

Beyond Population: Everybody Counts in Development

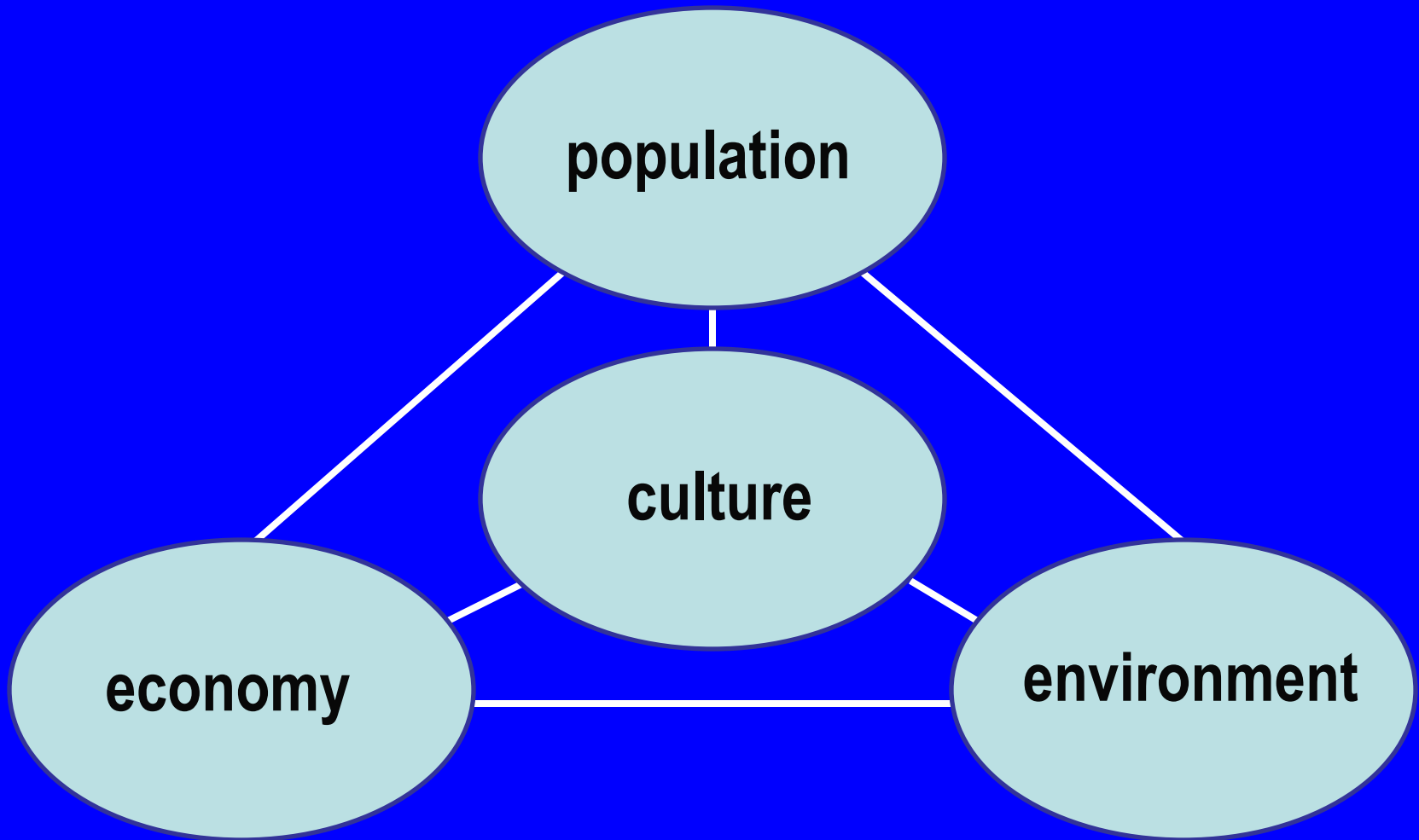
Joel E. Cohen

Rockefeller & Columbia Universities

Center for Global Development, Washington, DC, 2008-09-23



Population interacts with economics, environment & culture.



2008

world

rich

poor

population (billion)

6.7

1.2

5.5

GNP PPP/person

\$9,600

\$31,200

\$4,760

% with <\$2 / day

40%

0%

48%

% increase/year

1.2%

0.2%

1.5%

%15-59 HIV/AIDS

0.8%

0.5%

1.0%

infant mortality rate

0.049

0.006

0.054

children/woman

2.6

1.6

2.8

life expectancy (y)

68

77

67

% urban

49%

74%

44%

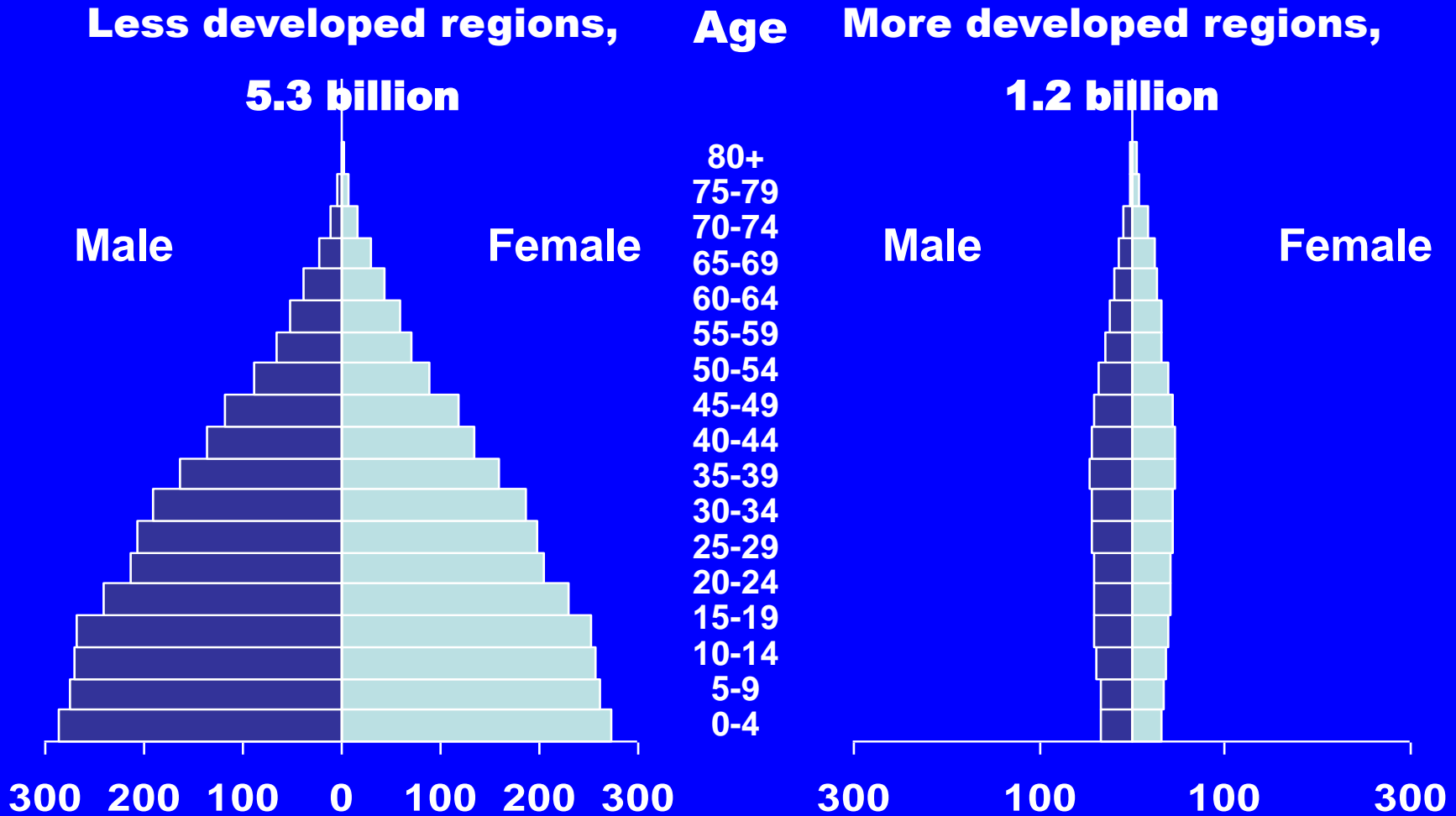
people/km²

49

27

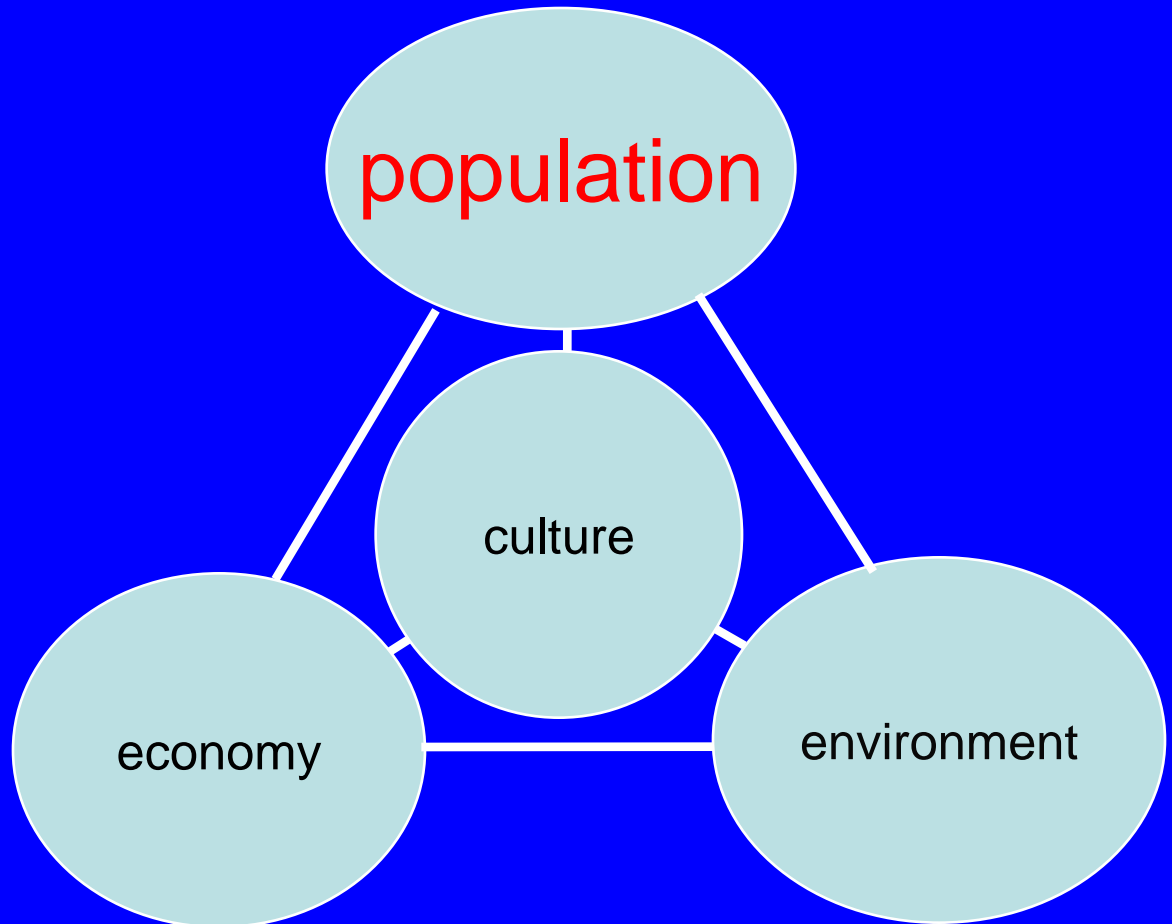
66

Less developed regions have a bigger, younger population, 2005.



Source: United Nations, *World Population Prospects: The 2002 Revision* (medium scenario), 2003.

Future population trends to 2050



Population from now to 2050

Bigger: 2-4 billion more people by 2050, mostly in poor countries.

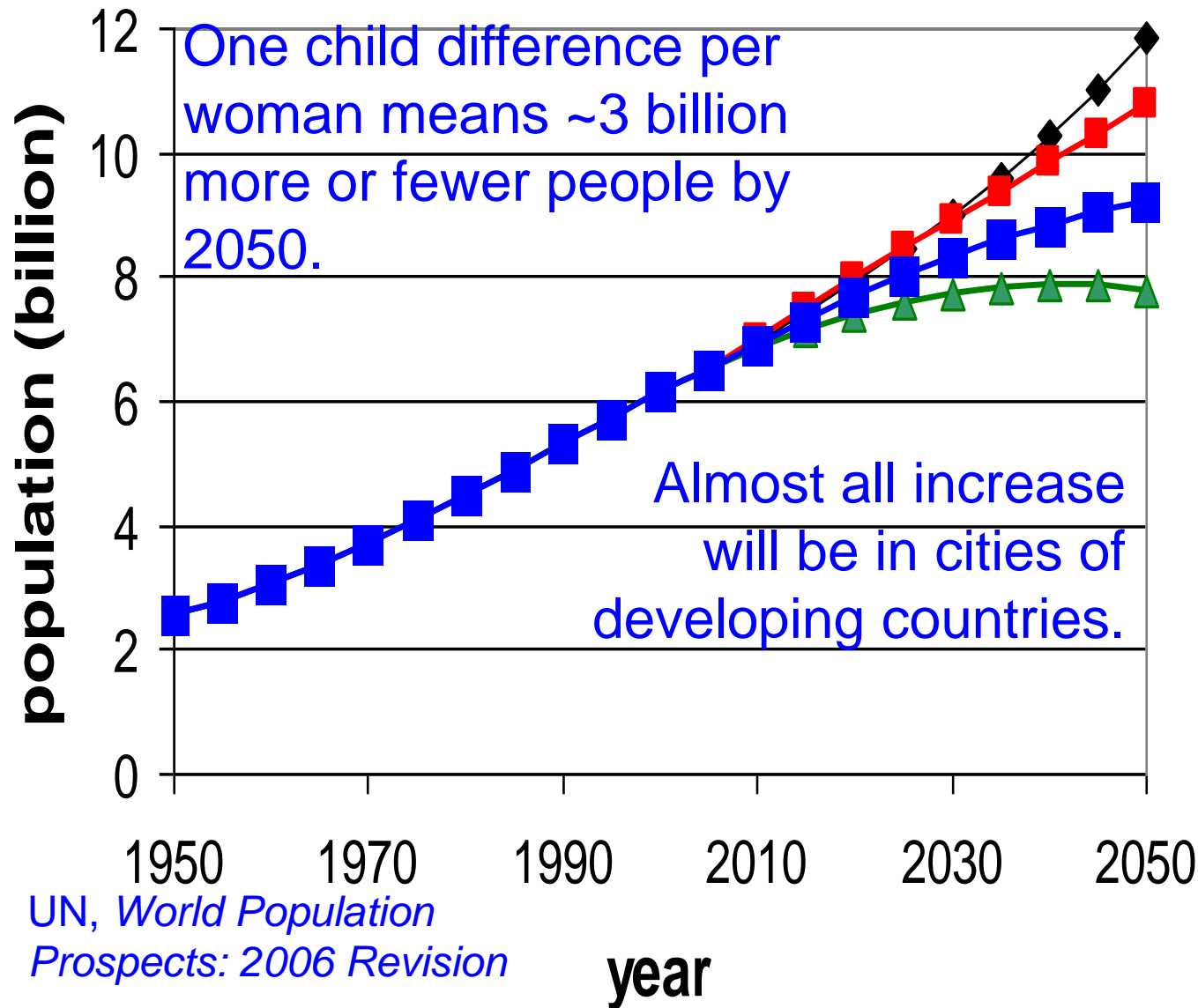
Slower: population growth could end, depending on choices now.

