

GLOBAL ISSUES

World Issues / Societal expectations



What do we mean by “Global Ethics ?”

- ⊕ **Micro-ethics:** Ethical and moral behavior of individuals; for professionals there is usually a code of professional conduct.
- ⊕ **Meso-ethics:** This usually refers to ethics at the group level, particularly governments and businesses.
- ⊕ **Macro-ethics:** This usually refers to the values we as a collective society hold, hence the term “Global Ethics.”

Micro-ethics

- ⊗ Ethical and moral behavior of individuals and may be:
 - ⊗ Rule or principle based.
 - ⊗ Contextual or situational.
 - ⊗ Family values.
 - ⊗ Religious, ethnic or community values.
 - ⊗ Dictated by professional rules of conduct.
 - ⊗ Dictated by law.

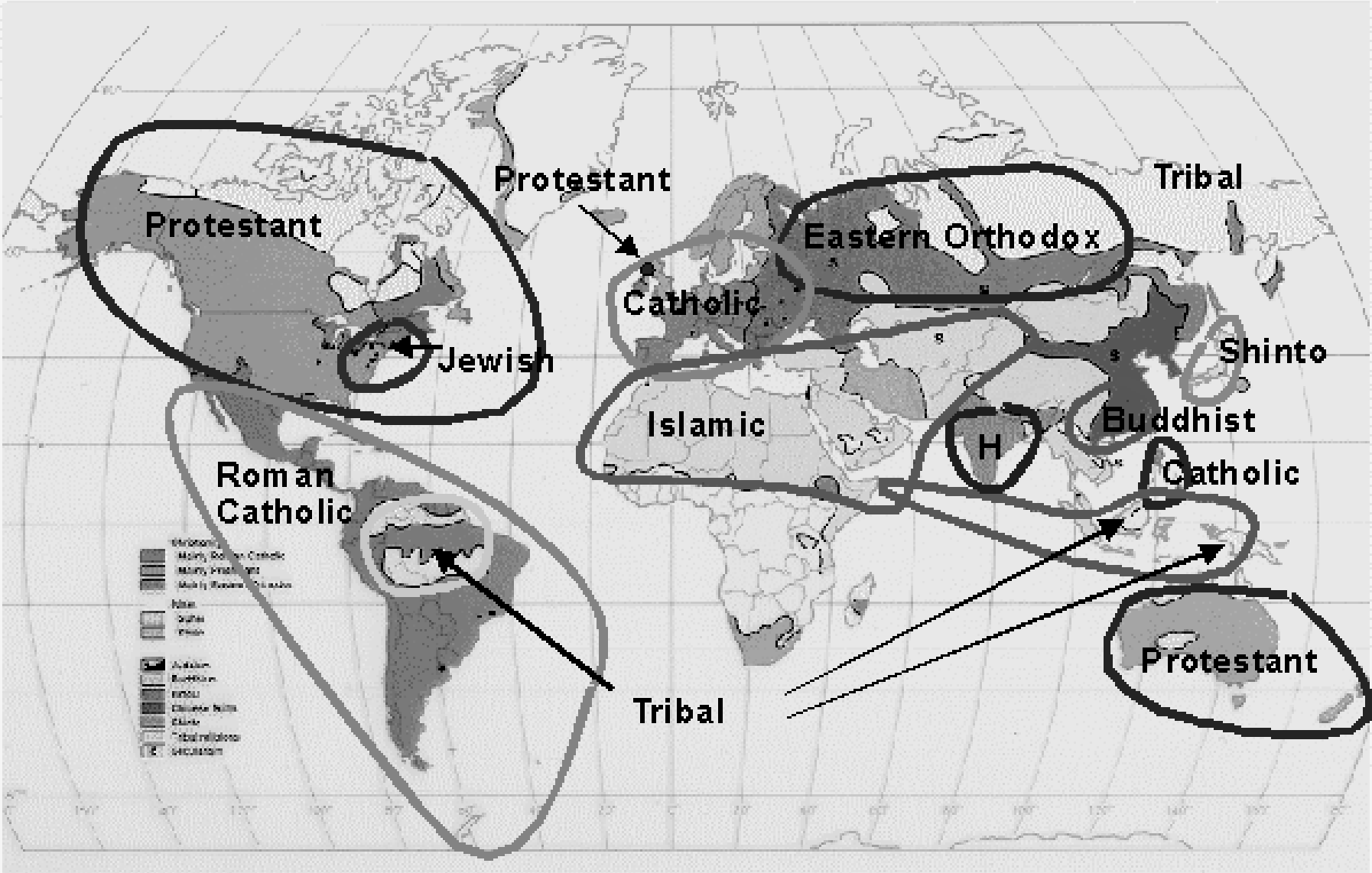
Meso-ethics

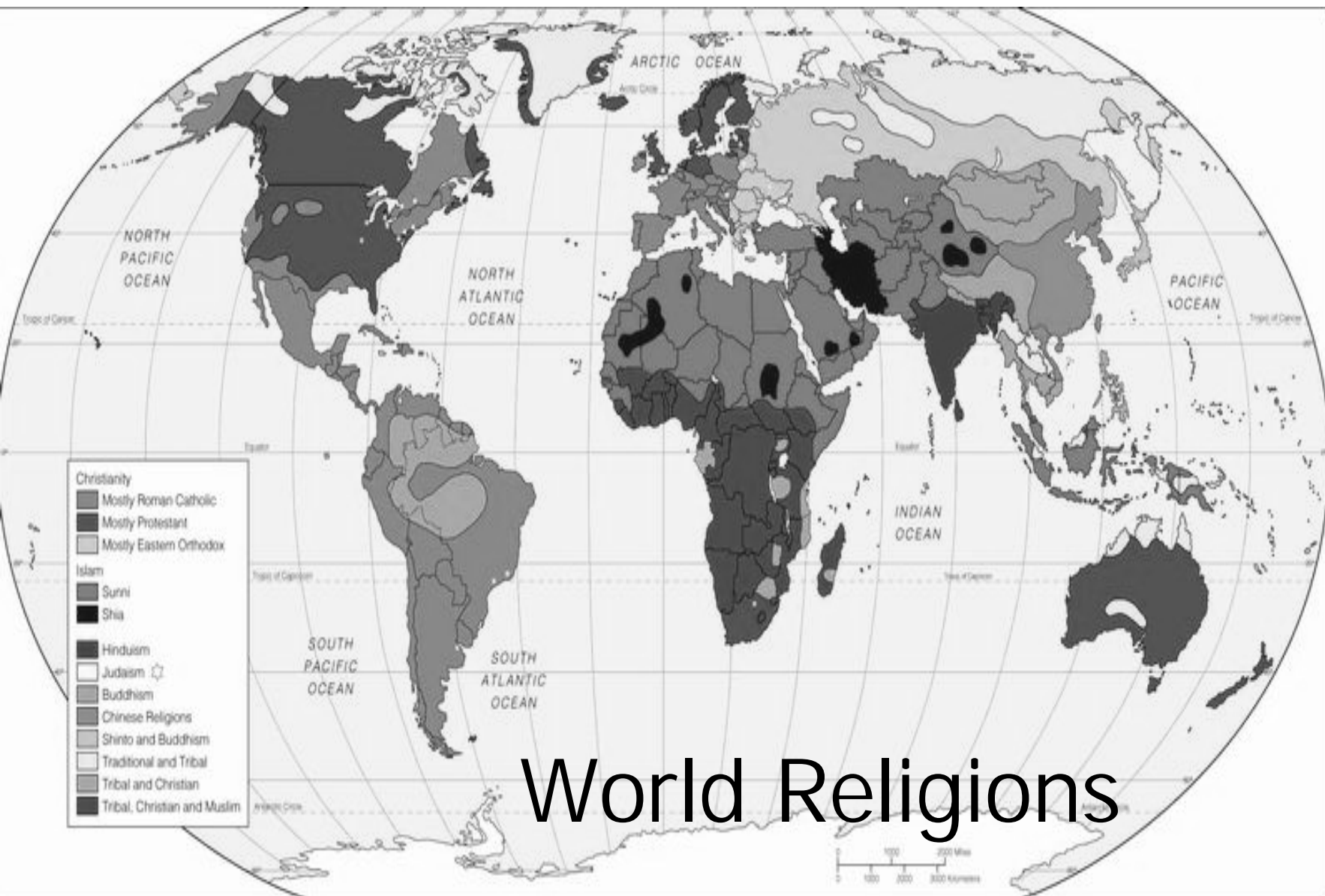
- ⊕ **Meso:** In the middle or intermediate with respect to position, time, size or degree.
- ⊕ **Governments:** National security; economic growth and economic competitiveness; assured food supply; justice and protection of citizens; etc.
- ⊕ **Businesses:** Obligations to shareholders (profit); obligations to workers (cash flow/payroll); protecting their social franchise; etc.

Macro-ethics: Global Ethics

- ⊕ **This has come to mean protection of our “commons.”** Current issues:
 - ❖ Social capital (population growth).
 - ❖ Biodiversity (extinction of species).
