



Population and Climate Change

Earth Day

Addis Ababa, Ethiopia

April 22, 2009

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“Let us recognize that the effects of climate change affects us all. And that they have become so severe and so sweeping that only urgent, global action will do.”

UN Secretary General Ban
Ki-moon, November 17, 2007



Key Points

Population dynamics affect climate change

Climate change feedback to human population

Reproductive health and family planning matter to climate change mitigation and adaptation

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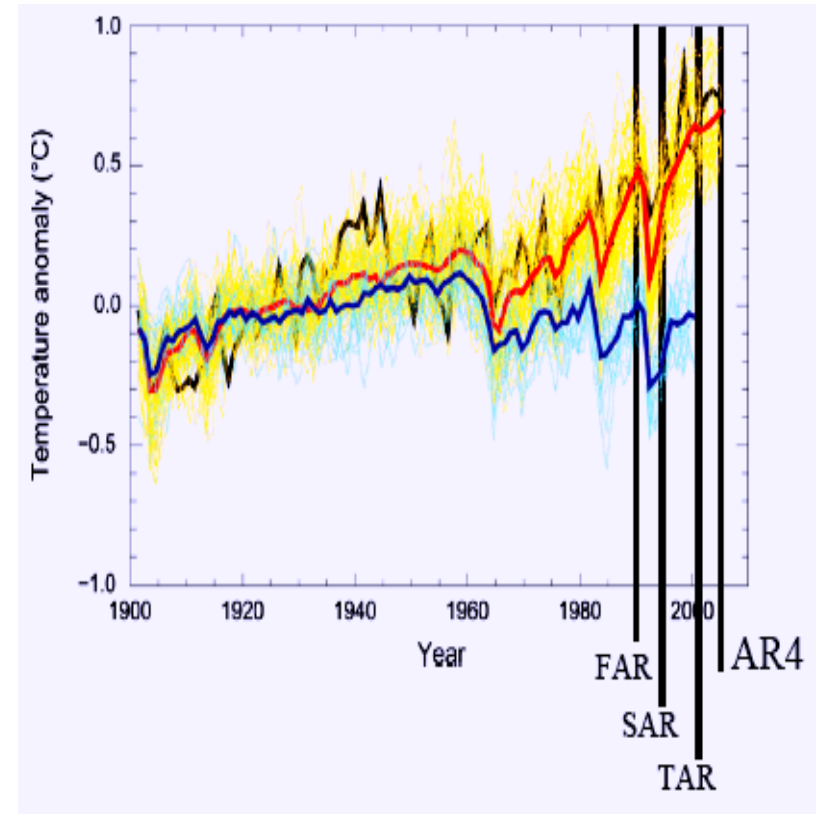
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Scientific evidence of climate change

- Global warming is unequivocal (FAR 1990)
- Most of the warming is very likely due to greenhouse gases (AR4 2007)
- Most of the warming is likely due to human activities (TAR 2001)



Historically, population growth has been a significant factor in climate change

Driver	1800	2000	Factor
Income (GDP PPP trillion 1990 US\$)	0.5	36	x70
Energy Use (primary EJ)	12	440	x35
CO₂ Emissions (GtC)	0.3	6.4	x20
Population (billion)	1	6	x6

Source: Nakicenovic et al. 2007.

Population and Emissions

- Since the first Earth Day in 1970, global population and annual carbon dioxide emissions have both increased by about 70%.
- As a result, per capita emission rates remain steady at about 1.2 metric tons of carbon per person per year.”

Source: Meyerson, 12/3/07. [www.thebulletin.org/web-edition/roundtables/population-and-climate change](http://www.thebulletin.org/web-edition/roundtables/population-and-climate-change)

Main Drivers of Climate Change

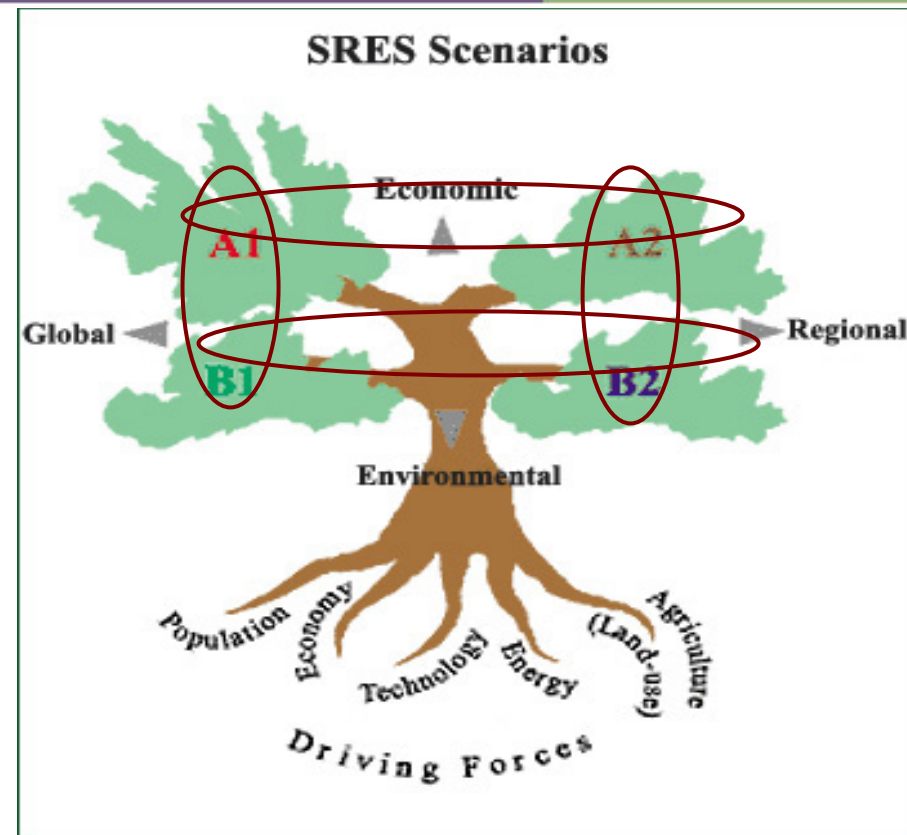
$$Emission = Population \times \frac{GDP}{Population} \times \frac{Energy}{GDP} \times \frac{Emission}{Energy}$$

Source: Erhlich and Holdren 1971; Kaya 1990.