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

More urban: added people will be in cities of poor countries. Rural population will peak at 3 billion & decline.

1. Bigger (& different)
population in 2050:
2-4 billion more people,
mainly in poor countries.

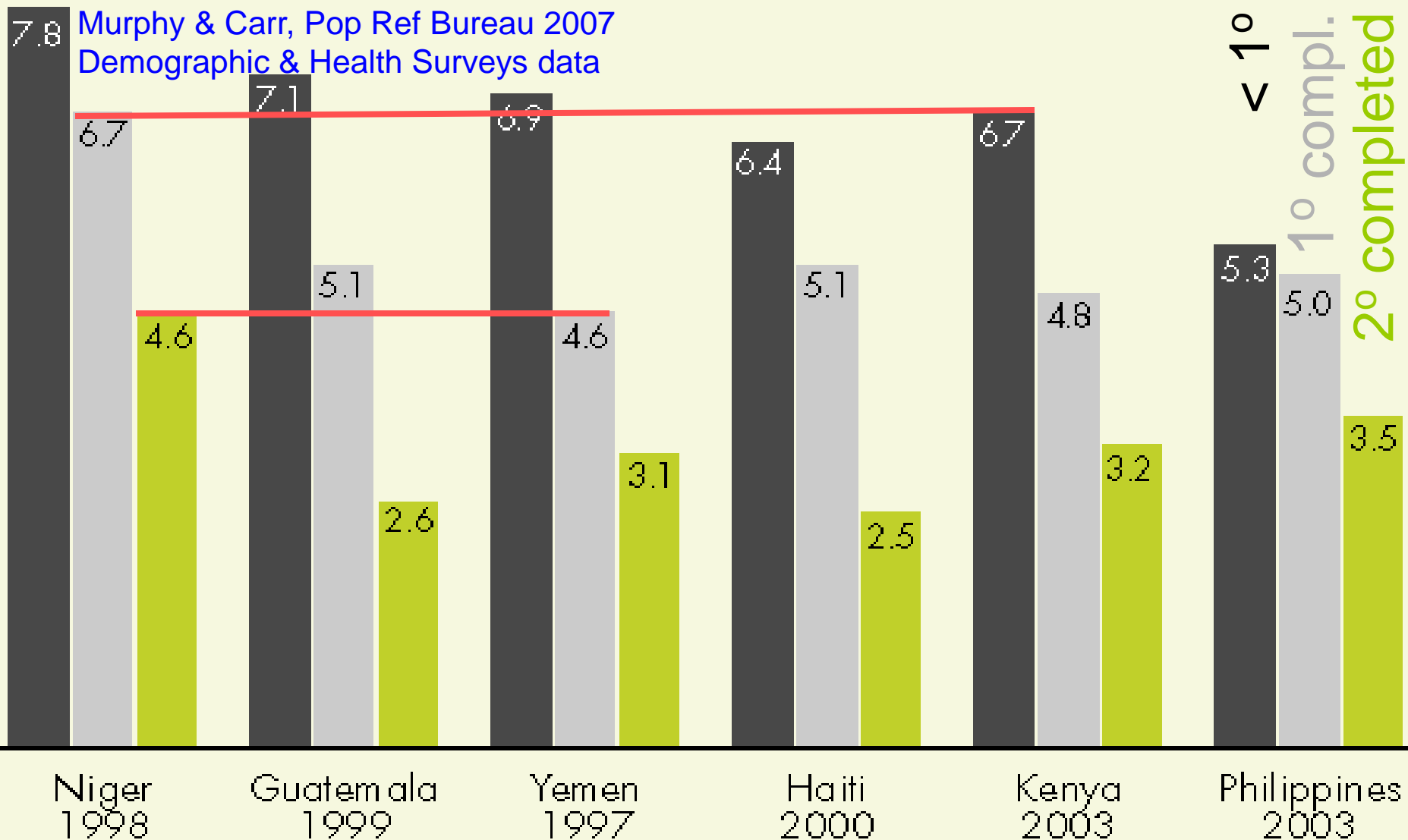
World population in 2050 depends on what we do from now to then.



11.9 const.
10.8 high
9.2 med.
7.8 low
billion.



Women who complete secondary school average at least 1.5 fewer children than those who complete primary, with cultural differences.



Demography 2000-2050 simplified

Year 2000: 6.1 billion people

Rural 3 billion	Urban 3 billion
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Year 2050: 9.2 billion people

Rural 3 billion	Urban 6 billion
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India's population size will outgrow China's.

Africa's will outgrow India's & China's.

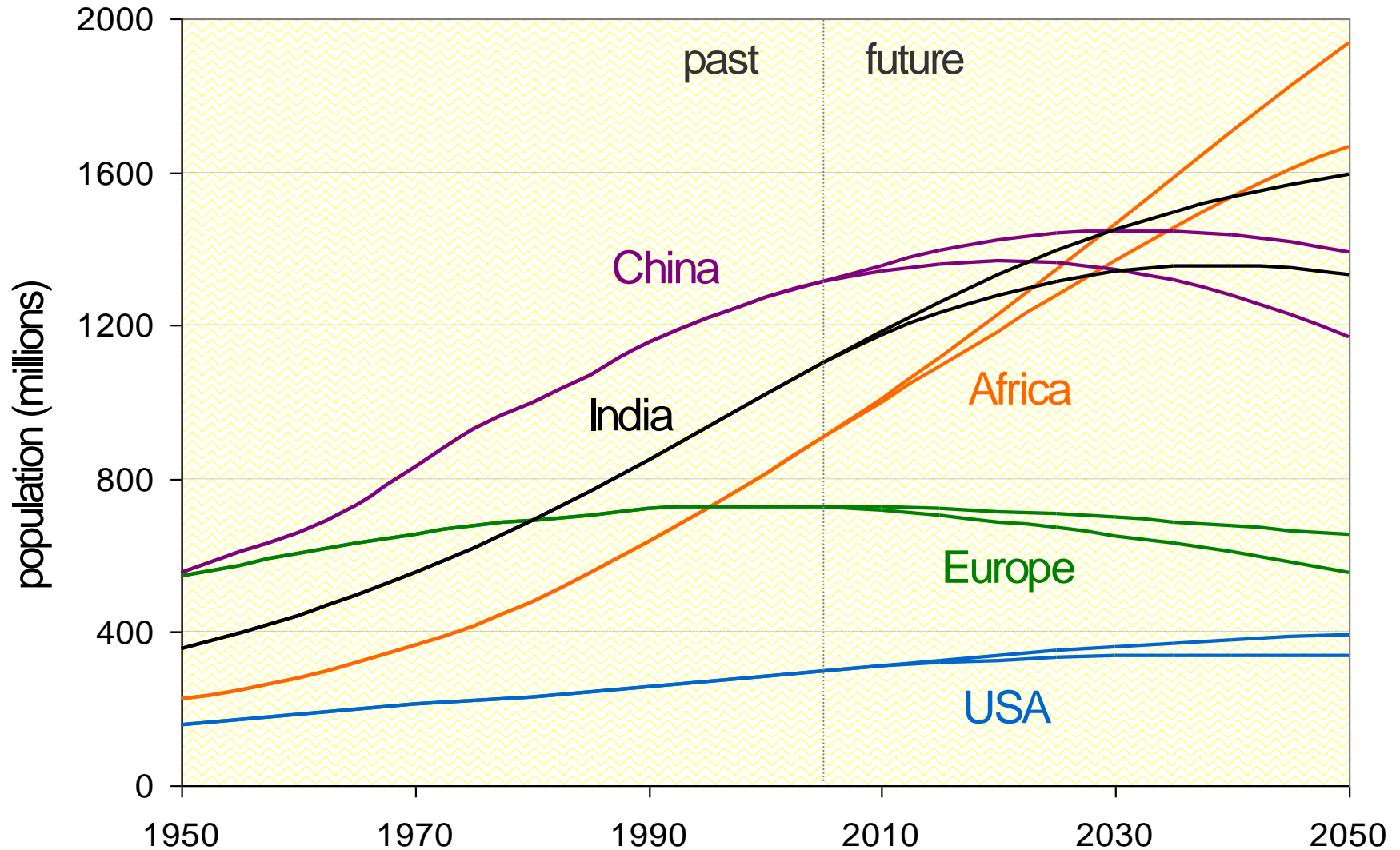


Chart: Joel E. Cohen, 2007

Medium & low projections, UN 2004

Enough food for 3 billion more?

World grows ~1.9 billion tons of cereal grains/year, enough to feed ~10 billion people a vegetarian diet.

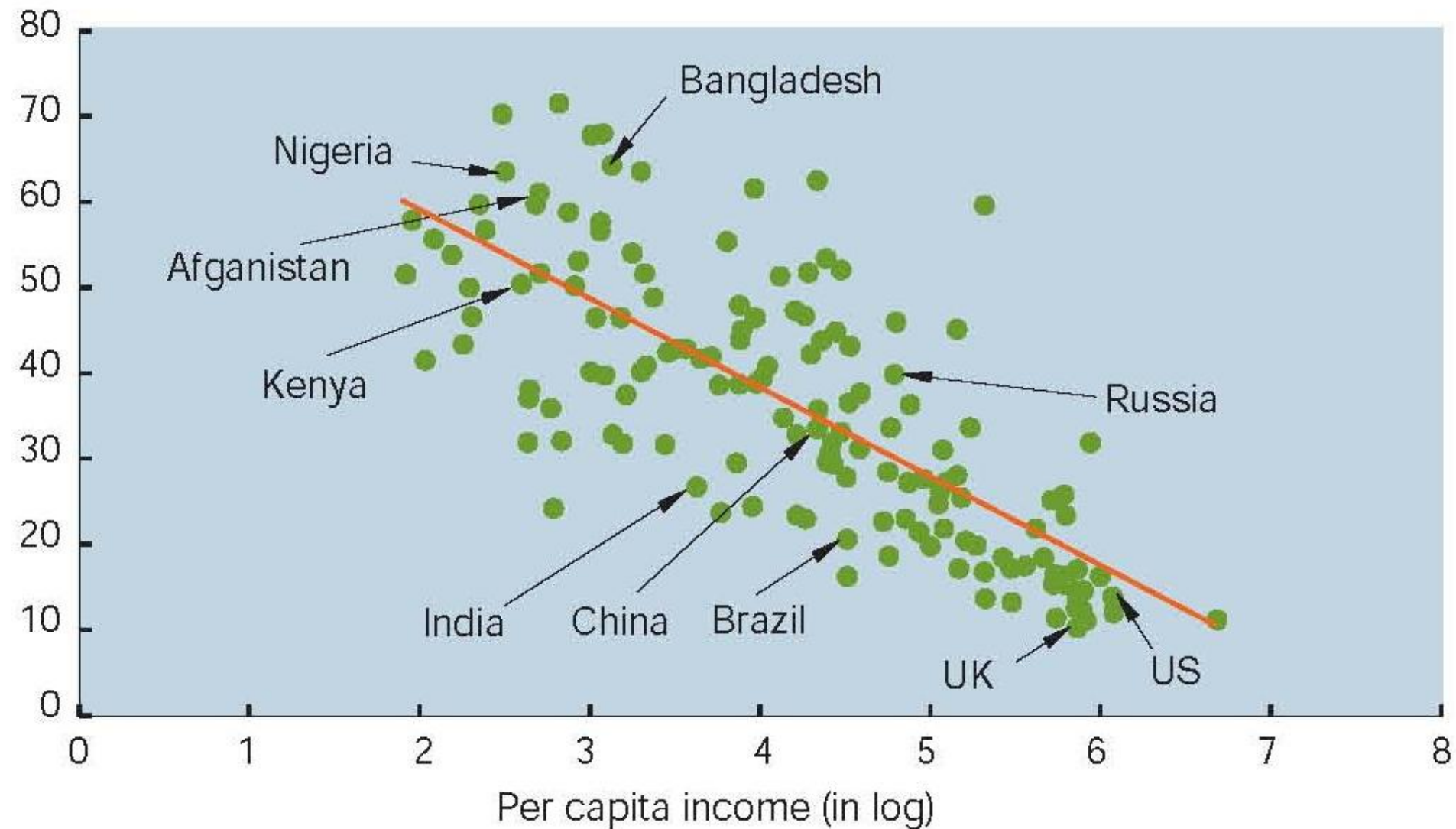
About 37-40% of grain is fed to domestic animals to grow meat for those who can afford it. *Brown 2004 Outgrowing the Earth*

Billions are chronically malnourished.

$\frac{3}{4}$ billion are chronically undernourished.

Rising food prices hurt the poor more.