 - ❖ Soil and food security (hunger/malnutrition).
 - ❖ Ocean fisheries.
 - ❖ Global air quality and pollution.
 - ❖ Global climate change.
 - ❖ Global freshwater resources.
 - ❖ Energy resources and global development.

Generalized map of world religions

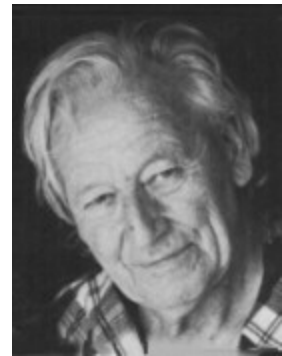




World Religions

Ecological and Societal Impact (After Bateson-1970)

- ⊕ World population growth
- ⊕ Acceleration of technological progress.
- ⊕ Certain “errors” in the thinking and attitudes of western culture, emanating from the industrial revolution.



“Errors” in Western Thinking

- ⊕ It's us *against* the environment.
- ⊕ It's us against other men.
- ⊕ It's the individual (or the individual company, or the individual nation) that matters.
- ⊕ We *can* have unilateral control over the environment and must strive for that control.

“Errors” in Western Thinking

(Continued)

- ⊕ We live within an infinitely expanding “frontier.”
- ⊕ Economic determinism is common sense.
- ⊕ Technology will do it for us.

Bateson (Continued)

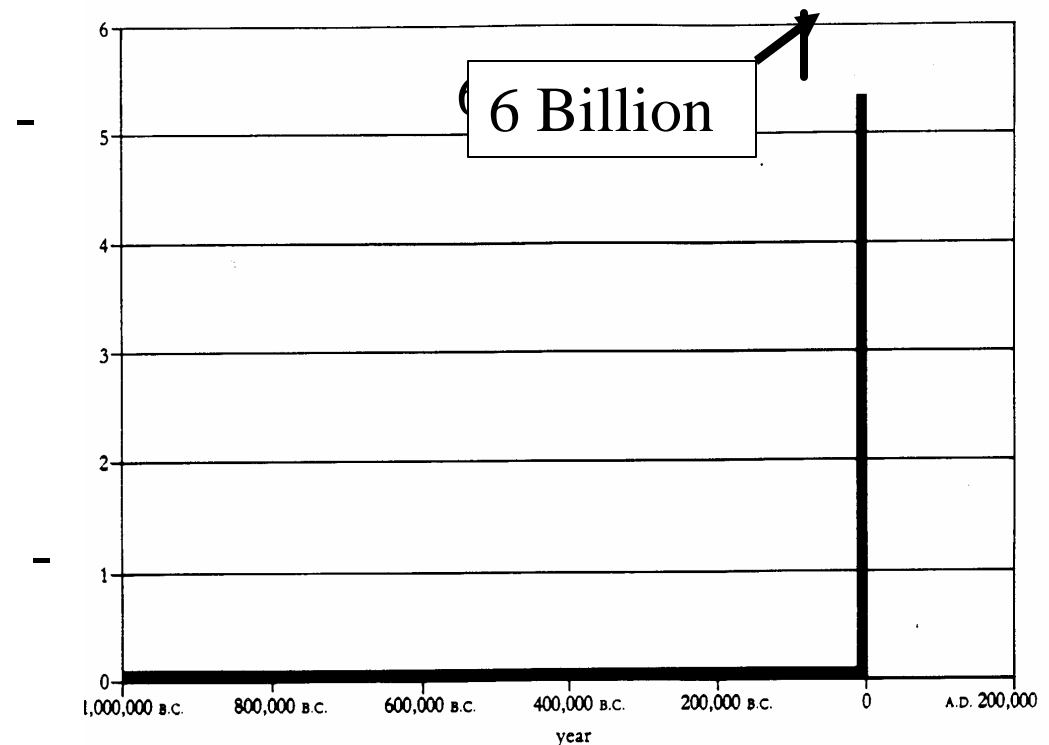
“...if we continue to operate in a Cartesian dualism of mind versus matter, we shall probably also continue to see the world as God versus man, elite versus people, ...and man versus environment. It is doubtful whether a species having *both* an advanced technology *and* this strange way of looking at its world can endure.”