Population:

a key variable in IPCC scenarios used for climate change modeling

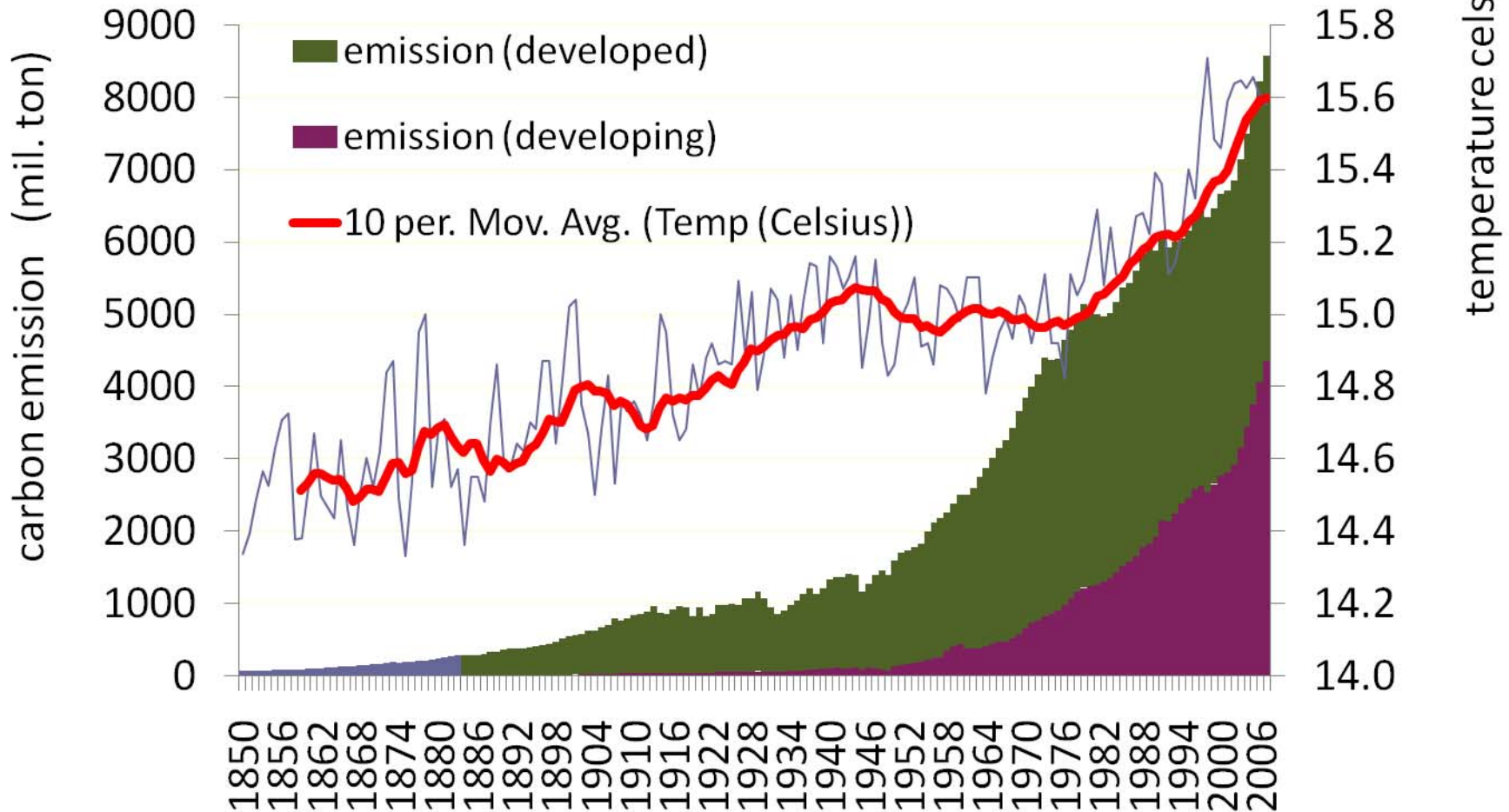
	A1	B1	B2	A2
Population growth	low	low	medium	high
GDP growth	very high	high	medium	medium
technological change	rapid	medium	medium	slow
Energy use	very high	low	medium	high
Land-use changes	low /medium	high	medium	medium /high



