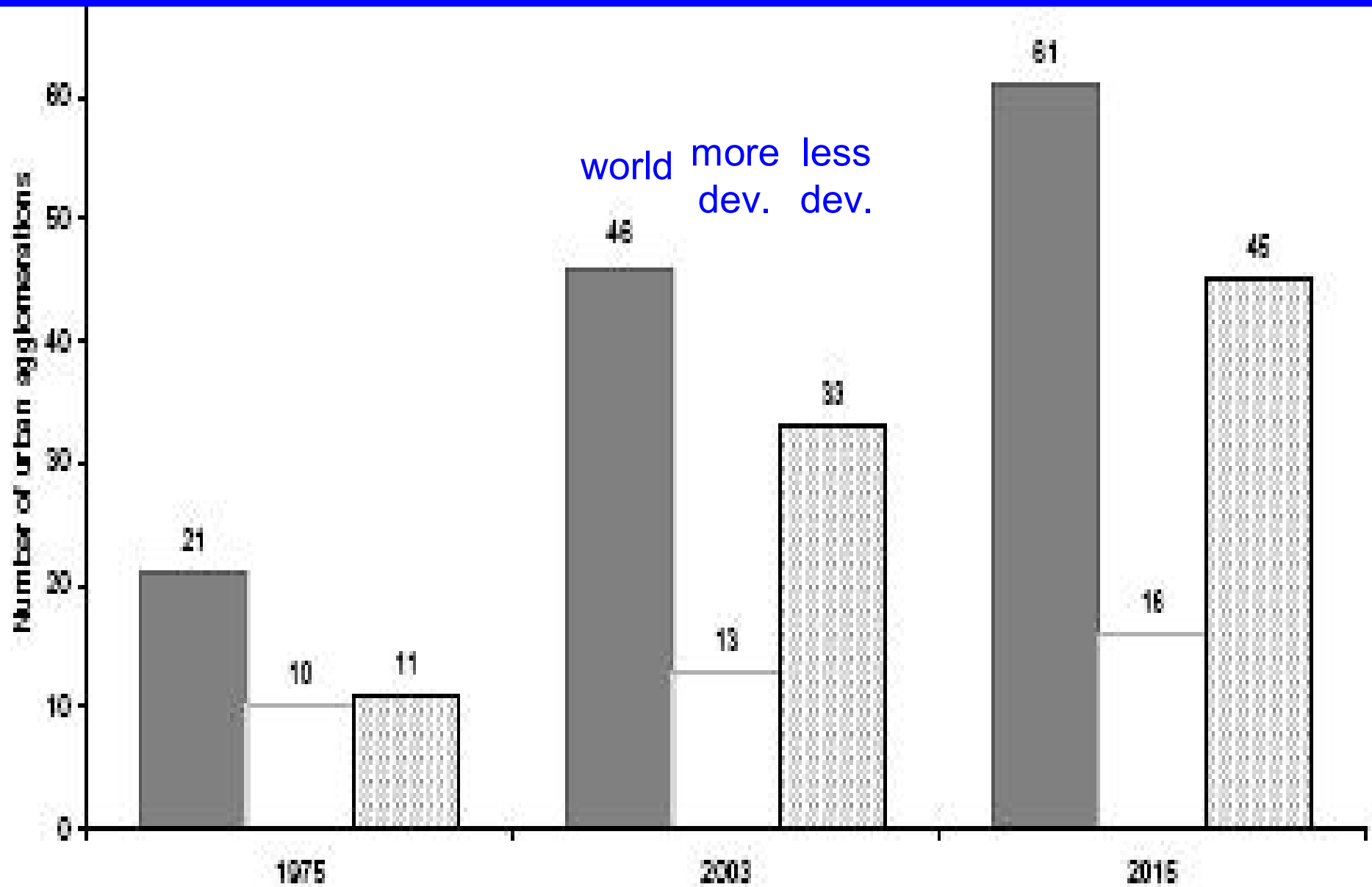
Urban population will grow faster in less developed regions



Half of city people live in cities of 500,000 or less: % population by urban size, 1975, 2003 and 2015



Number of urban areas with >5 million people grows faster in less developed regions, 1975, 2003, 2015



Urbanization & physical capital

IF 2.6 billion people to be added by 2050 will live in cities of 1 million people in less developed countries, THEN must build:

2600 additional cities in 45 years

$$= 2.6 \times 10^9 \text{ people} / (10^6 \text{ people} / \text{city})$$

45 years = $45 \times 52 = 2340$ weeks

2600 cities / 2340 weeks requires

>1 city / week for next 45 years

(parallel growth, not serial growth)

Is this feasible physically, environmentally, financially, socially?

Urban & rural people have different food habits in developing countries

Rural residents eat more cereals, tubers and roots.

Urban residents eat more meat, fruits, vegetables.