Human Population Growth and the Environment

- Human Population - An Explosive Growth
- Human Needs - Limited Resources
- Our Natural Environment Under Attack
- Roles of Technology and Engineering
- An Uncertain Future

Humans are Recent Arrivals

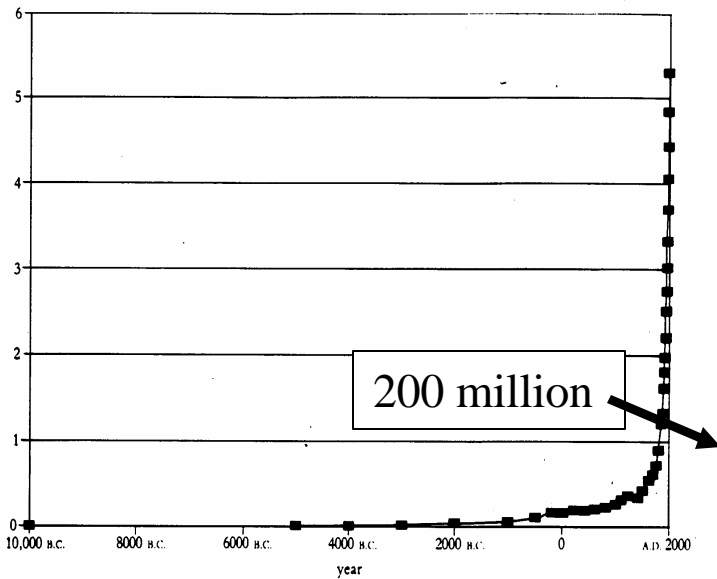
- Earth - 5 Billion Years
- Multi-cell Biota
600 Million Years
- Human Beings
~ 2 Million Years
- Human Population
Growth into Billions
Last 200 years



A Million Years Of Human Growth (1)

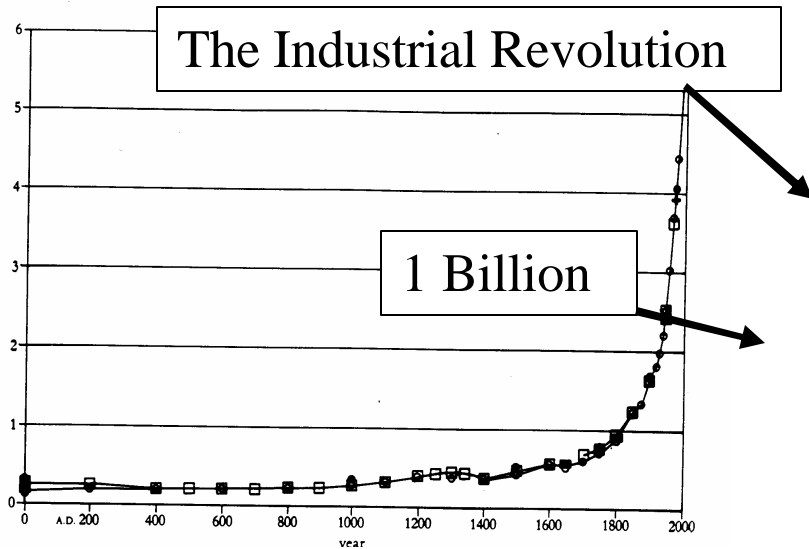
A Closer Look (1)