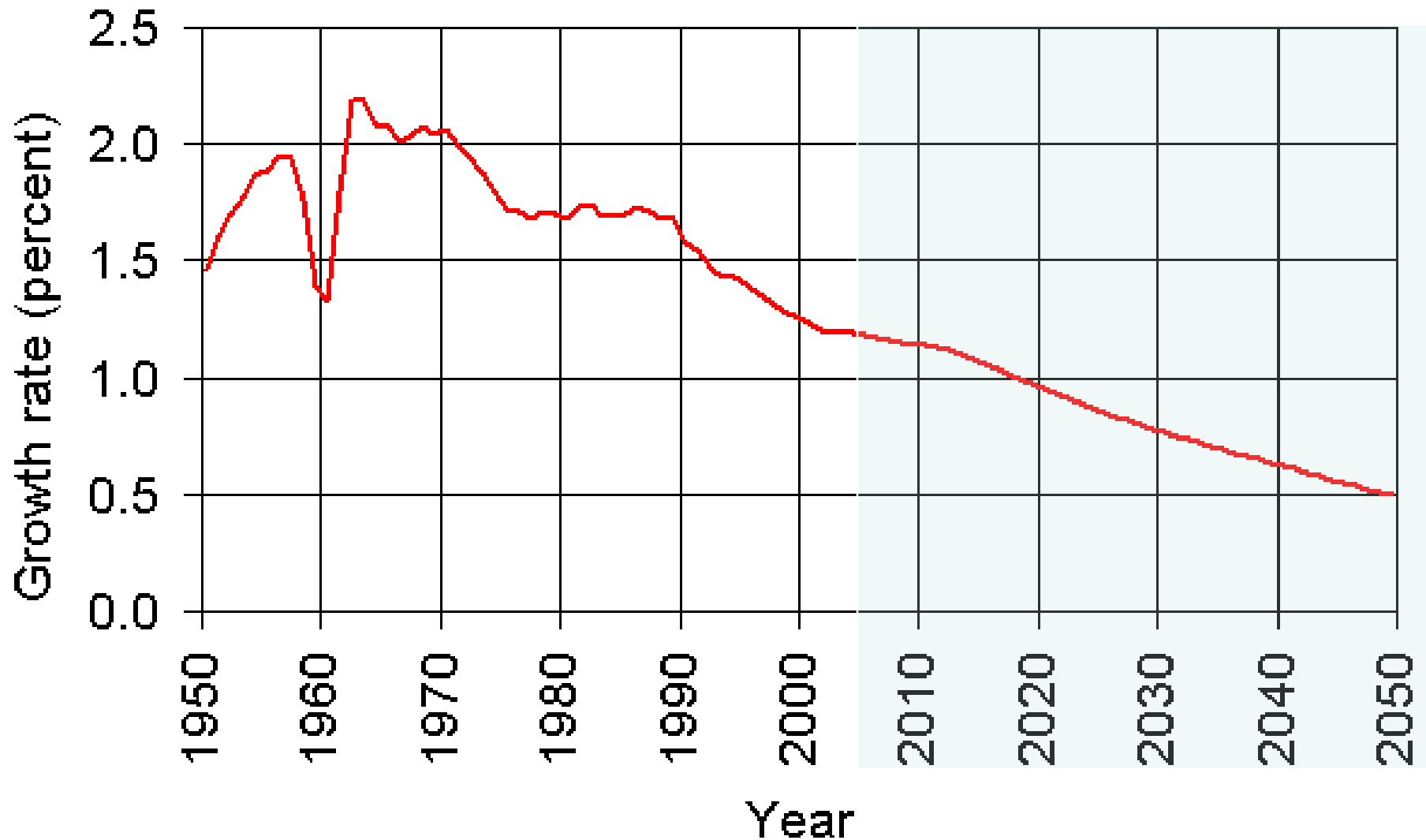
(food weighting within consumer price index, percent)



2. Slower:

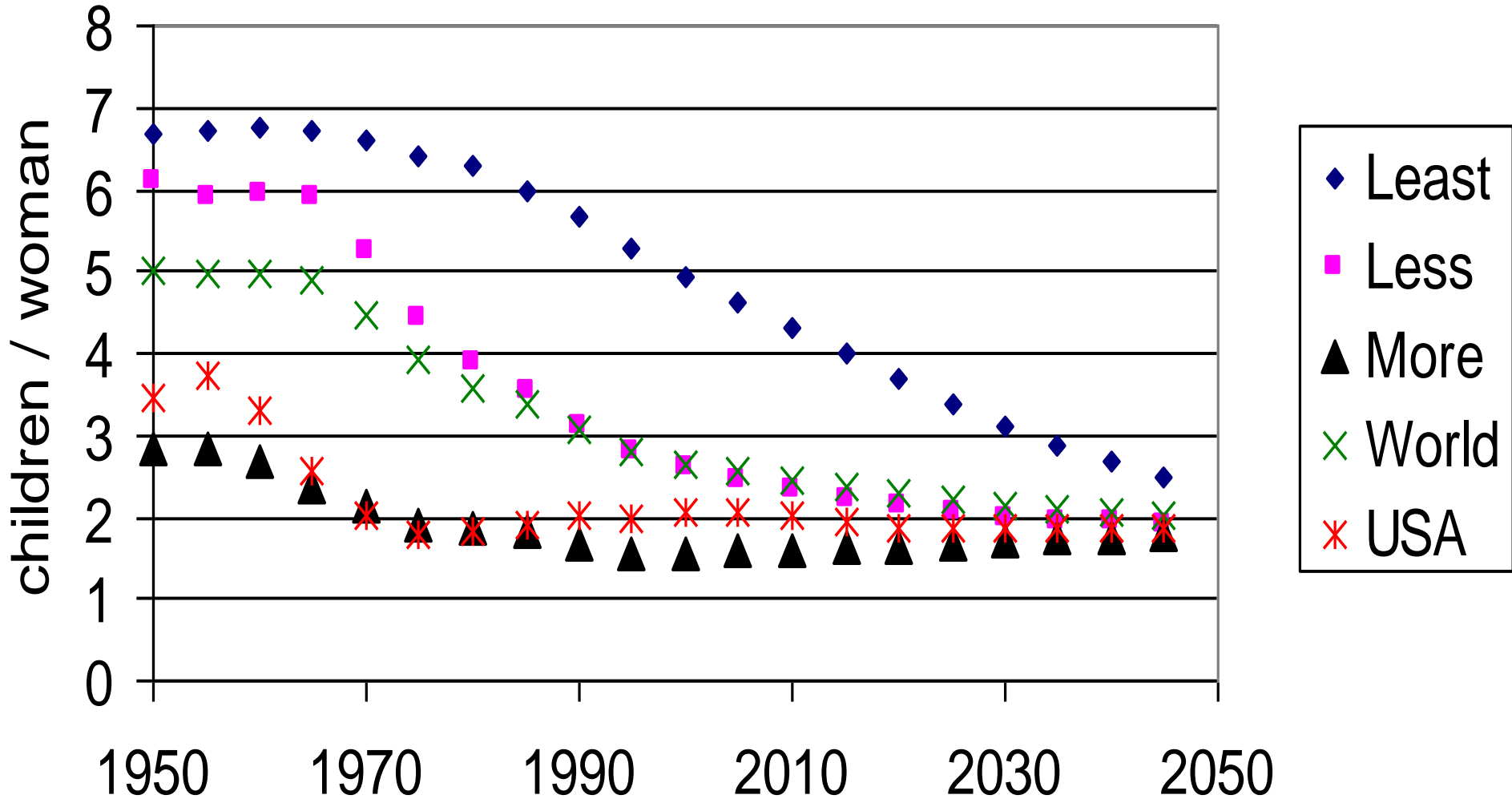
population growth could end, depending on choices now, from lower fertility or higher mortality.

World Population Growth Rates: 1950-2050



Source: U.S. Census Bureau, International Data Base, July 2007 version.

Total fertility rate

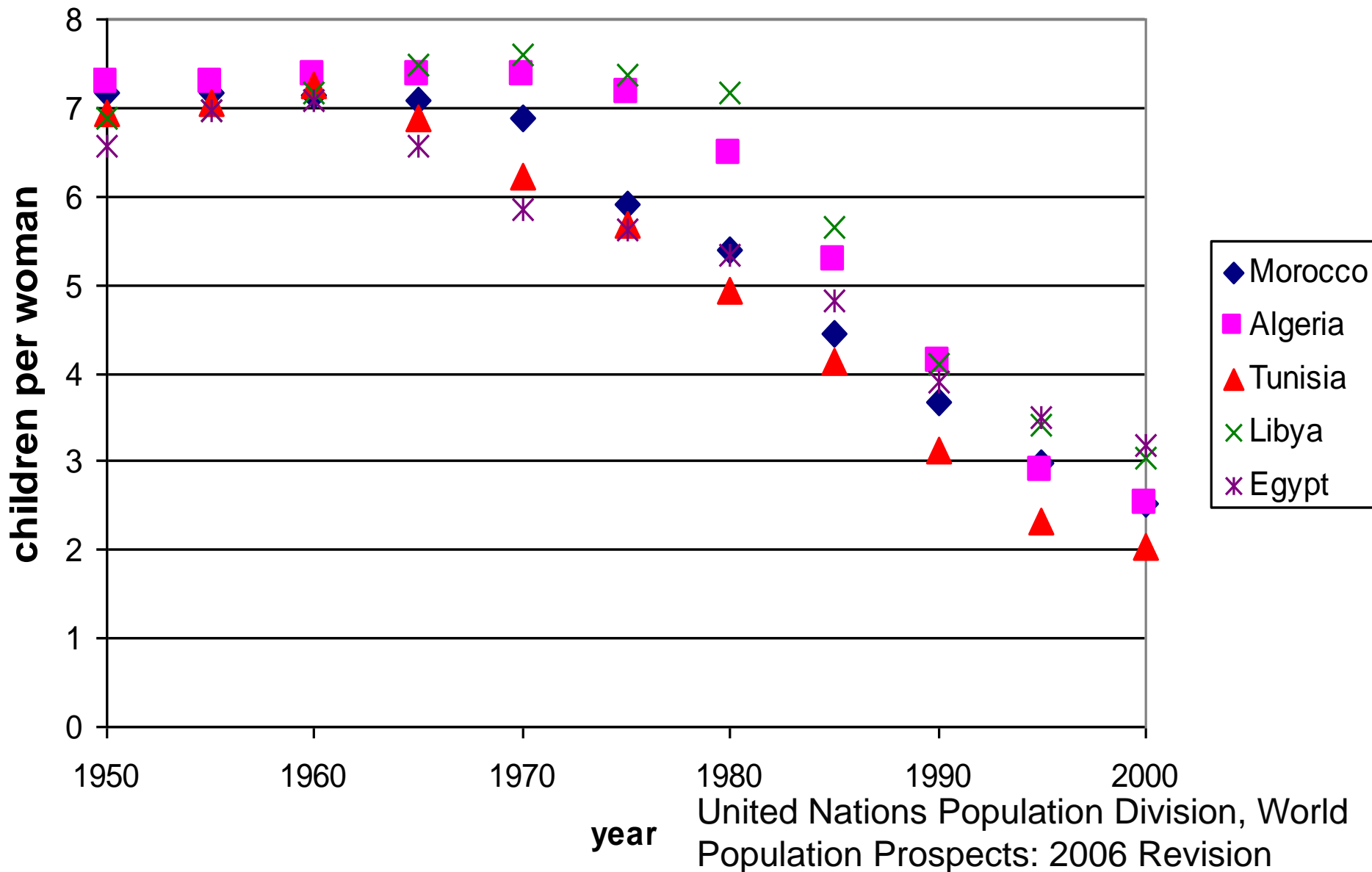


“less developed” excludes
“least developed”