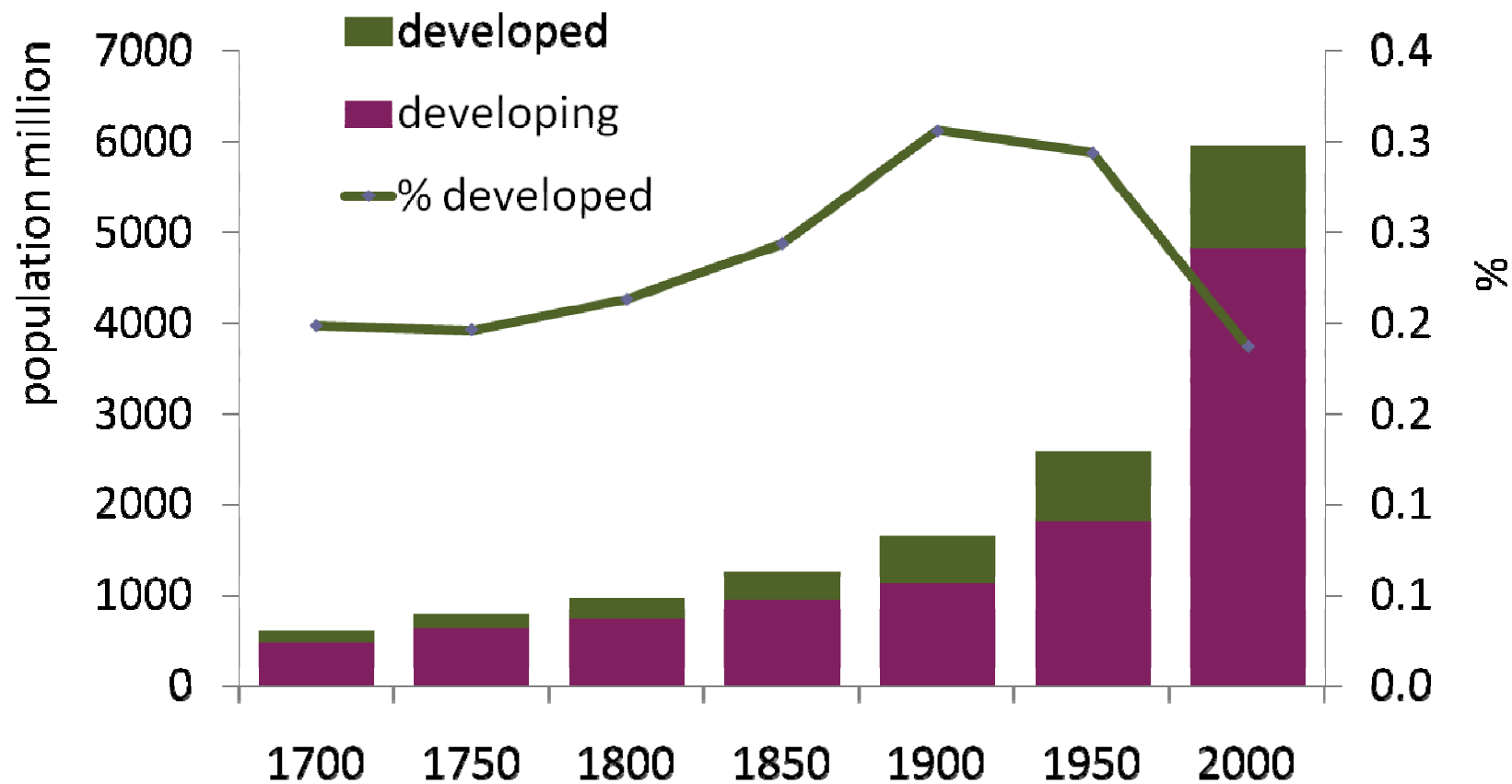
A: economic focus
B: environmentally friendly

1: global convergence
2: regional divergence

Carbon emission and Global warming



Population Change in Developed and Developing Regions



Limitations in current climate models

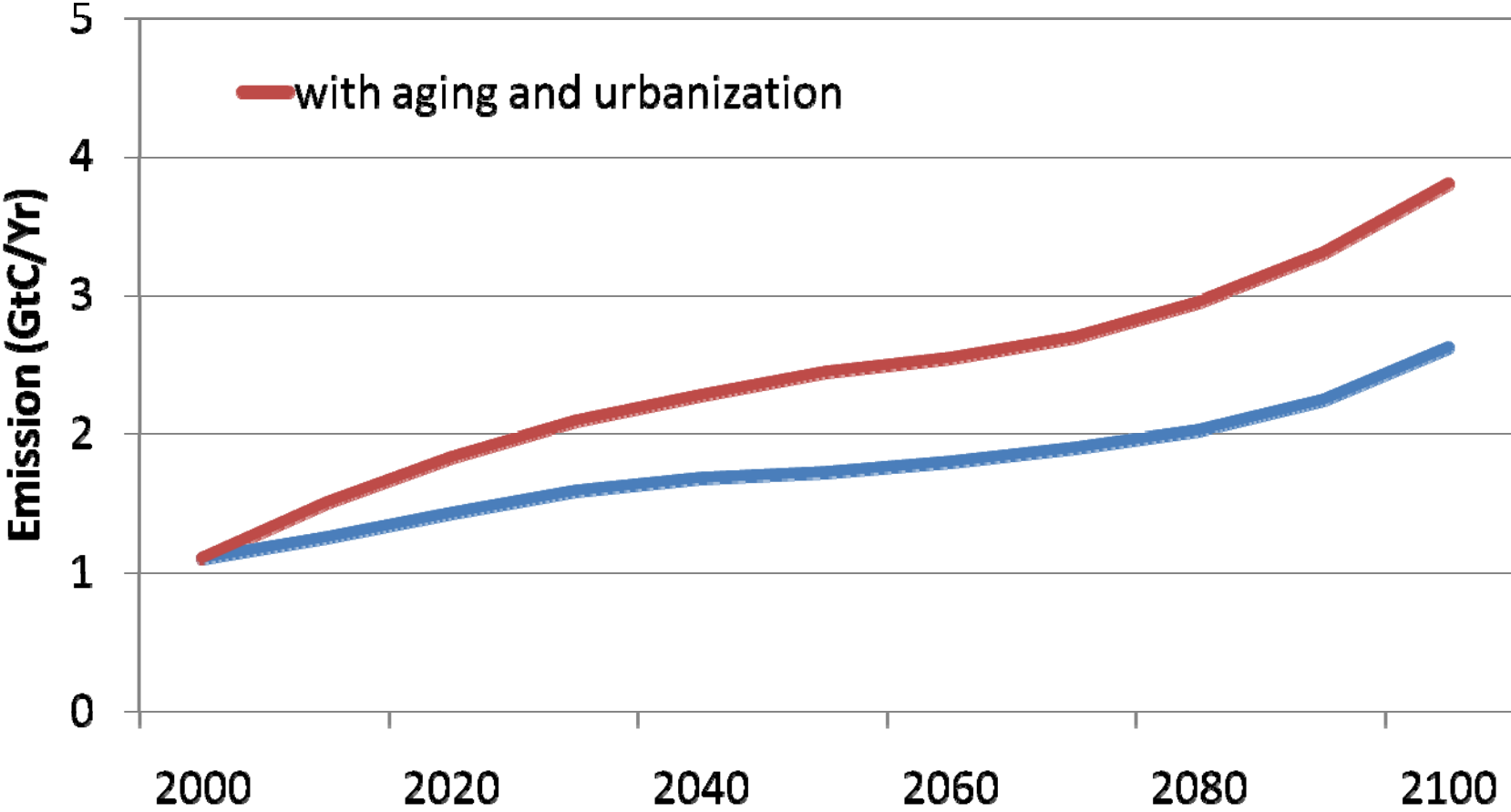
- Population SIZE as the only demographic variable
- Even distribution of the effects among all individuals in a population
- Individuals, instead of households are used as demographic unit of analysis