12,000 years



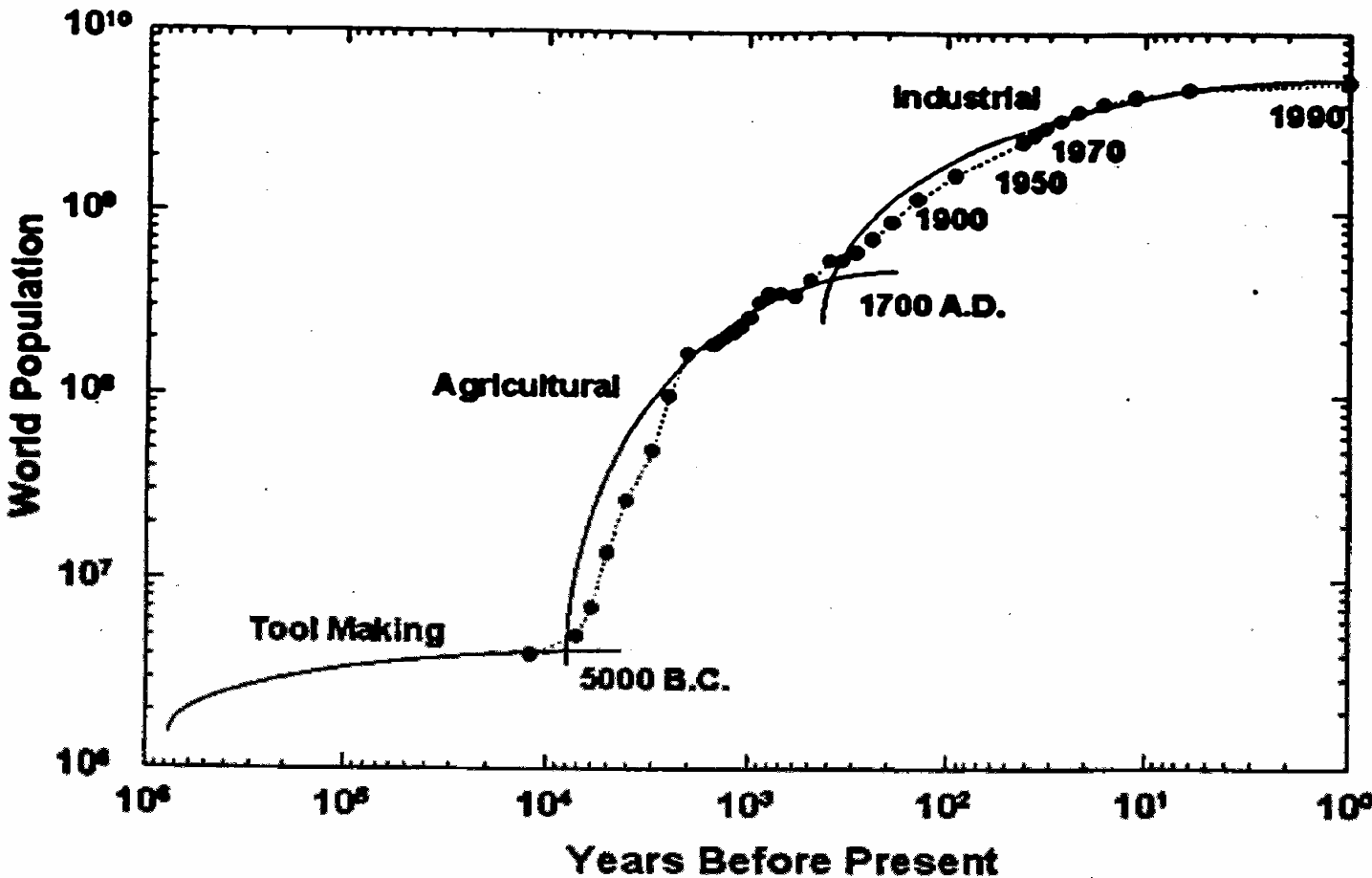
200 Million by 1 A.D.

2,000 Years



1 Billion in 1800 A.D.

Three Technological Eras (2)

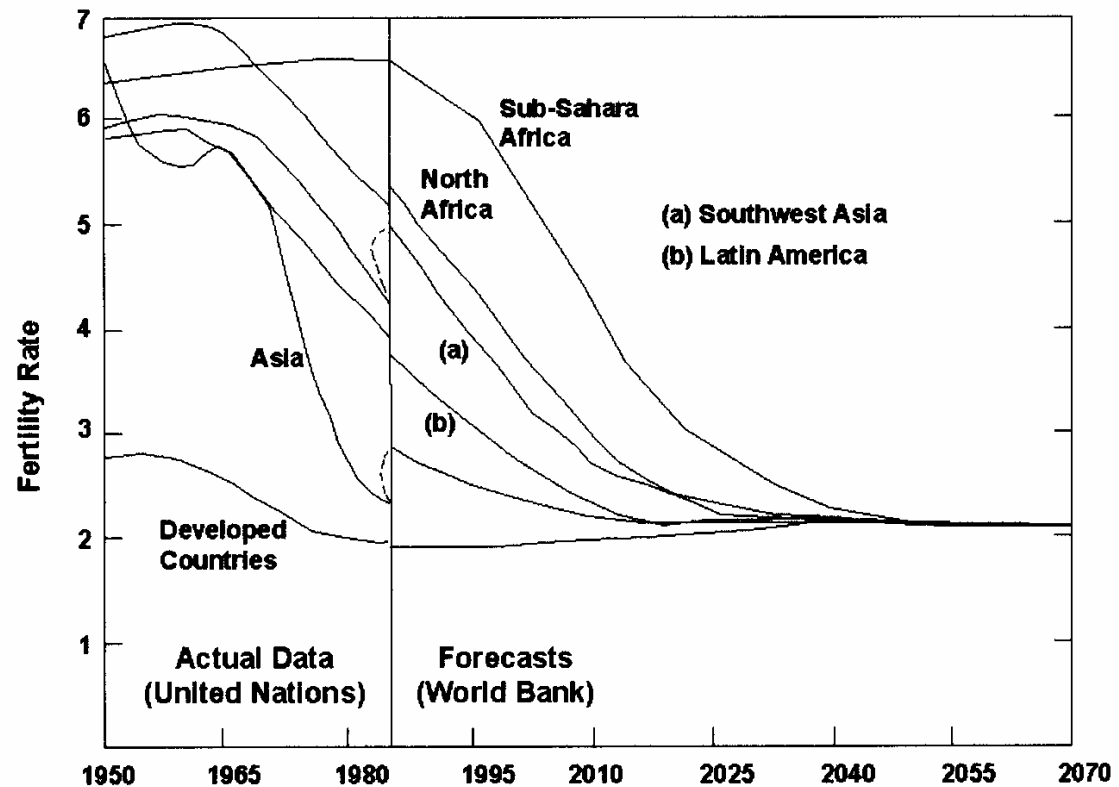


What's Behind Population Growth

- Three Factors
 - Fertility
 - Infant Mortality
 - Longevity
- Animal Domestication and Agriculture
 - Provided for a few to feed many
- Industrial Revolution
 - Growth of Cities and Infrastructure
 - Water
 - Energy
 - Transportation
 - Increased Productivity
 - Nutrition
 - Sanitation
 - Medicine