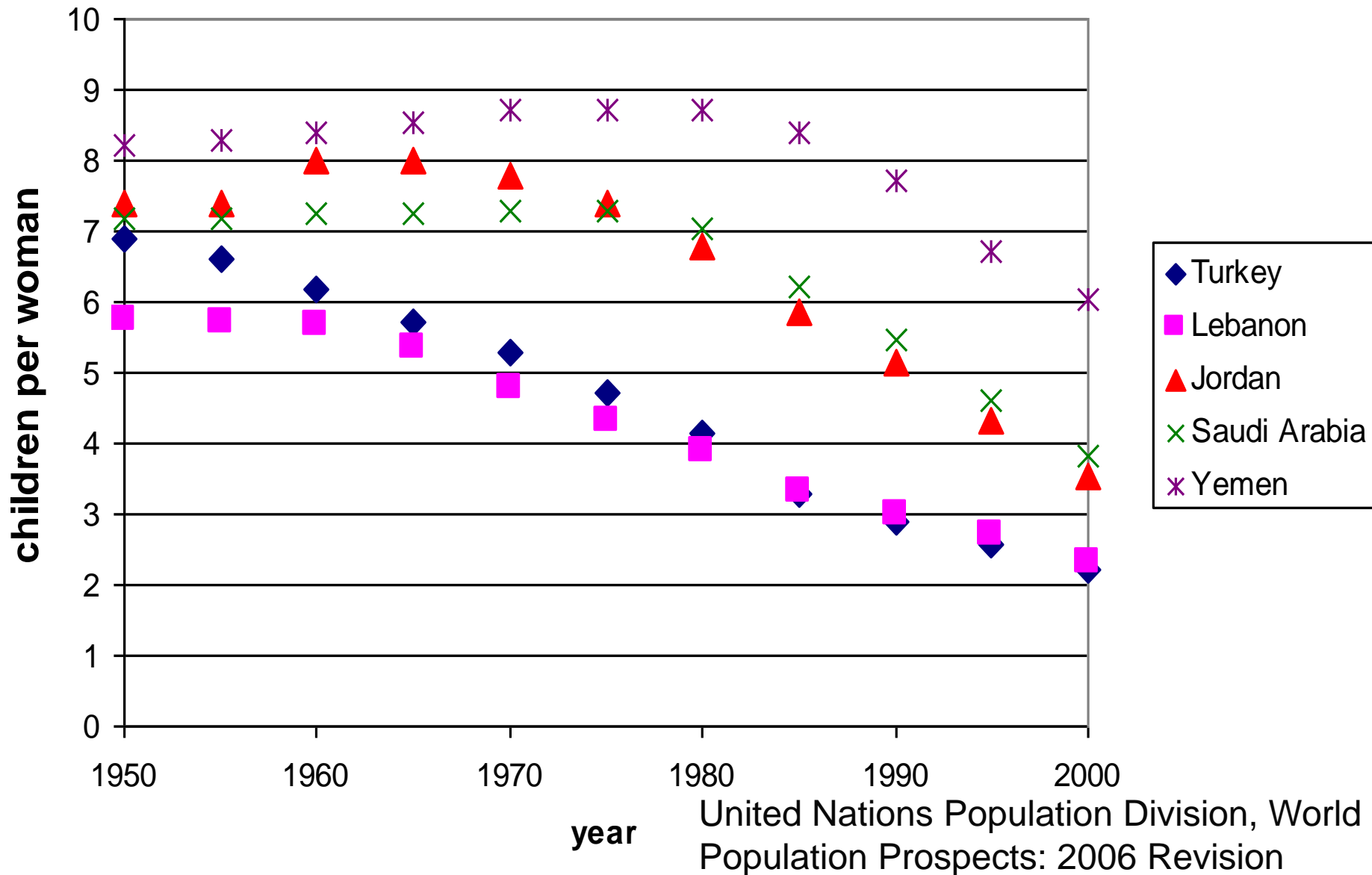
year

United Nations Population Division, World
Population Prospects: 2006 Revision

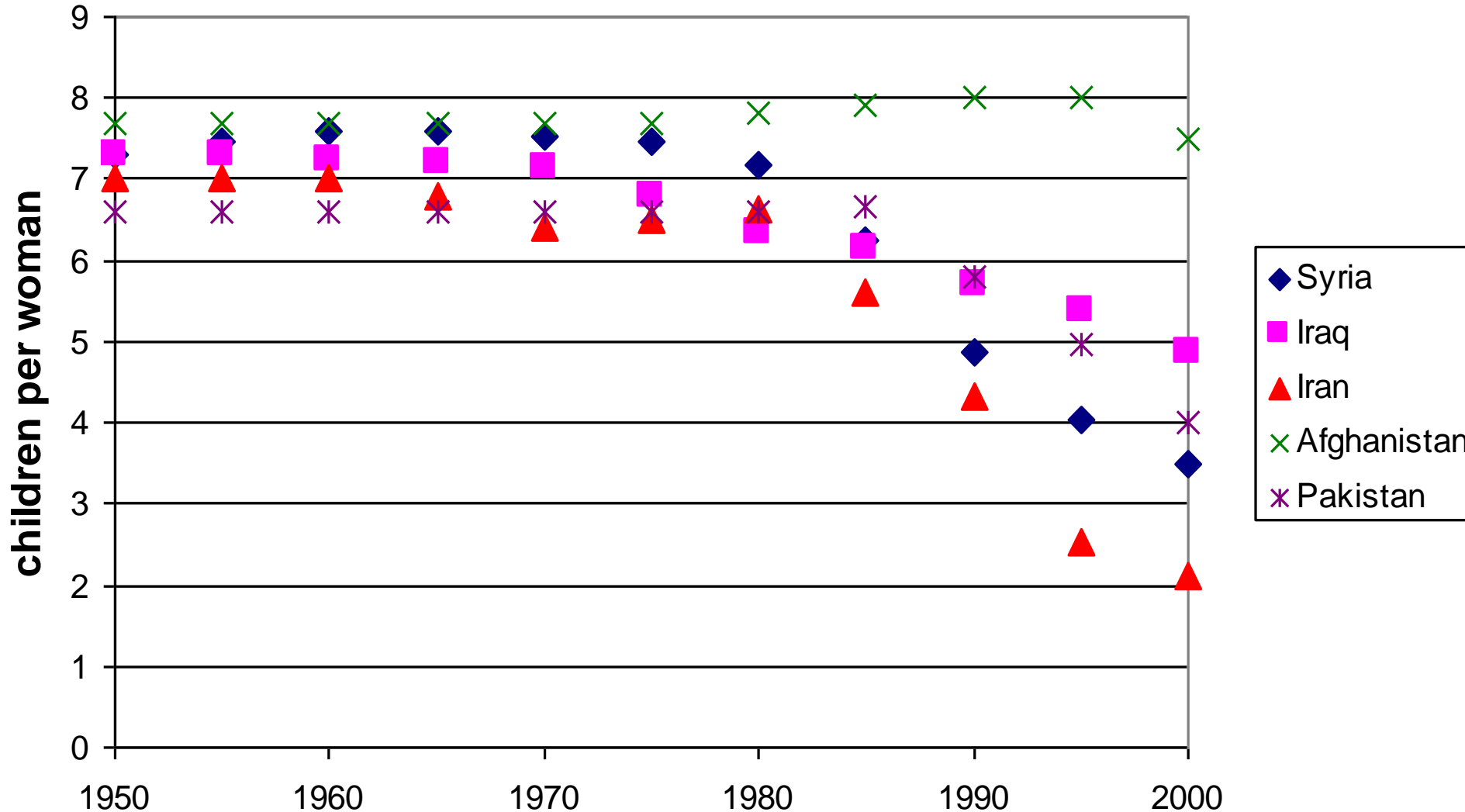
Total fertility in north Africa



Total fertility in the Middle East



Total fertility in western Asia



United Nations Population Division, World Population Prospects: 2006 Revision

Slower growth, slow decline

Current population growth is ~78 million / year.

“Developed” countries absorb 5%, developing countries 95%.

By 2050, developed countries will **decrease** by 1 million persons / year, developing world will **add** 35 million / year.

United Nations Population Division 2005 World Population Prospects: The 2004 Revision, medium variant

Lower fertility brings smaller families.

People will have fewer siblings, cousins, aunts, uncles.

Reproduction, child-rearing will occupy smaller portion of adult life.

Average number of people per household will decline (unless patterns of cohabitation change), so numbers of households will rise faster than numbers of people.

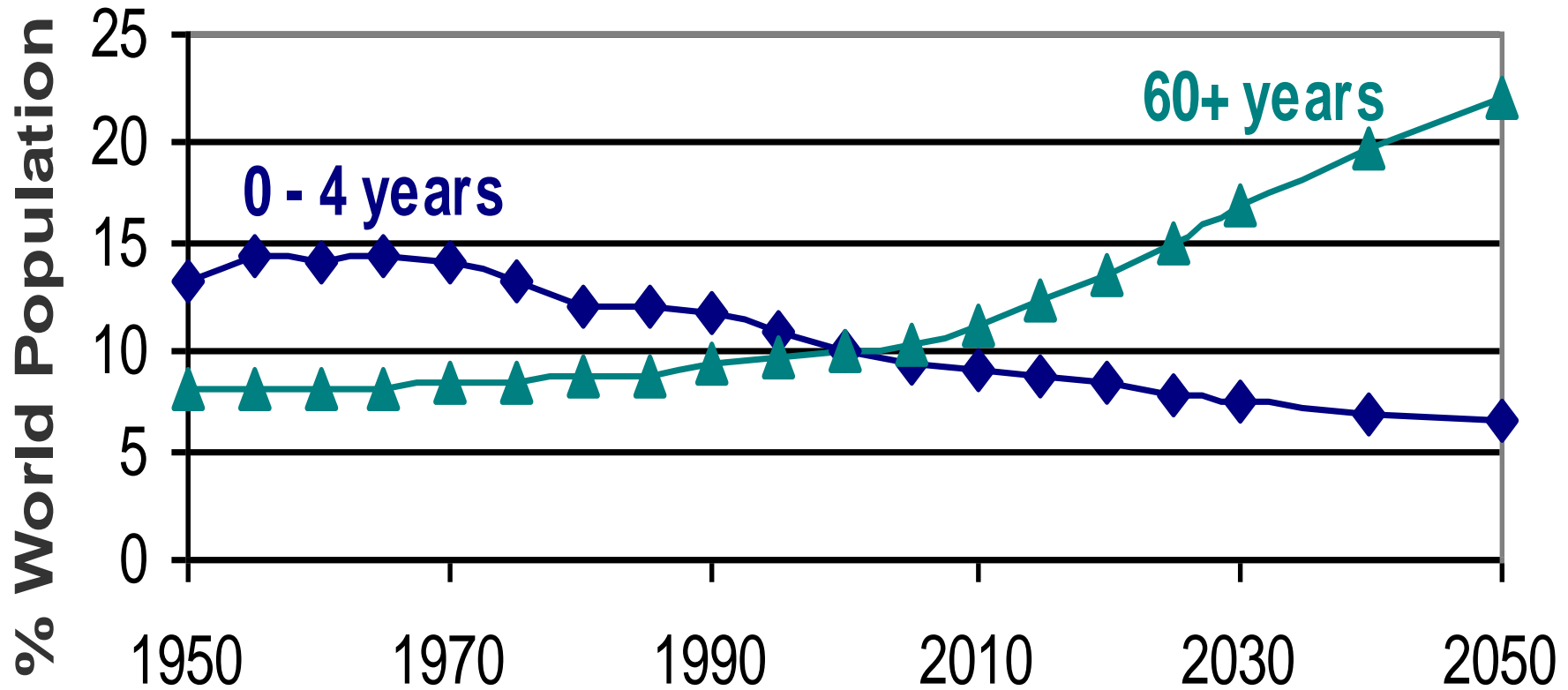
3. Older:

numbers & fraction of older people will increase everywhere, first in rich countries, then in poor.

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

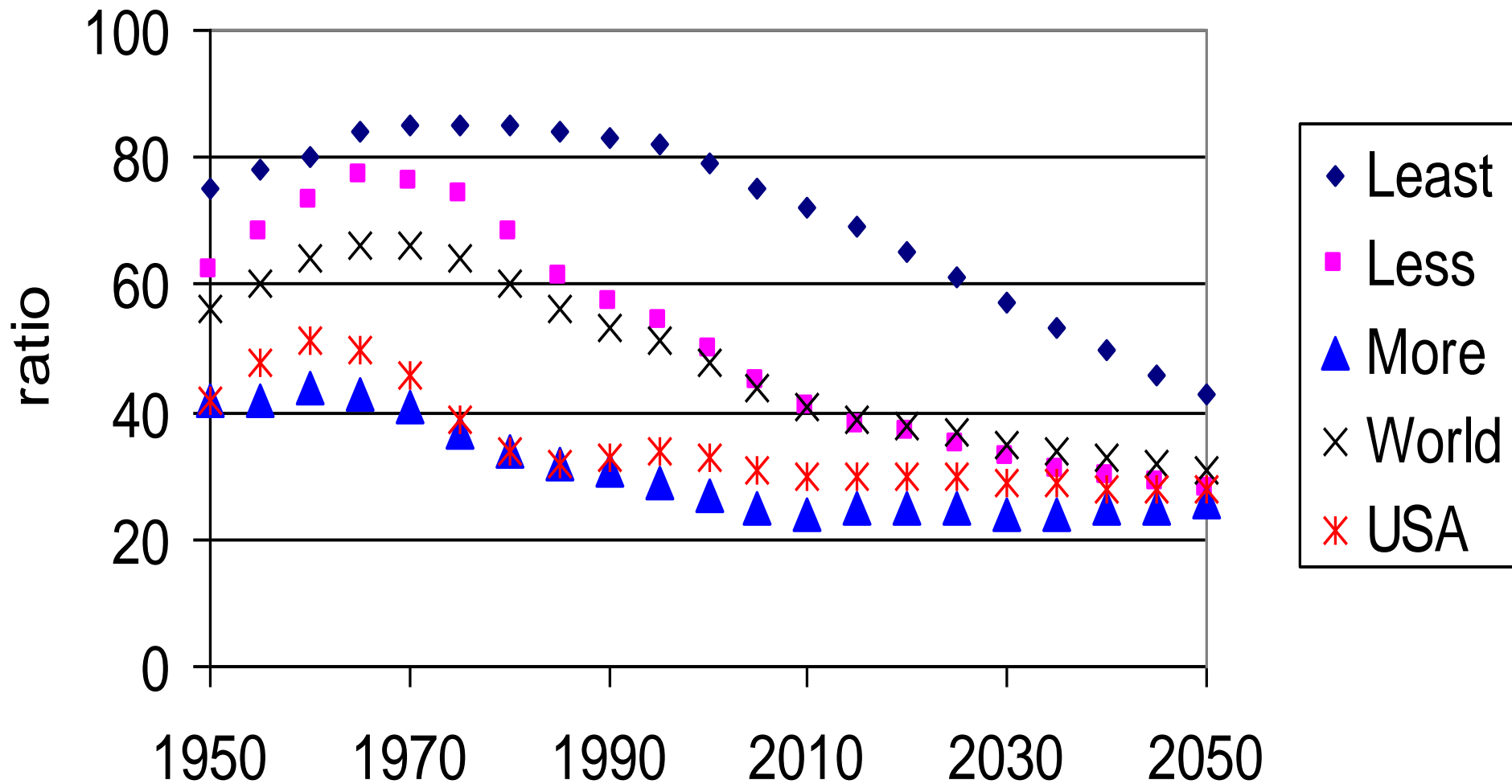


People aged 60+ outnumber children aged 0 - 4.