Urbanization will increase average meat, fruit, vegetable consumption/person, reduce average cereal, root, tuber consumption/person.

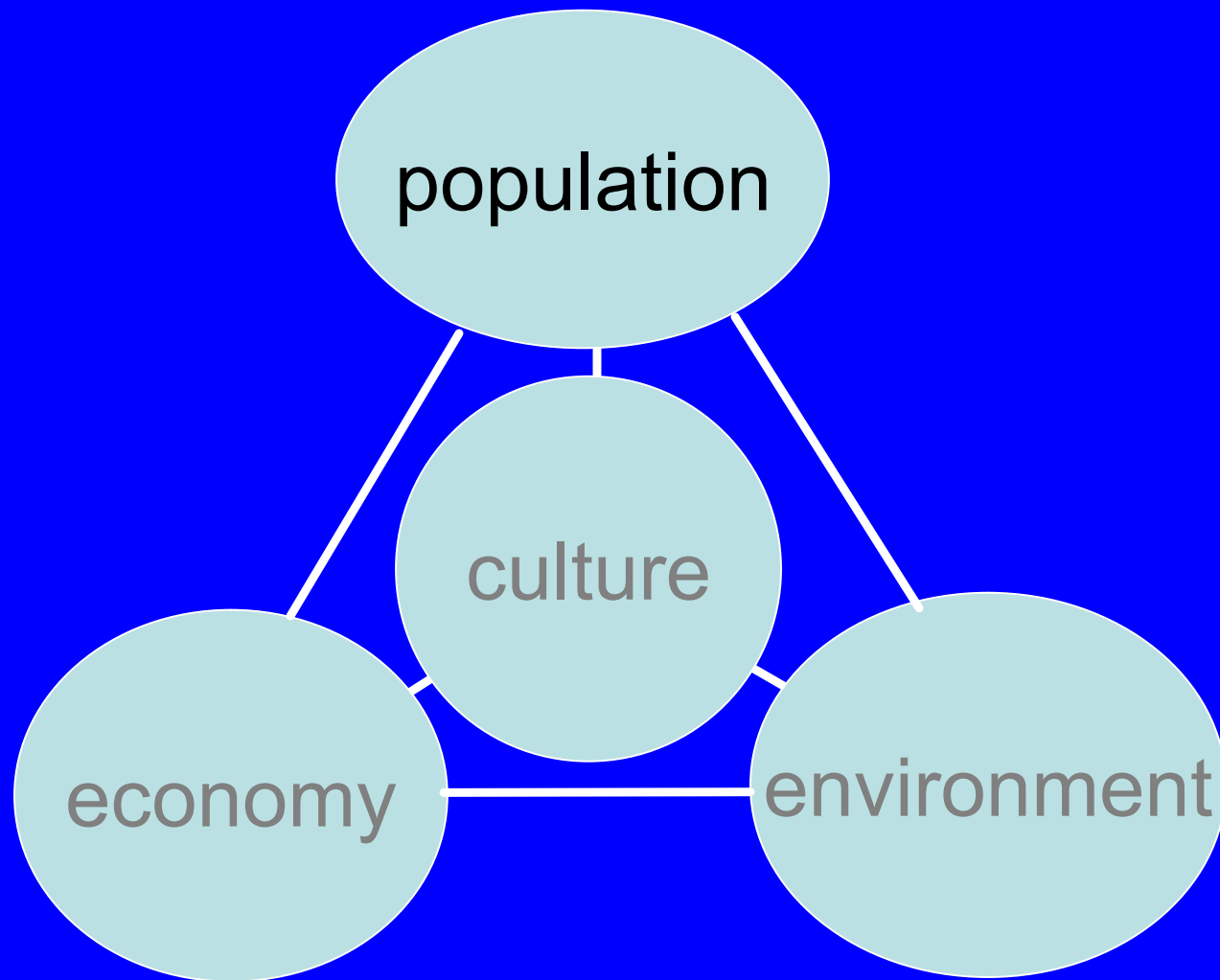
Diets rich in meats require feedgrains & meals, so demand more cereal than diets based on direct cereal consumption.

Changes in consumption patterns brought about by urbanization can significantly affect global food supply, markets, and trade.

Cities of the future will

- Have higher % of older people than now
- Be located in poor countries
- Have smaller household sizes
- Be concentrated along tectonic fault lines
- Be located coastally at low elevation
- Be constrained by energy limitations
- Demand more food from agricultural areas that cities will invade

Population interacts



Further information

How Many People Can the Earth Support? (W. W. Norton, NY, 1995)

Human population: the next half century. *Science* 302:1172-1175, 14 Nov. 2003

Human population grows up. *Scientific American* special issue "Crossroads for Planet Earth" September 2005.

Beyond Six Billion: Projecting the World's Population by Panel on Population Projections, National Research Council (Washington DC, 2000)

Thank you! Questions?