Global demographic trends

	2005	2050
Population size (billion)	6.7	9.2
developed	1.2	1.2
developing	5.5	8.0
Urban (billion) (%)	3.3 (48%)	6.4 (70%)
developed	1.0	1.1
developing	2.3	5.3
Elderly (60+ billion) (%)	0.67 (10%)	2.0 (22%)
developed	0.24	0.4
developing	0.43	1.6

Source: UN Population Prospects, 2006 Revision; UN Urbanization Prospects, 2007 Revision.

Impact of Urbanization and Aging on Carbon Emission in China



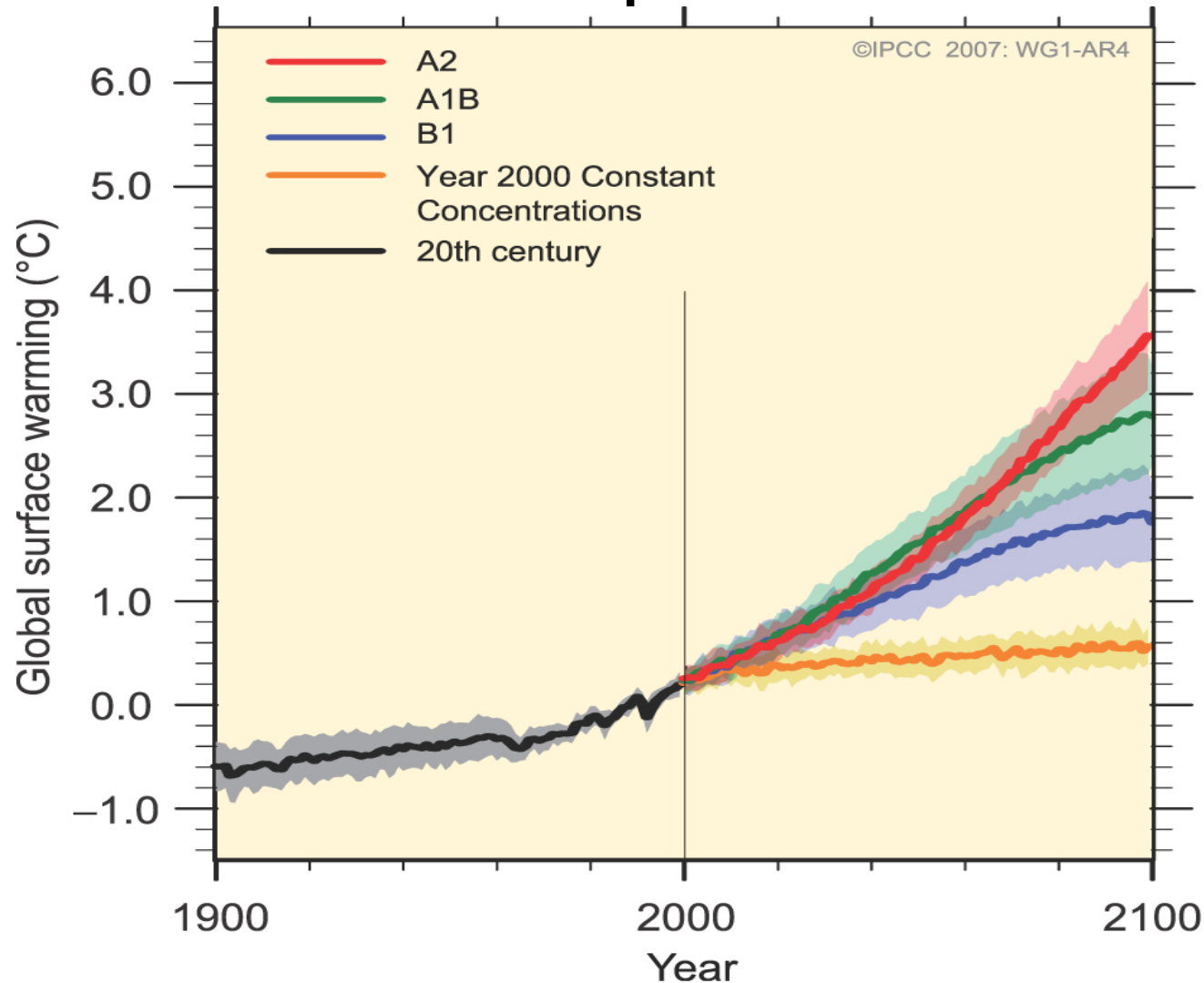
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Inevitability of climate change demands adaptation