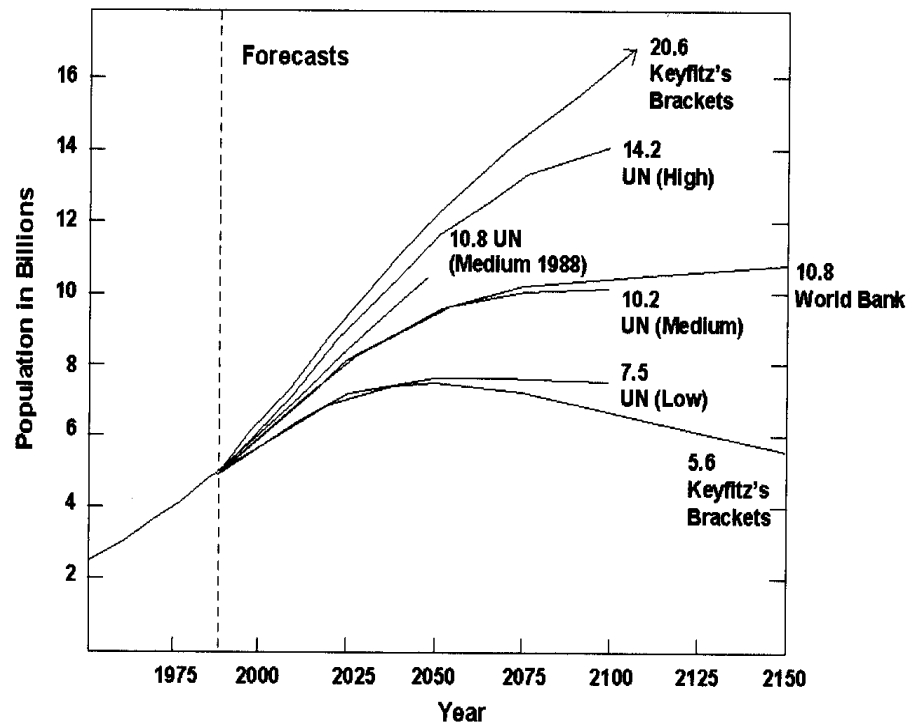
Fertility Trends

- Population predictions are very sensitive to future fertility assumptions
- At 1990 fertility rates (constant by region) population would grow to 110 billion in 2100, over 700 billion in 2150 (3)
- Has been dropping since 1800 in developed nations - now at Zero Growth (4)
- Is on its way down in much of the developing world (4)



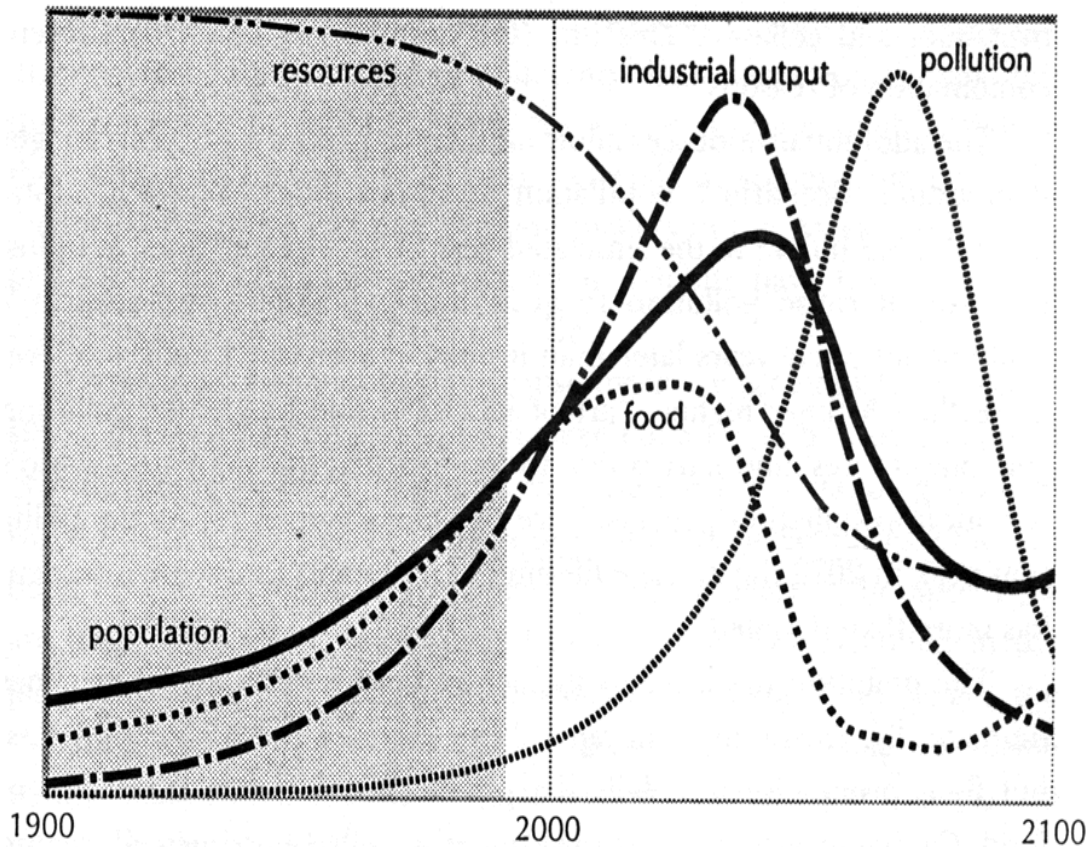
Population Predictions (4)

- Most predictions:
9-12B by 2050
10-15B by 2100
- UN (Low) requires
global fertility at
less than zero
growth in 15 years
- Large uncertainties