Graph by Joel E. Cohen from
United Nations Population Division estimates and projections (medium variant)

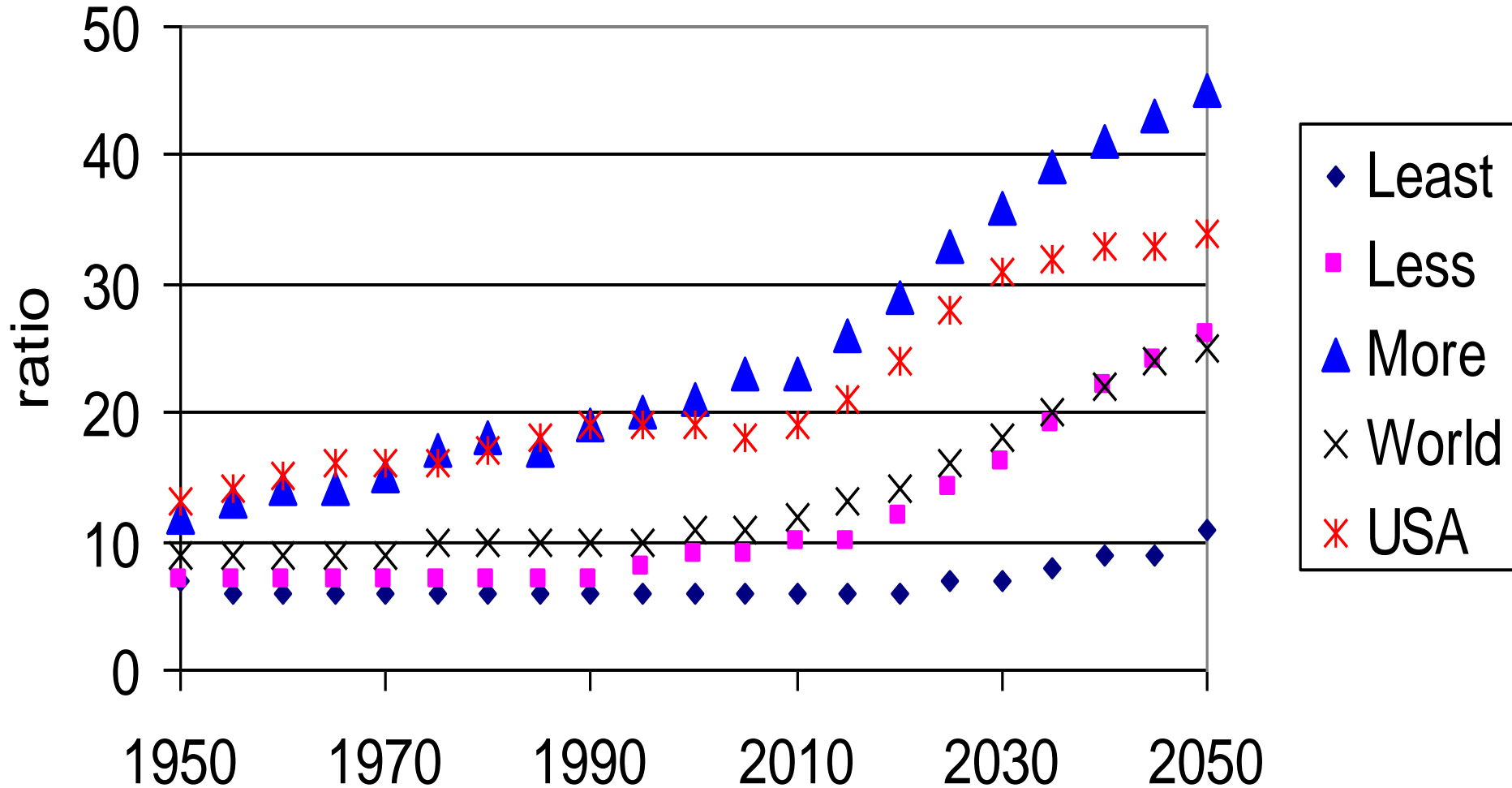
Child dependency 0-15 / 15-64



“less developed” excludes
“least developed”

United Nations Population Division, World
Population Prospects: 2006 Revision

Elderly dependency 65+ / 15-64



“less developed” excludes
“least developed”

United Nations Population Division, World
Population Prospects: 2006 Revision

A tsunami of population ageing is on the way.

The number of people 60+ will nearly **triple** by 2050.

The number of people 80+ will more than **quadruple** by 2050.

Median age will rise everywhere.

	2000	2050
world median age (years)	26.7	38.1
more developed regions	37.4	45.7
less developed regions	24.1	36.9

UN Population Division, *World Population Prospects 2006 Revision*

Relative increase of elderly is most rapid in some less developed countries.

Greatest numbers of elderly are in more developed countries.

Ageing results from 2 successes:

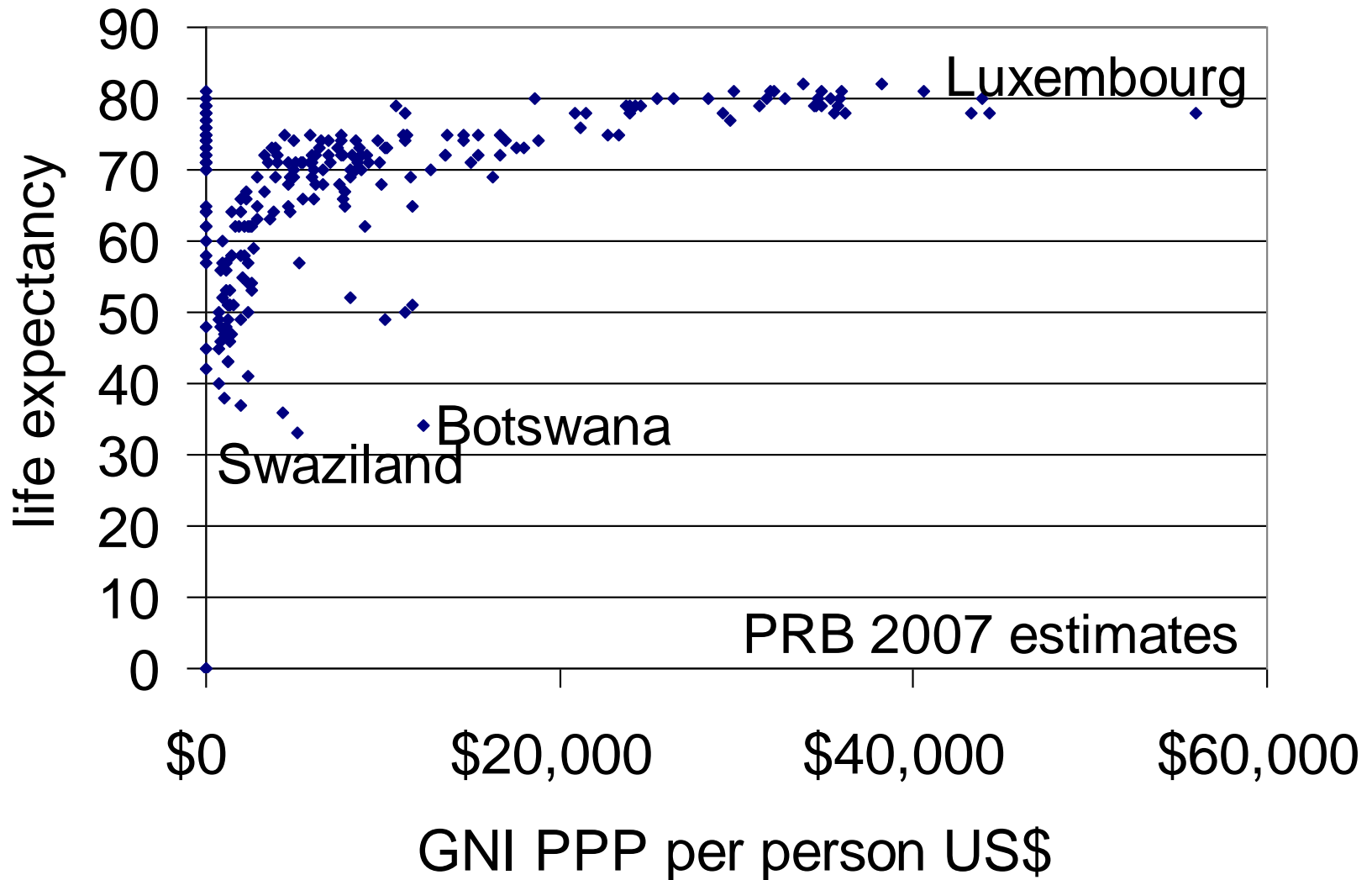
Lower fertility

Longer life

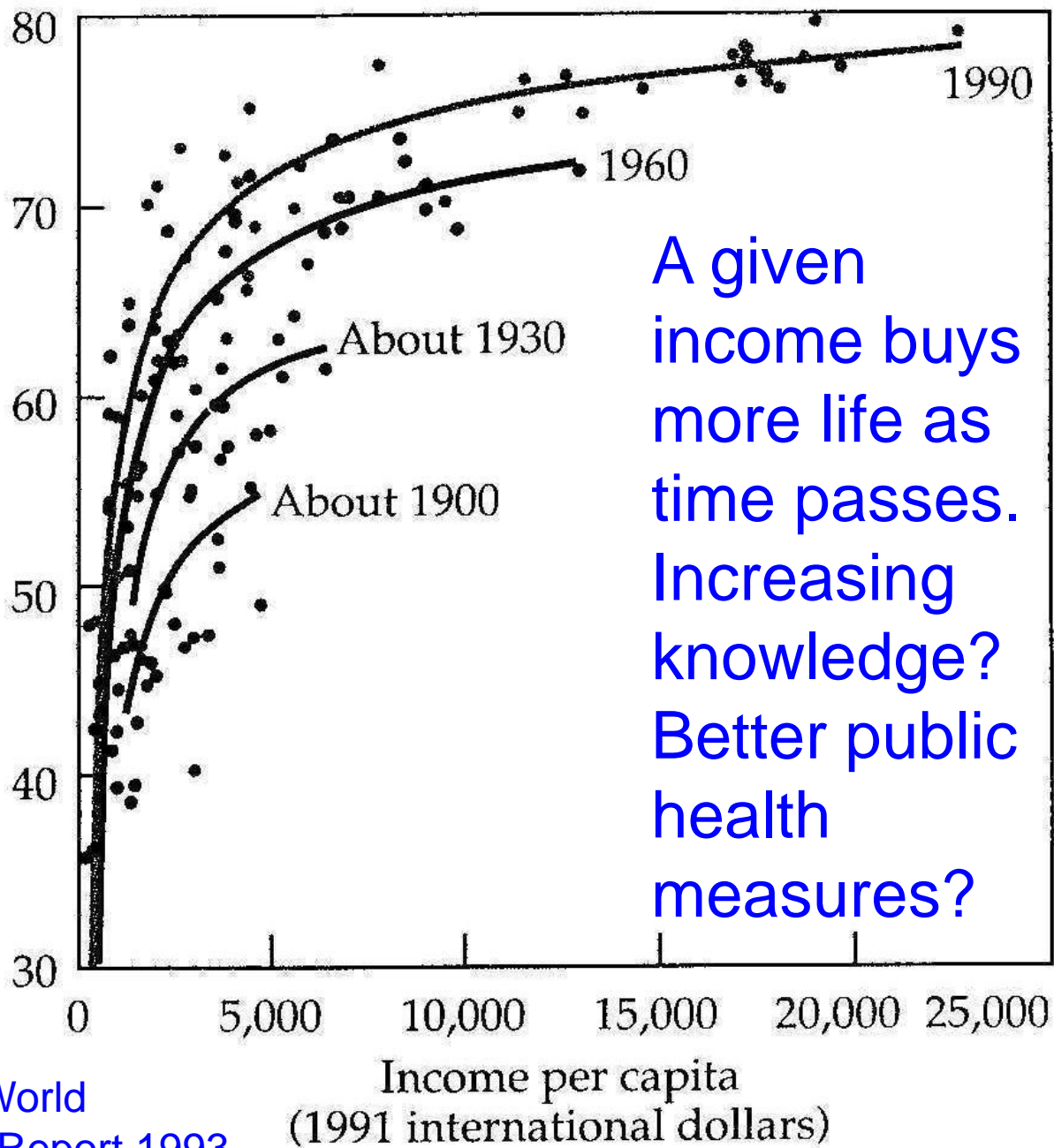
Fall in fertility contributes more to population aging than increasing length of life.

If birth rates and death rates remain low, population aging is irreversible.

Life expectancy rises with income per person, up to a point.



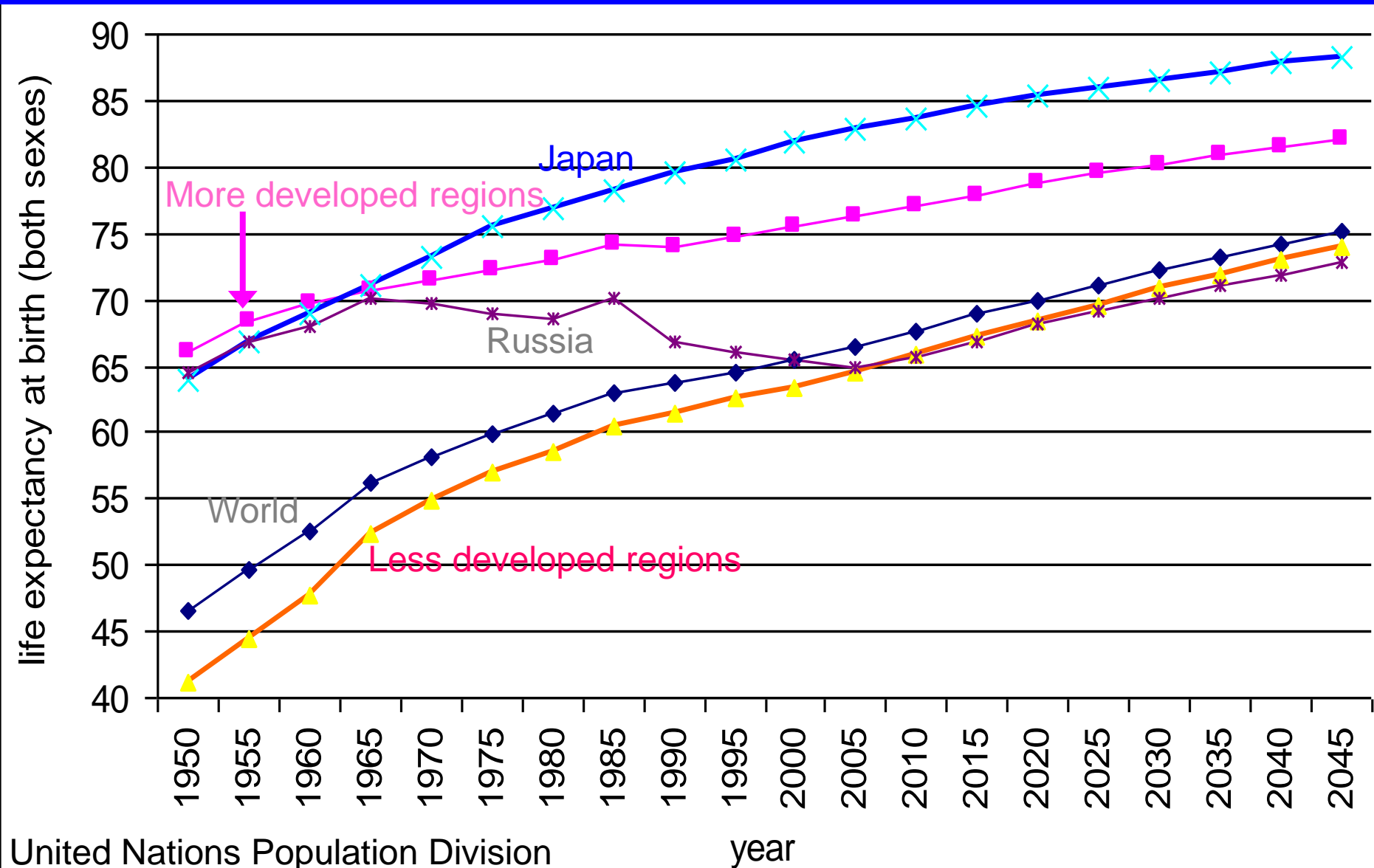
Life expectancy (years)