Climate change hurts people

Temperature

Sea level rise

Change in
precipitation

Increasing storm
severity

Loss of glacial ice

Spread vector of
diseases



Additional 50 million people at risk of hunger by 2020

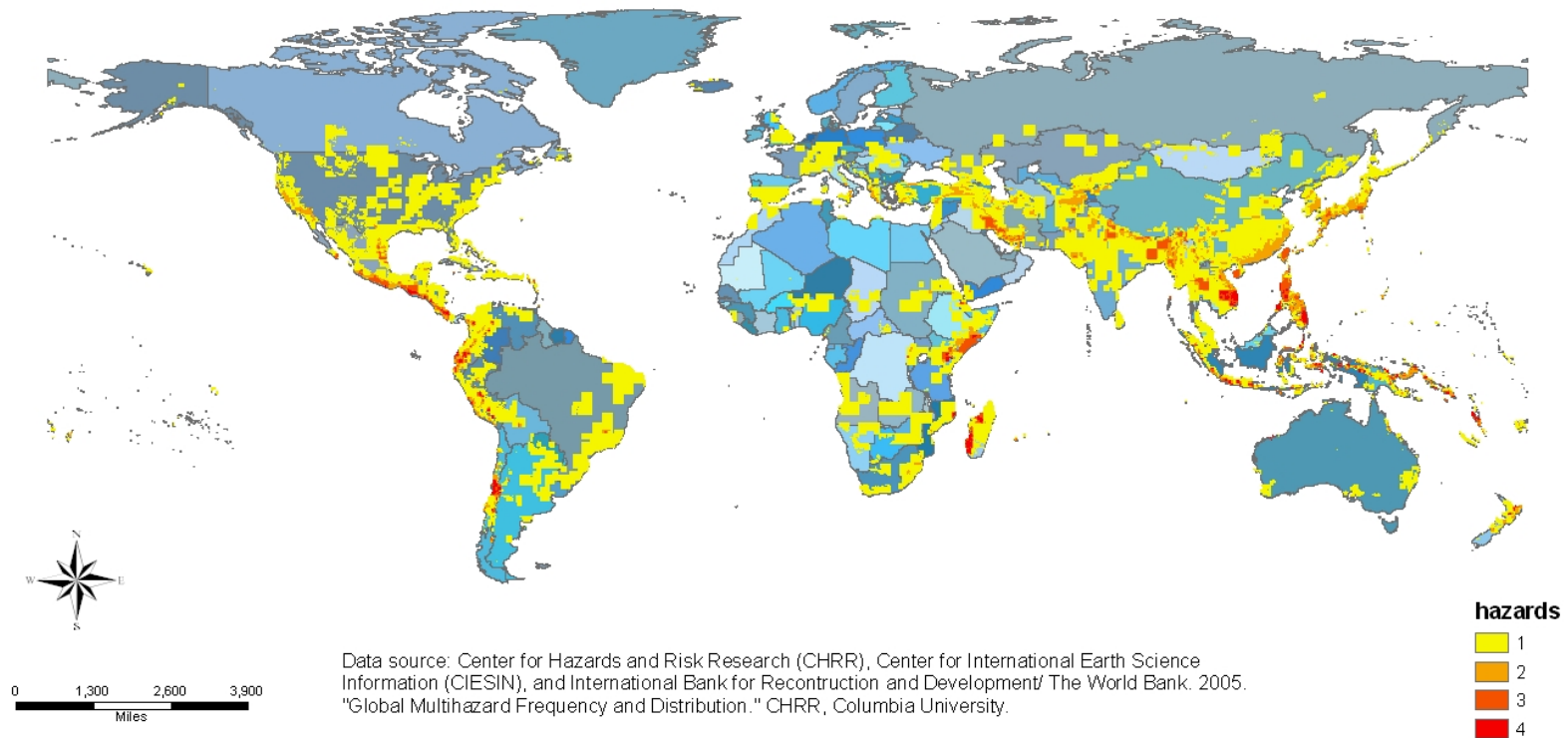
20% of the population of developing countries living in low elevations are exposed to sea level rise and storms

1-2 billion people will suffer water shortages by 2050

Diseases: 3% increase in diarrhea, 5% increase in malaria, 10% increase in malnutrition by 2030