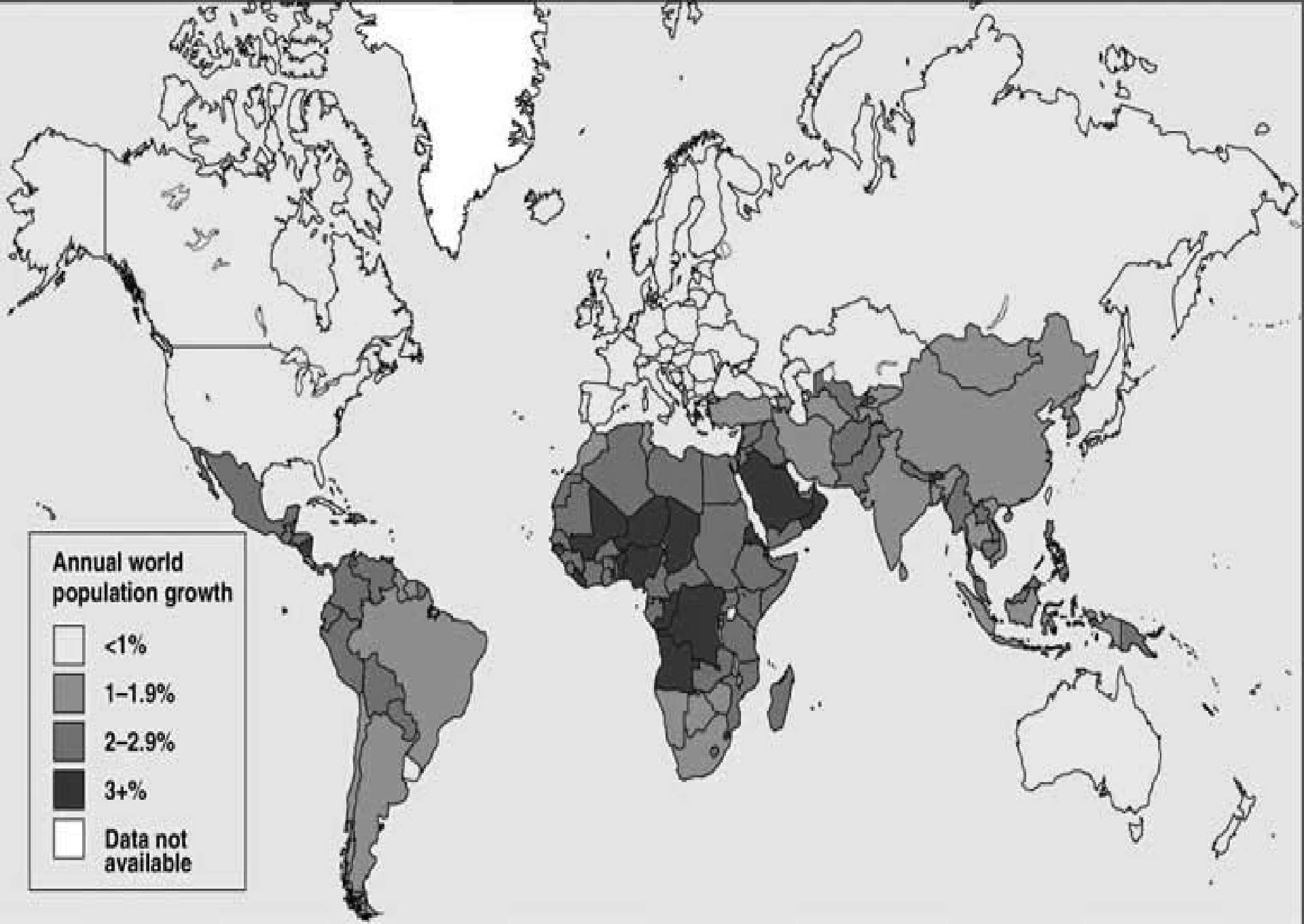


Population May Overshoot

When Population Outpaces Resources



Scenario - current population trend, doubled resources (5)



Resource Consumption (6)

- High consumption
- Getting worse
- Rate increase faster than population growth

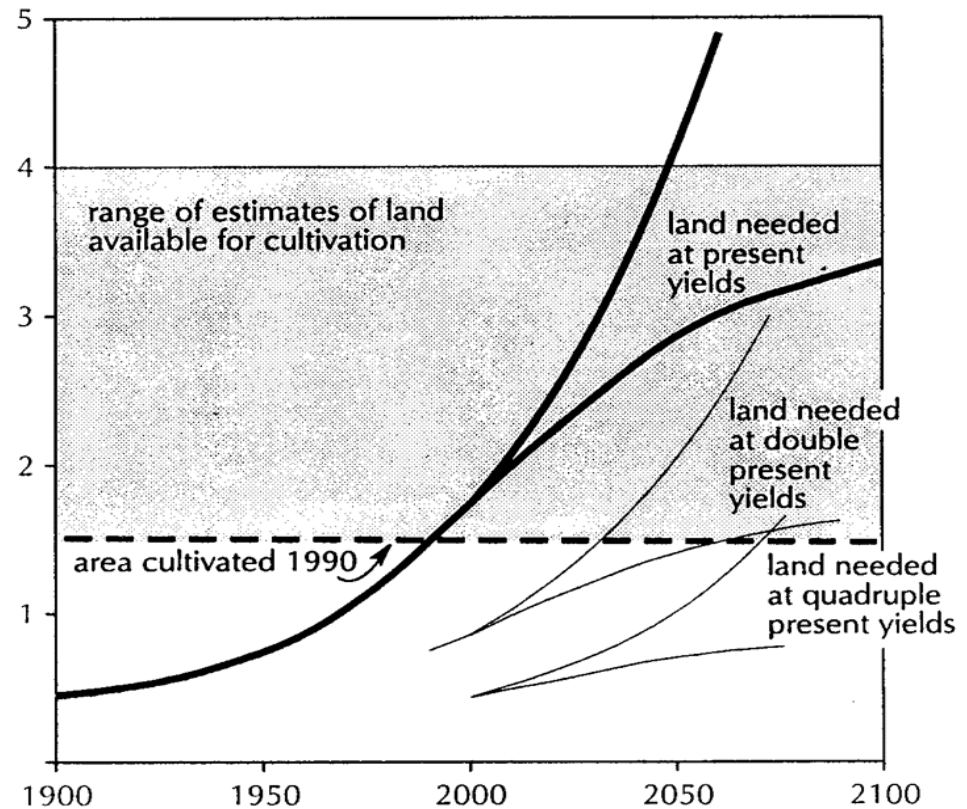
	1970	1990
Human population	3.6 billion	5.3 billion
Registered automobiles	250 million	560 million
Kilometers driven/year (OECD countries only)		
by passenger cars	2584 billion	4489 billion
by trucks	666 billion	1536 billion
Oil consumption/year	17 billion barrels	24 billion barrels
Natural gas consumption/year	31 trillion cubic feet	70 trillion cubic feet
Coal consumption/year	2.3 billion tons	5.2 billion tons
Electric generating capacity	1.1 billion kilowatts	2.6 billion kilowatts
Electricity generation/year		
by nuclear power plants	79 terawatt-hours	1884 terawatt-hours
Soft drink consumption/year (U.S. only)	150 million barrels	364 million barrels
Beer consumption/year (U.S. only)	125 million barrels	187 million barrels
Aluminum used/year for beer and soft drink containers (U.S. only)	72,700 tonnes	1,251,900 tonnes
Municipal waste generated/year (OECD countries only)	302 million tonnes	420 million tonnes