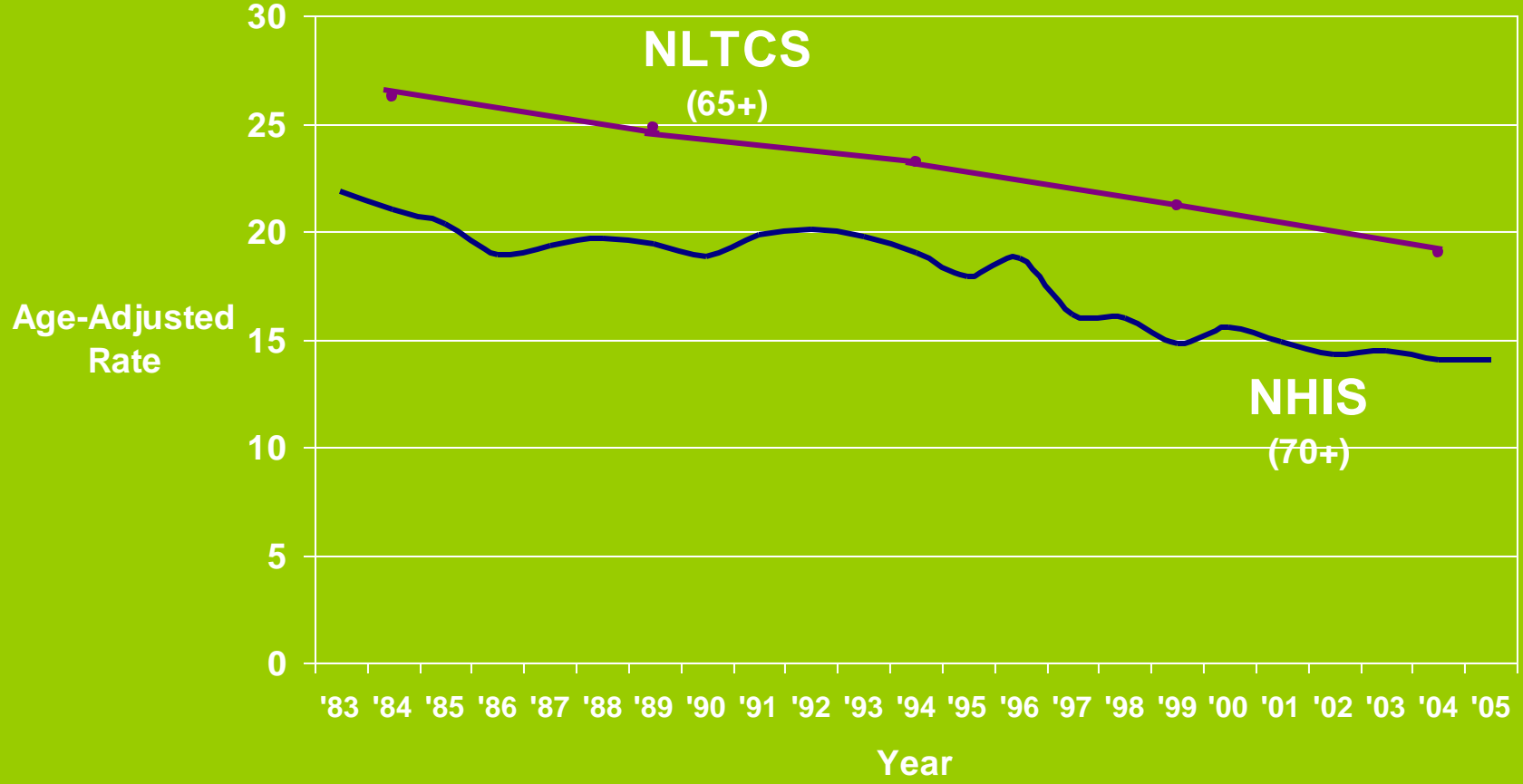
A given
income buys
more life as
time passes.
Increasing
knowledge?
Better public
health
measures?

Life expectancy will increase.

(One hopes.)

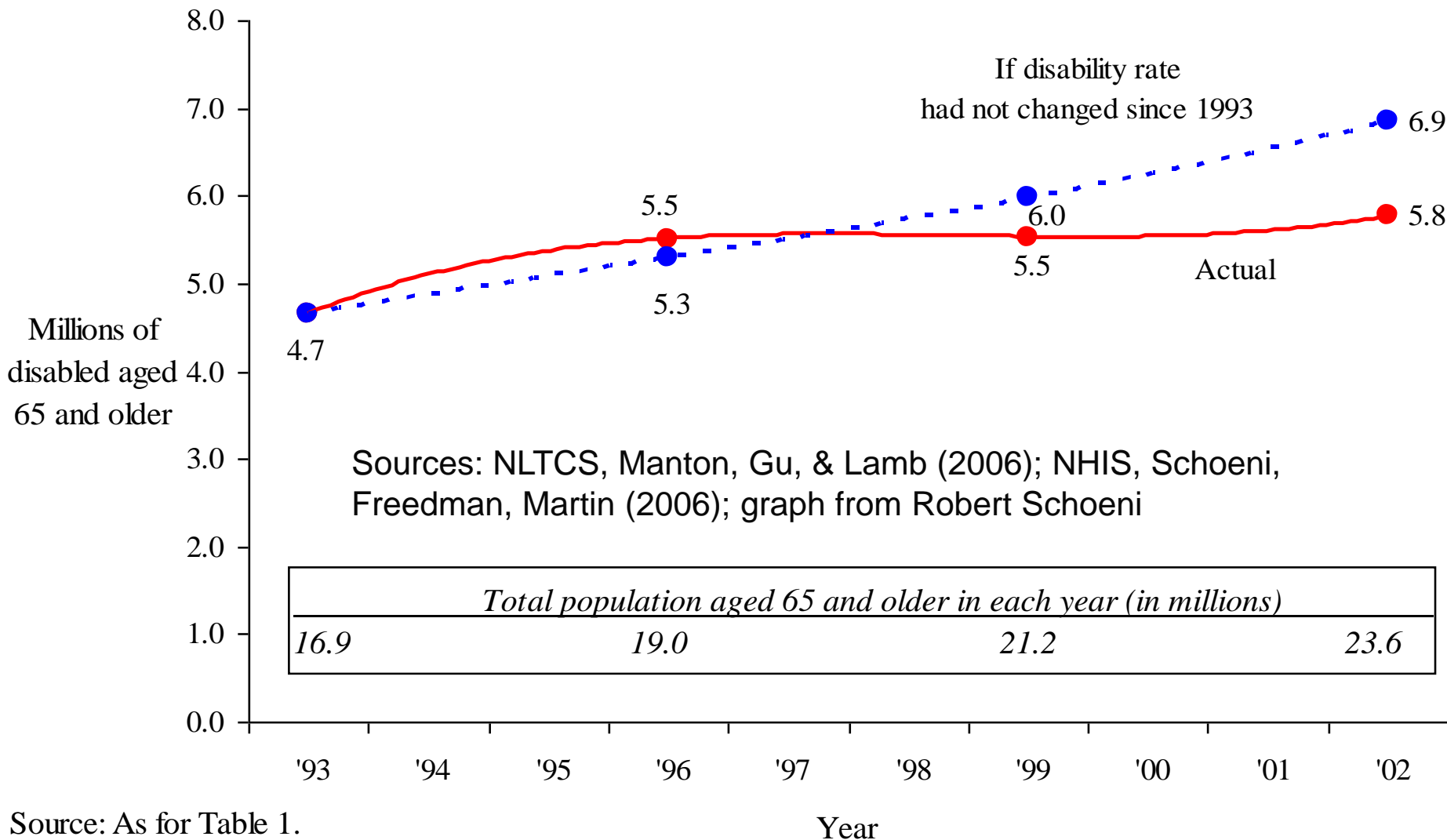


USA elderly disability rates fell 1.5% per year in last 25 years.



Sources: NLTCS, Manton, Gu, & Lamb (2006); NHIS, Schoeni, Freedman, Martin (2006); graph from Robert Schoeni
Joel E. Cohen

Japan would have 1.1 million more disabled people 65+ in 2002 if disability prevalence had not fallen since 1993.



Source: As for Table 1.

Top 15 people-killers in 2002, by disease or injury

1. Ischaemic heart disease
2. Cerebrovascular disease
3. Lower respiratory infections
4. HIV/AIDS
5. COPD
6. Perinatal conditions
7. Diarrhoeal diseases
8. Tuberculosis
9. Trachea, bronchus, lung cancers
10. Road traffic accidents
11. Diabetes mellitus
12. Malaria
13. Hypertensive heart disease
14. Self-inflicted injuries
15. Stomach cancer

Mathers & Loncar PLOS Medicine 2006

Tobacco is responsible for about
1 death in 10.

	million deaths / year
tobacco	6
HIV / AIDS	3
tuberculosis	2
malaria	1

Mathers & Loncar PLOS 2006; The Global Fund to Fight AIDS, Tuberculosis and Malaria

“Tobacco ... world’s leading preventable cause of death”

“The consumption of cigarettes and other tobacco products and exposure to tobacco smoke are the world’s leading preventable cause of death, responsible for about 5 million deaths in 2003, mostly in poor countries and poor populations. The toll will double in 20 years unless known and effective interventions are urgently and widely adopted.” *World Health Report 2003: Shaping the Future* (WHO).

Tobacco: poor people smoke, poorest smoke most

Smoking rates have declined in high-income countries.

Smoking rates have increased sharply in many low-income & middle-income countries.

Smoking rates are untouched by public health measures in poorest nations.

Feldman & Bayer, eds. *Unfiltered: Conflicts over Tobacco Policy and Public Health*. 2004

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



People are concentrated in cities.

Half of all people (more than 3 billion) live in cities on less than 3% of censused land area

> 500 people/km²,

> 1 person/(45m x 45m).

Least densely populated half of Earth's censused land area has less than 2% of people,

< 10 people/km².

Most urban people live in small cities.

Approximately 51% of all urban dwellers in the world in 2005 lived in cities with fewer than 500,000 people.

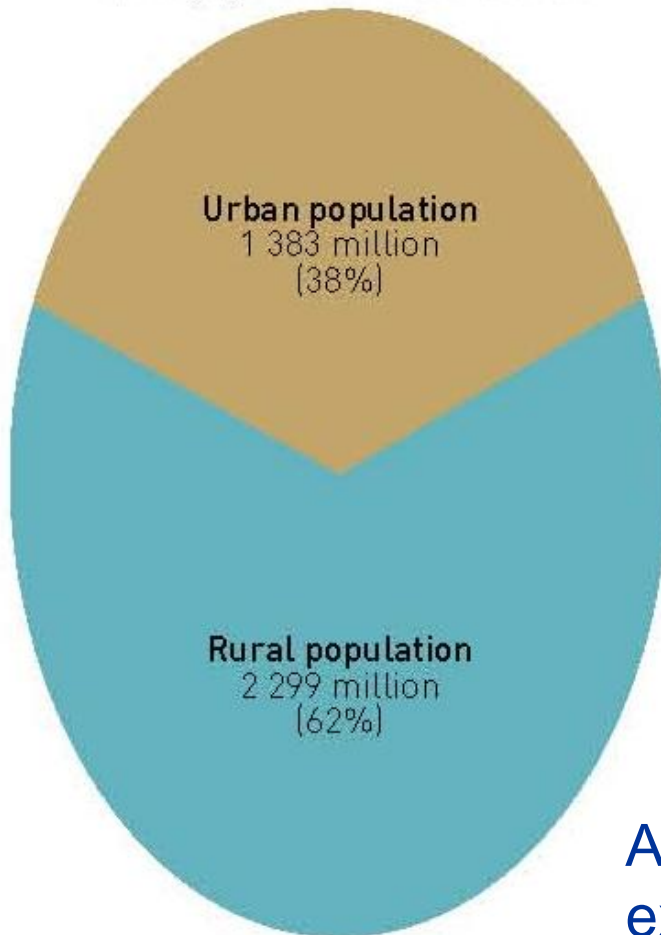
United Nations Population Division

World Urbanization Prospects: The 2005 Revision

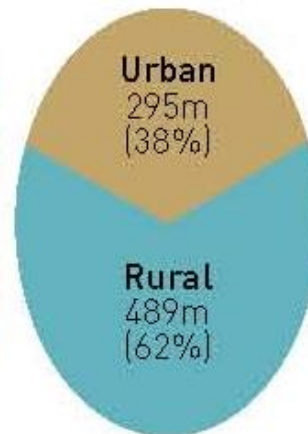
Urban populations, 2000

Asia's urban population exceeded that of Africa, Europe, Latin America and Caribbean combined.