Impacts distributed unevenly

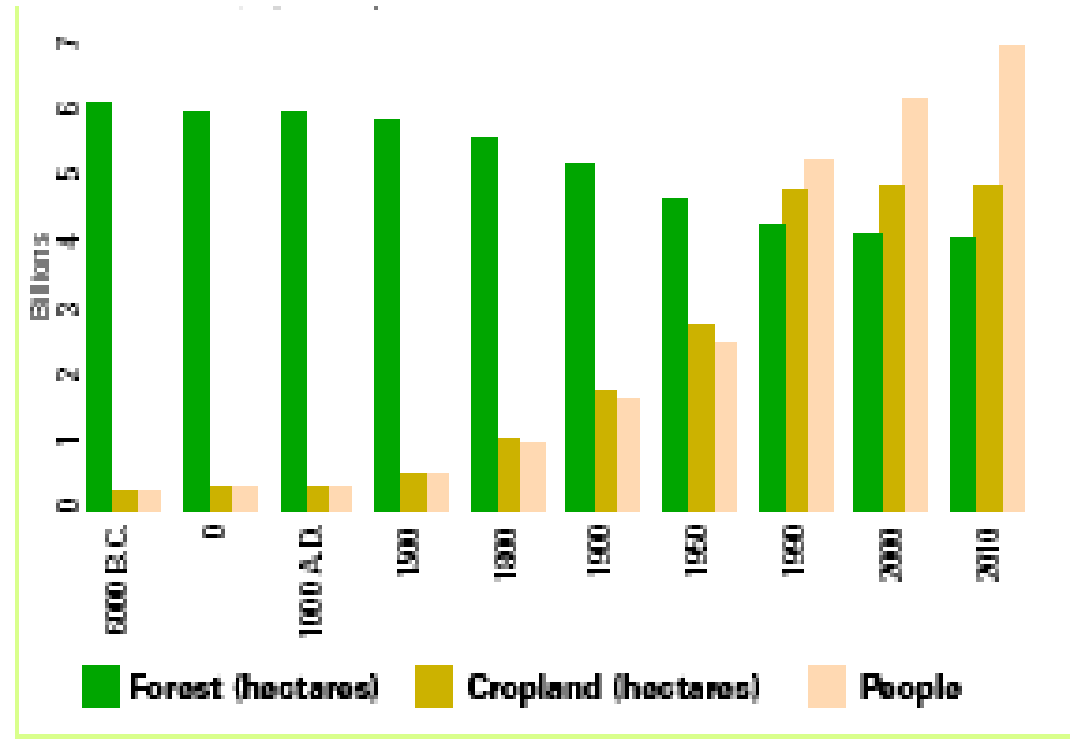
Figure 5 Global distribution of climate-related hazard hotspots



People and the Environment

Consequences of population growth and environmental decline

- Environmental change
- Consumption and overuse of scarce resources
- Pollution and environmental health



People can have severe and sometimes irreversible impact on their environment

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Fertility decline in Developed and Developing Regions