Resource Limits - Land (7)

- Deforesting to acquire more arable land
- Would run out in next century at current yields
- Probably need to double yields

Figure 3-4 POSSIBLE LAND FUTURES

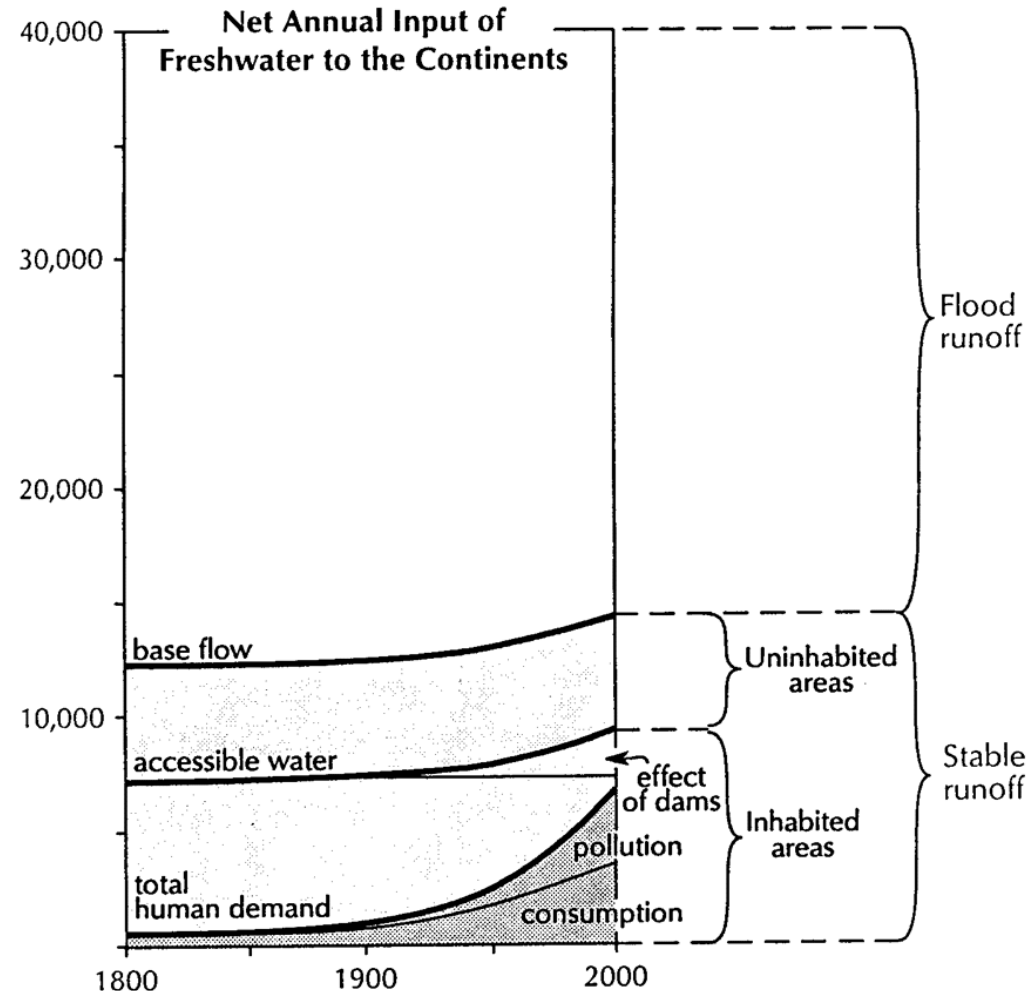
Billion hectares



Resource Limits

- In 1950 people used half of accessible water
- Are now dependent on dams
- Pollution loses 33% of potential water
- Getting close to limits