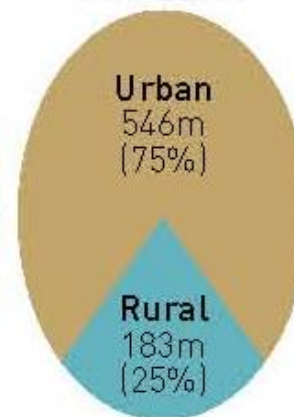
Asia
Total population: 3 682 million



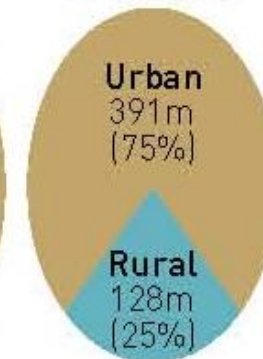
Africa
784 million



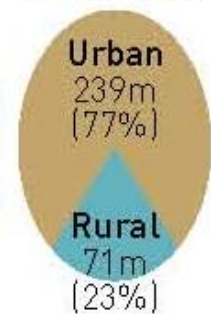
Europe
729 million



Latin America and Caribbean
519 million



North America
310 million

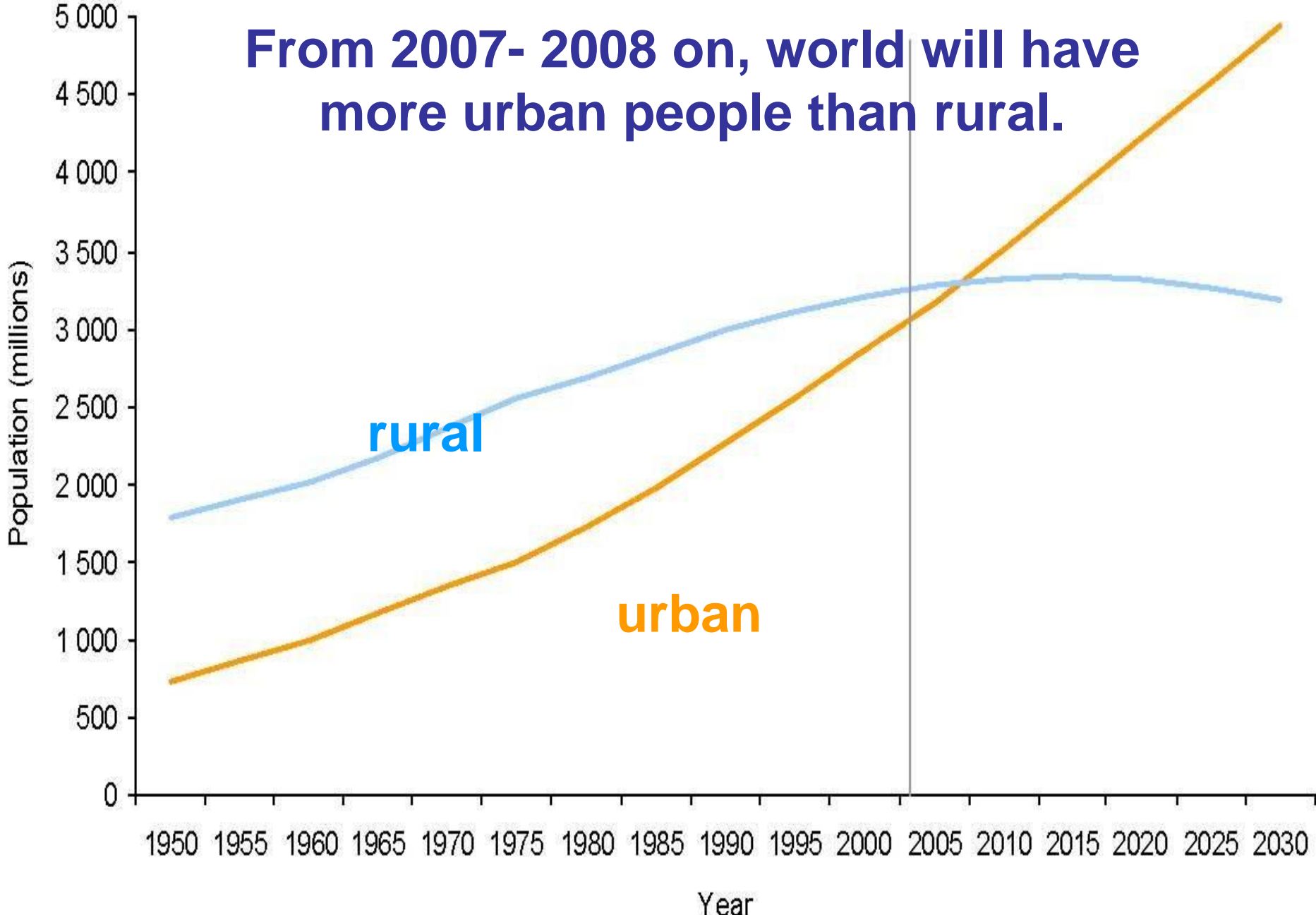


Oceania 30 million

Urban 21m (70%)
Rural 9m (30%)

Africa's urban population exceeded that of North America and Oceania combined.

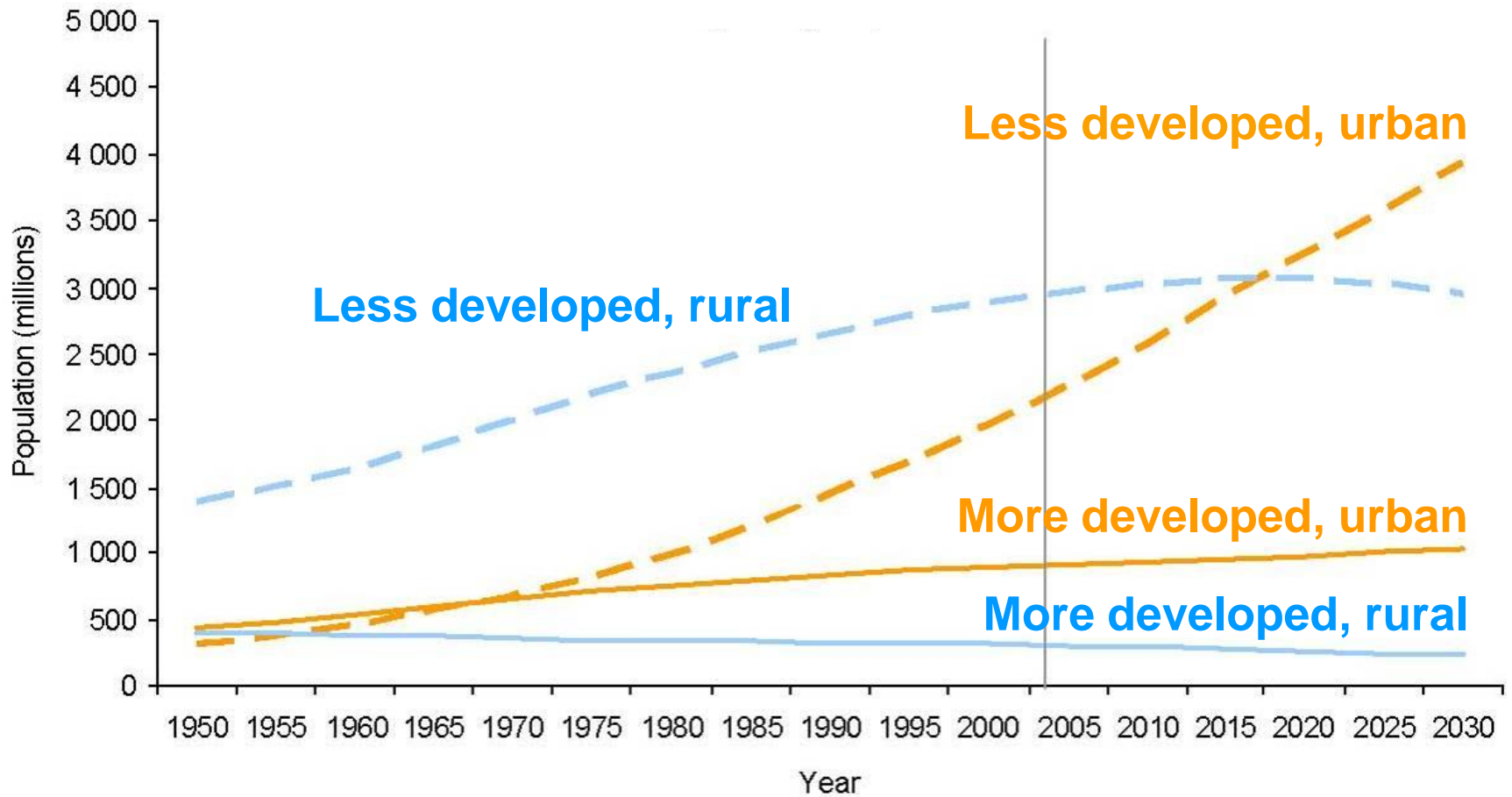
From 2007- 2008 on, world will have more urban people than rural.



UN, World Urbanization Prospects 2003

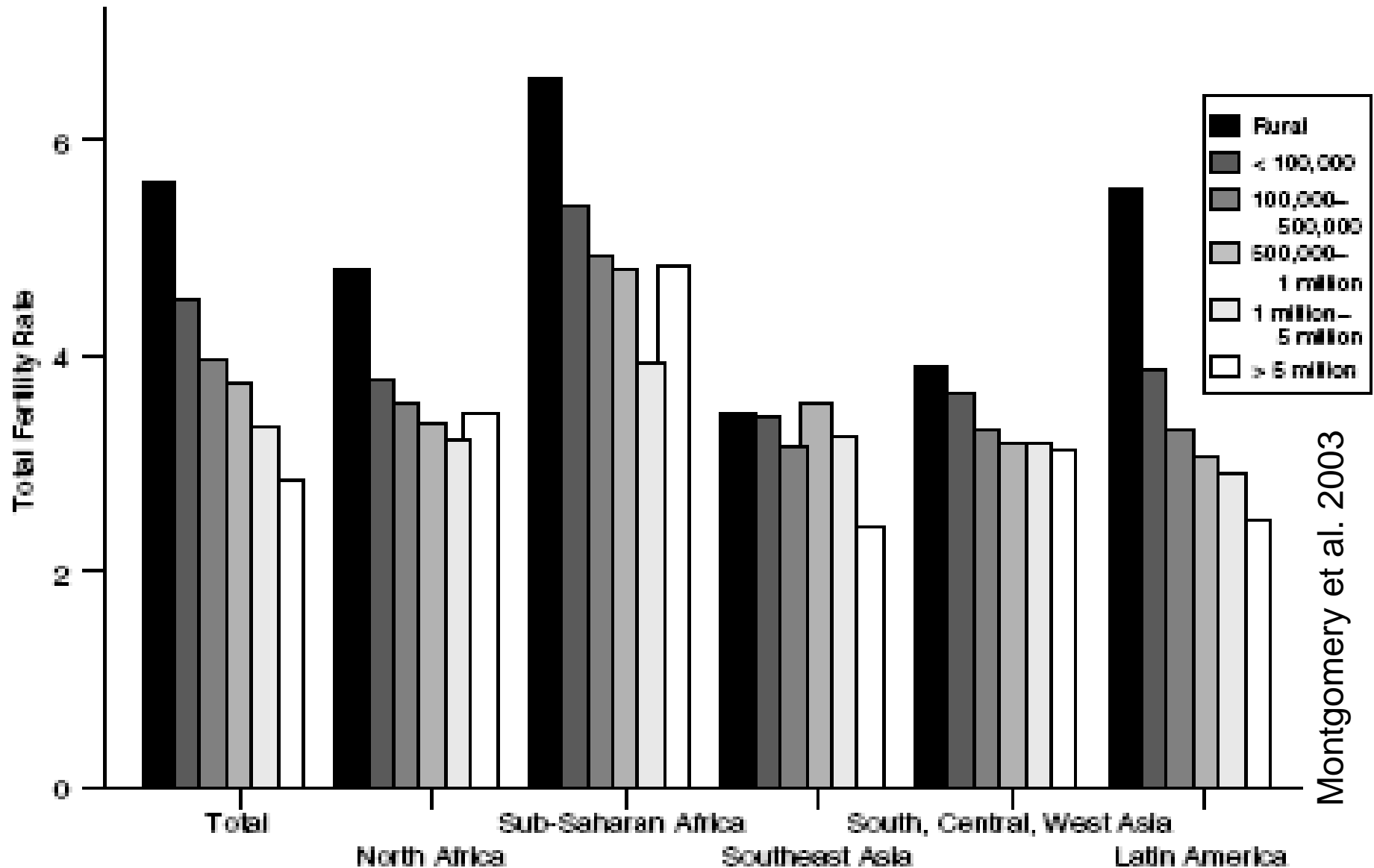
Year

Urban population will grow faster in less developed regions.



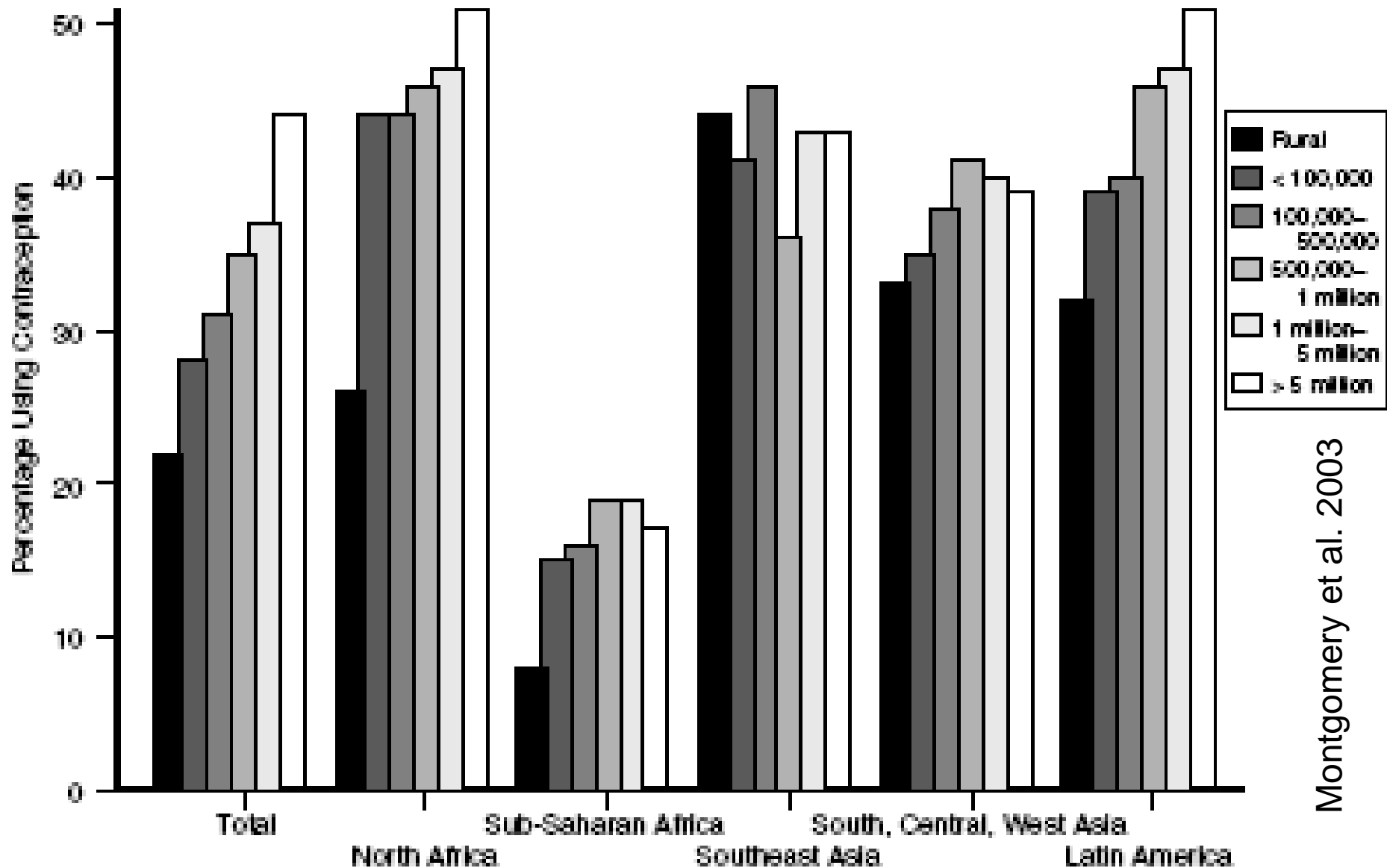
UN, World Urbanization Prospects 2003

Total fertility rates decline from rural to urban areas.