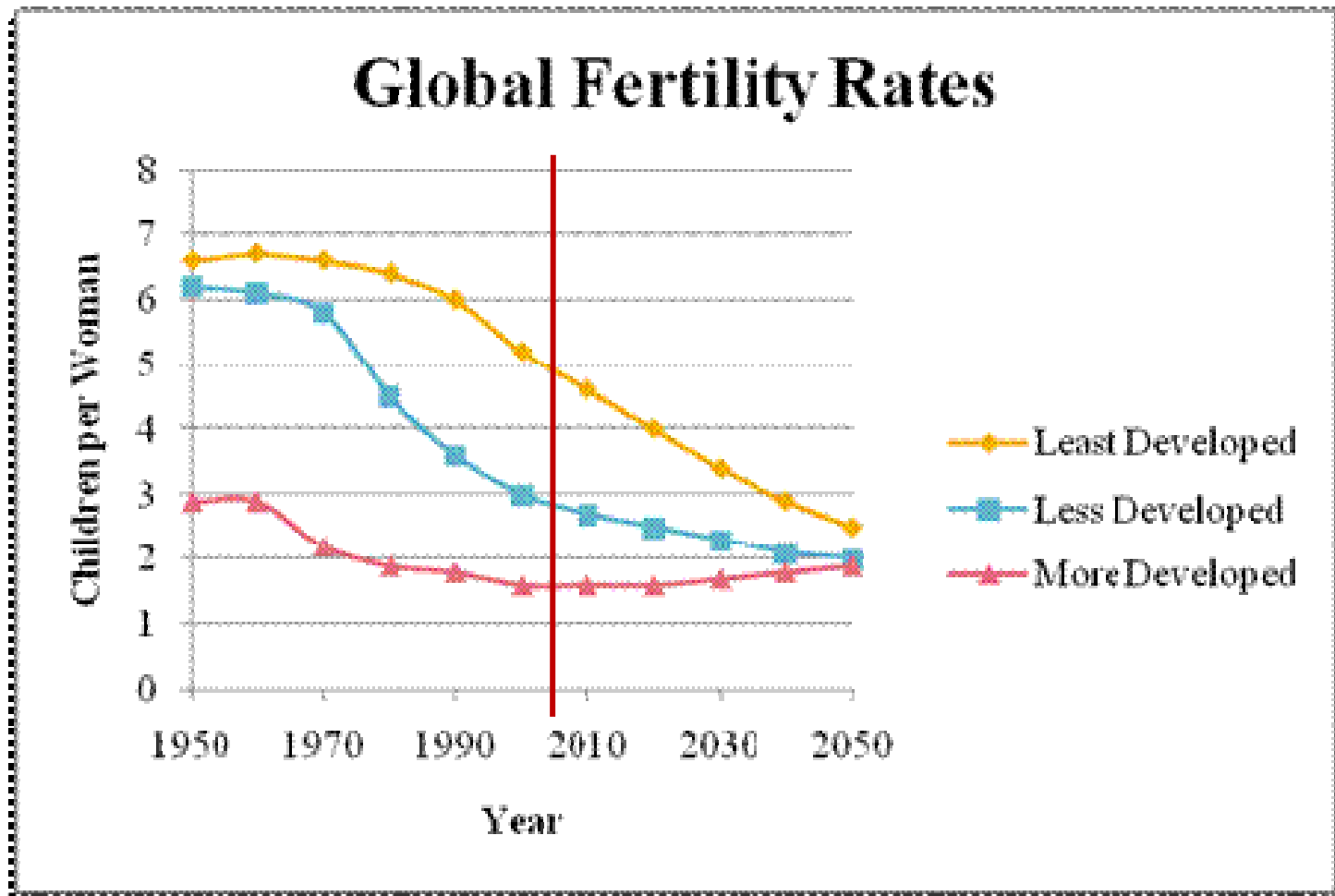
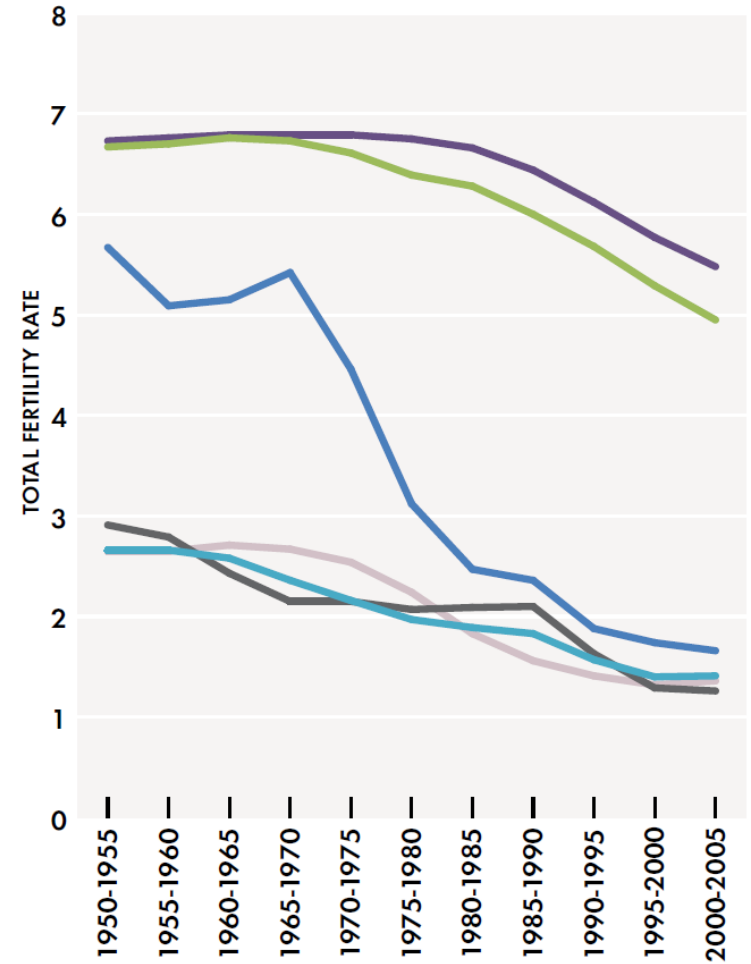
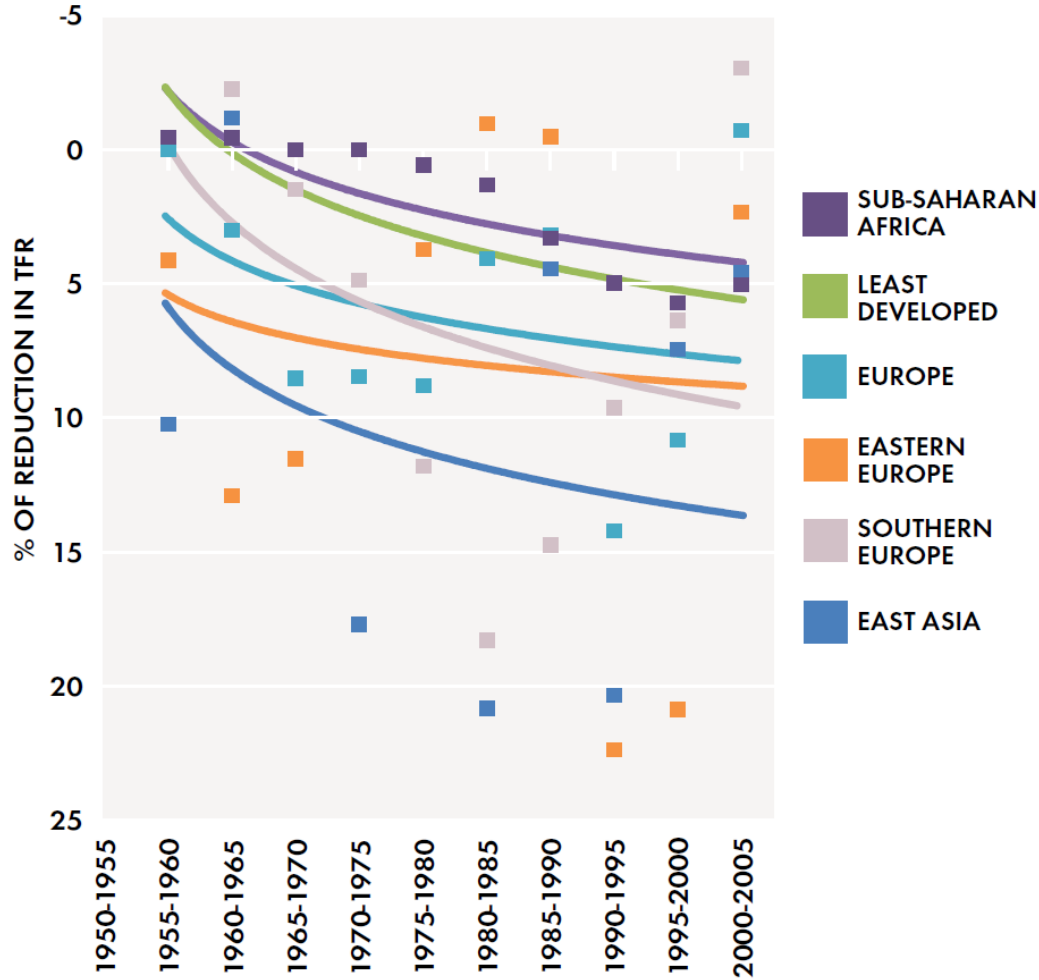
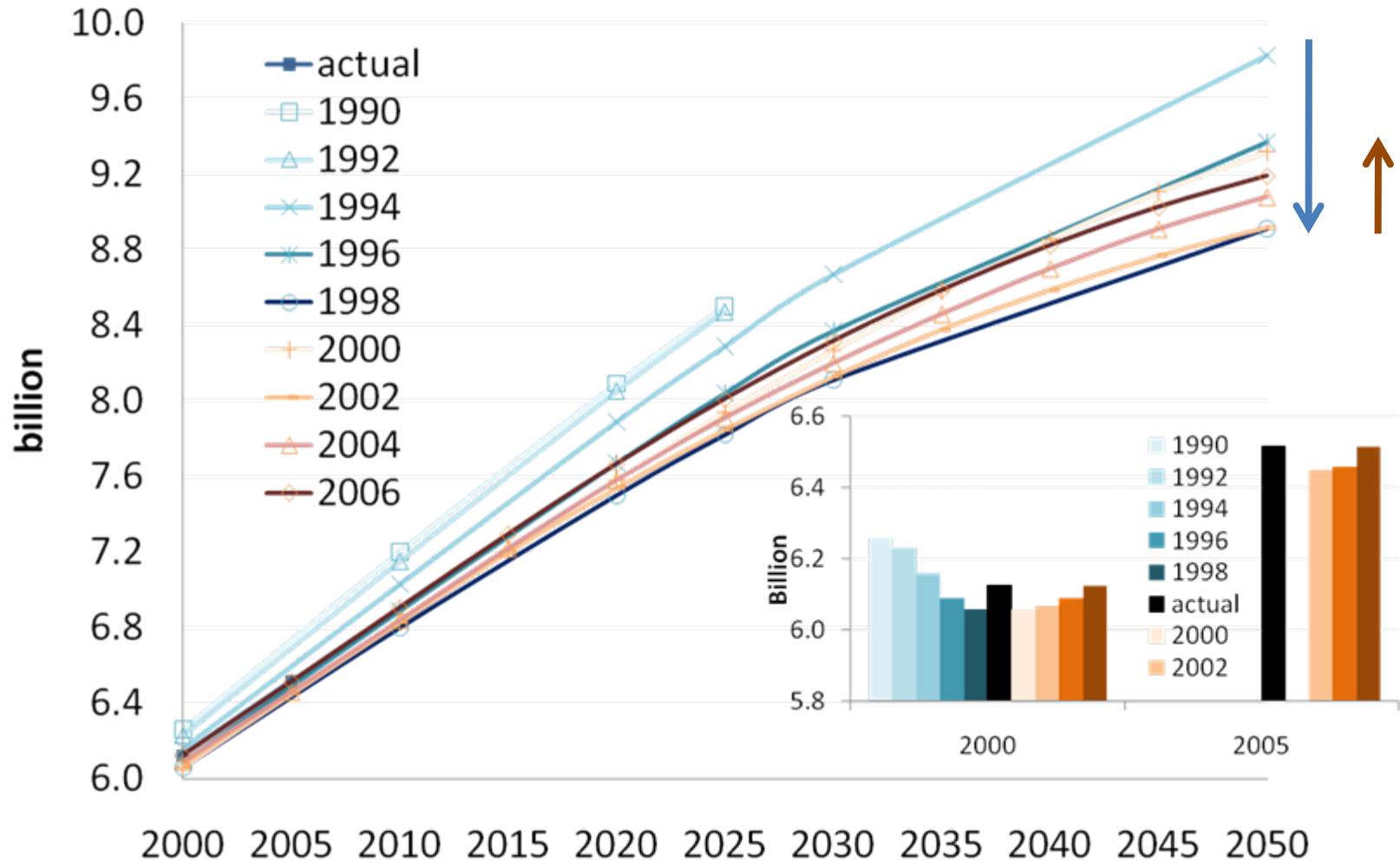