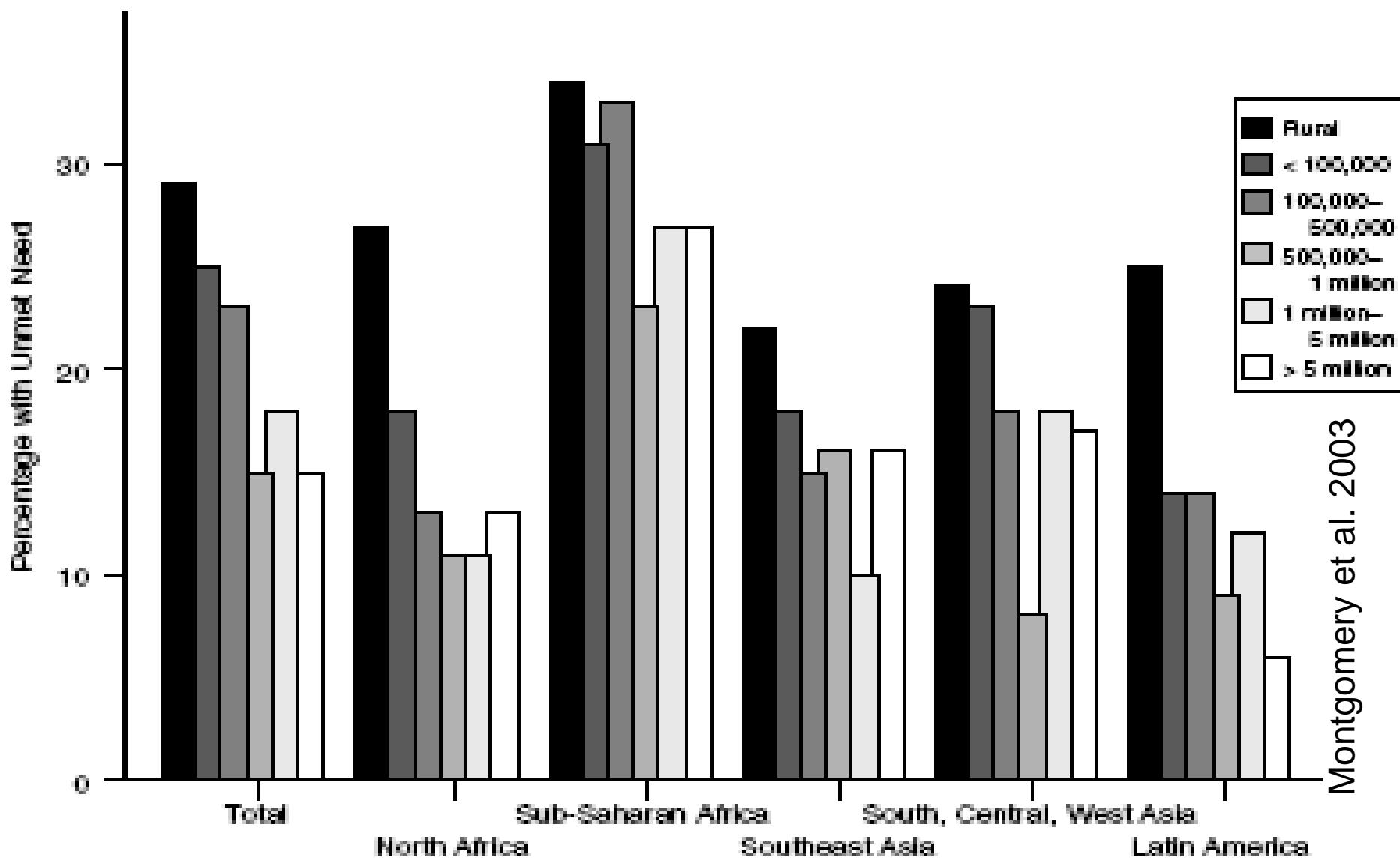
Montgomery et al. 2003

Modern contraceptive use increases from rural to urban areas.



Montgomery et al. 2003

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



Montgomery et al. 2003

Cities will face unprecedented confluence of rapid increase in total numbers of people and numbers of elderly people.

Cities old & new need to be designed to accommodate increasing numbers of the elderly.



Home, work, shopping should be nearby.

Cities have environmental impacts.

Cities located on coasts & at river mouths affect wetlands & coastal & offshore fisheries.

Many cities (~3% of land) are located on prime agricultural land (~10% of land). If urban area doubles with doubled population, food production could hurt.



Michiko Shimoda,
Rice field, Fuji City 2005



Michiko Shimoda,
Fuji City 2005

20 “urban agglomerations” had more than 10 million people in 2005.

On coast or coastal river (15)

Tokyo
New York-Newark
Mumbai
Shanghai
Kolkata
Buenos Aires
Dhaka
Jakarta
Los Angeles-Long Beach-Santa Ana
Karachi
Rio de Janeiro
Osaka-Kobe
Al-Qahirah (Cairo)
Lagos
Manila

Inland (5)

Ciudad de México
São Paulo
Delhi
Beijing
Moskva



New Haven

Montauk

New York City

Long Beach

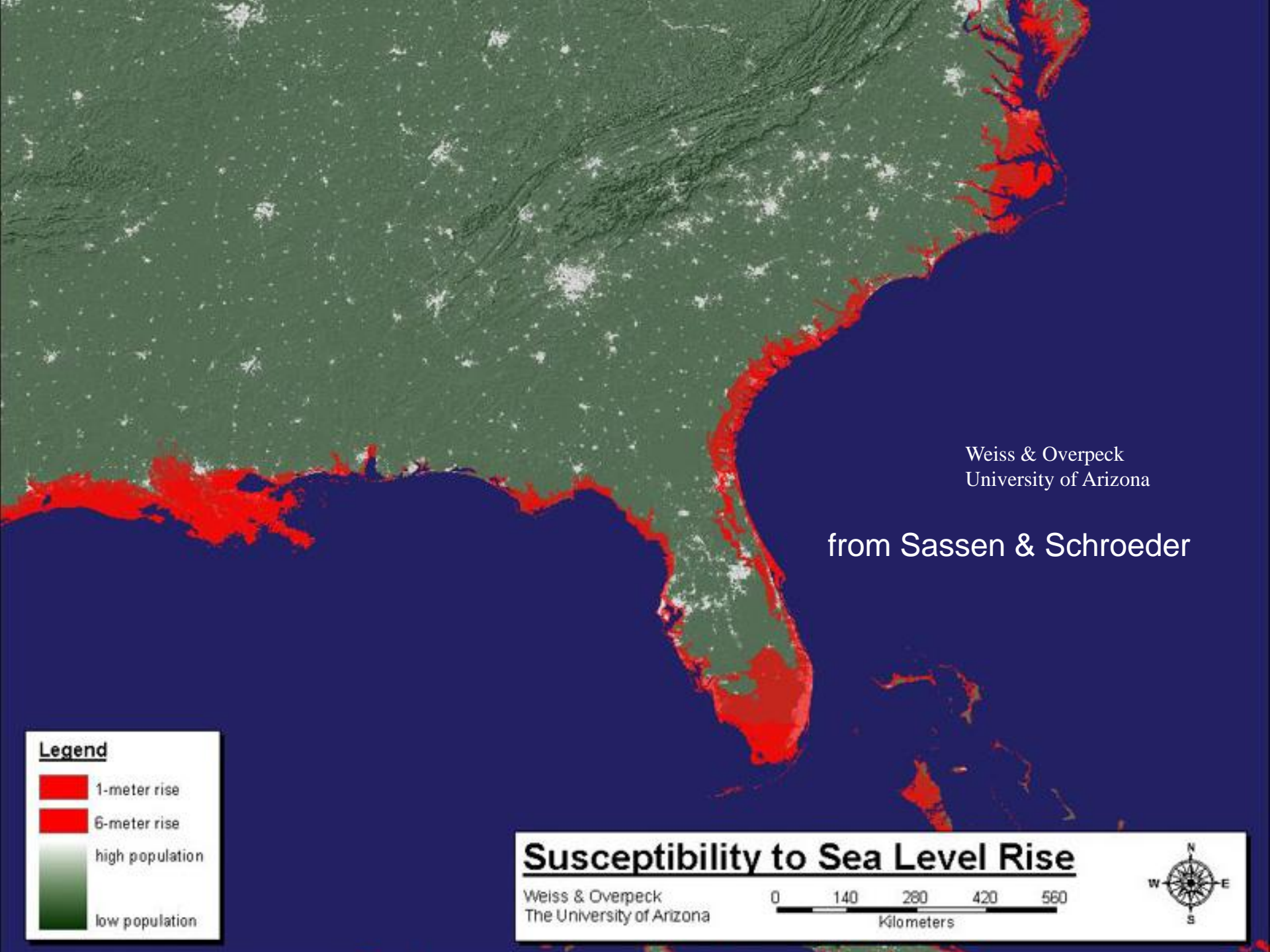
Atlantic City

Wildwood

Sea Level +1M

Weiss and Overpeck, University of Arizona

from Sassen & Schroeder



Weiss & Overpeck
University of Arizona

from Sassen & Schroeder

Legend

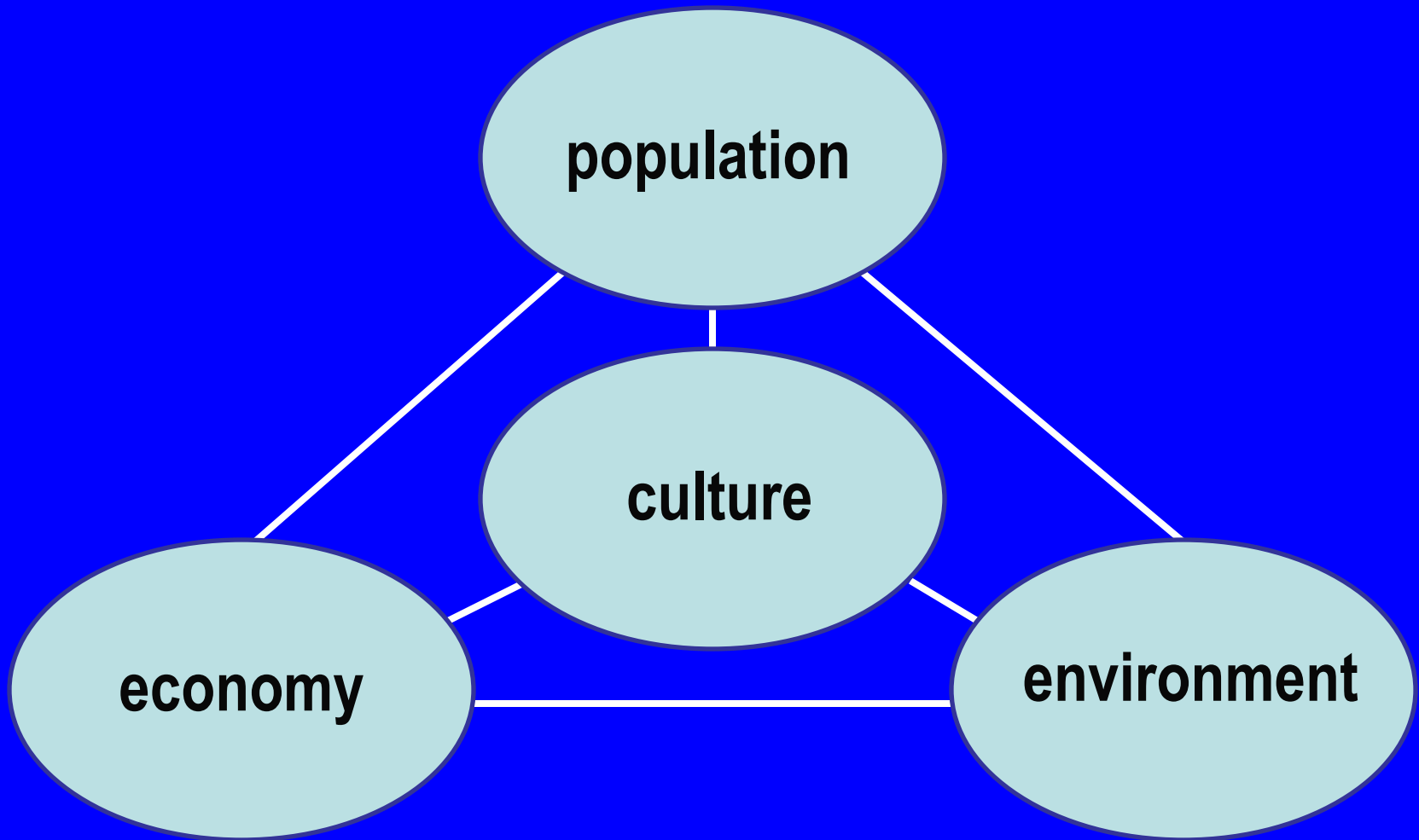
- 1-meter rise
- 6-meter rise
- high population
- low population

Susceptibility to Sea Level Rise

Weiss & Overpeck
The University of Arizona

0 140 280 420 560
Kilometers

Population interacts with economics, environment & culture.



Further information

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

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

Cohen, Human population grows up. *Scientific American* special issue “Crossroads for Planet Earth” September 2005.

Cohen, Bloom, Malin, *Educating All Children: A Global Agenda* (MIT Press, 2007)