FIGURE 7. UNEVEN FERTILITY CHANGES ACROSS REGIONS



UN Medium Population Projections since 1990



Slower population growth: benefits



- Could slow the growth of greenhouse gas emissions
- Relieves pressure on natural resources that serve as carbon sinks
- Reduces scale of human vulnerability to impacts
- Buys time for economic development and spread of green technology

Ethiopia's National Adaptation Programme of Action (NAPA)

- Submitted to the UNFCCC by the Ministry of Water Resources and the National Meteorological Agency in 2007,
- Acknowledges that population pressure is one of the key causes of climate change vulnerability
- Does not include any projects that address the country's ability to accommodate rapid population growth.

What is Population-Health-Environment (PHE)?

Addresses **the impact of population dynamics on ecological systems.**

- Need to preserve the proper function of the environment for health, quality of life, economic security and development.
- Individuals cannot exercise adequate stewardship over natural resources unless their basic needs for health, nutrition and economic well-being are addressed.
- Integrating approaches build synergies that improve outcomes .

Example of PHE Project in Ethiopia

- **Wichi Integrated Wetland – Watershed Management Project** in South Western Ethiopia
 - Works at community level to protect the environment against climate change damages through improved resource management; also has a reproductive health and family planning component. P
 - Preliminary results suggest project is successful. Contraceptive use, initially very low, may now be used by over 30% of married couples.

Voluntary family planning programs: win-win opportunities for climate change

- Relatively easy to implement
- Already in demand among the world's women
- Relatively inexpensive
- Likely to strengthen family's resilience to climate change impacts





Thank You

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