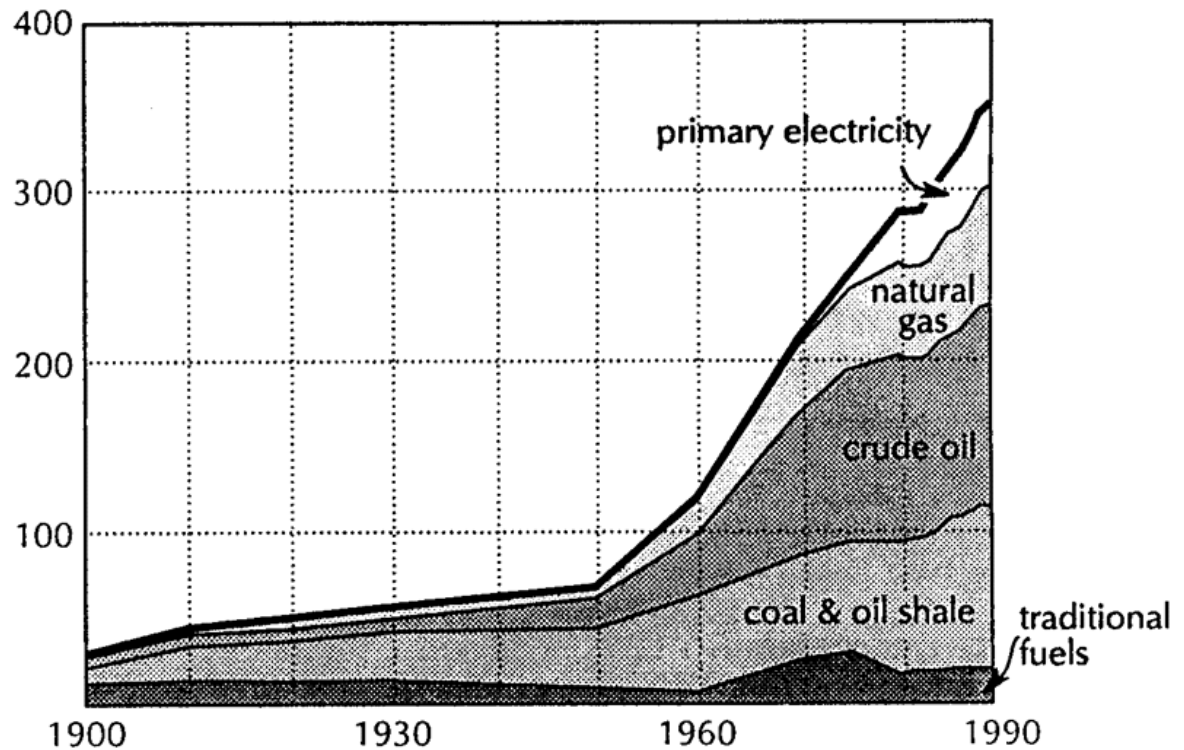
Figure 3-5 FRESH WATER RESOURCES
Cubic kilometers per year



Energy Consumption (9)

- Energy growth very high last fifty years
- Mostly hydrocarbon fuels
- Nonrenewable resource consumption and climate change issues

Figure 3-9 WORLD ENERGY USE
Millions of terajoules per year



Fossil Fuel Reserves (9)

Table 3-1 ANNUAL PRODUCTION AND RESERVE/PRODUCTION RATIOS FOR OIL, COAL, AND GAS, 1970 AND 1989

<i>Fuel</i>	<i>1970 production (per year)</i>	<i>1970 R/P (years)</i>	<i>1989 production (per year)</i>	<i>1989 R/P (years)</i>
Oil	16.7 billion barrels	31	21.4 billion barrels	41
Coal	2.2 billion tons	2300	5.2 billion tons	326 (hard coal) 434 (soft coal)
Gas	30 trillion cu. ft.	38	68 trillion cu. ft.	60

- Lots of coal - but heavy CO₂ contributor
- Look for alternative forms of energy to emerge

Planet Earth is Impacted (12)

- Ecological Footprints
 - United States - 5 hectares/person
 - Developing nations - 0.5 hectare/person
- For everyone to live at today's US footprint would require 3 planet Earths
- Increasing affluence and population is damaging Earth's essential ecology

Our 'Commons' are in Danger

- Atmospheric pollution and climate change
- Water pollution, including ground aquifers
- Deforestation and loss of oxygenation
- The oceans, coral reefs and their bounty
- National parks, wildernesses and wetlands
- Nonrenewable natural resource depletion
 - Fossil fuels, mineral ores, topsoil.....

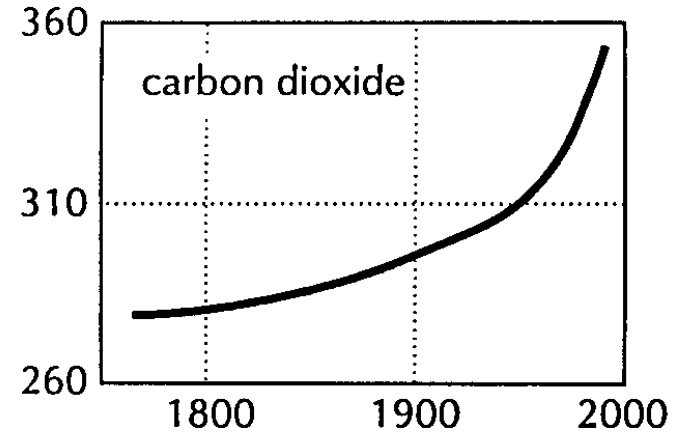
Biodiversity is in Danger (13)

- Humanity has spawned a species extinction to rival the 5 great extinctions of 65 - 440 million years ago
- Recovery times from the great extinctions took 10's of millions of years
- Biodiversity is essential to life on Earth and holds untold treasures for the future
- An ecological ethic is emerging

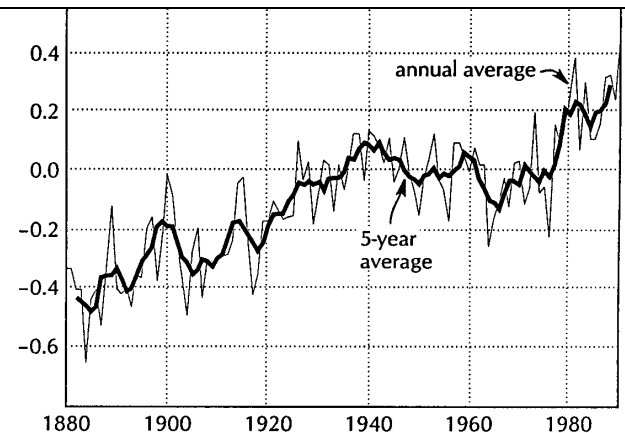
Global Warming - A Good Example

- Atmospheric CO₂ is increasing, and creates greenhouse effect. (14)
- 3-5°C rise predicted by computer models for this century would have major environmental impact. (15)
- Observed change of 0.25-0.4°C surface and 0.0-0.2°C troposphere rise in last 20 years doesn't agree with models and may or may not be due to CO₂. (16)

Parts per million



0.6°C rise in last 100 years



Global Warming

- Humans - 6 billion tons/year of CO₂ (up 500% from 1950, and increasing) (17)
 - Other sources 200B tons/year
 - Total atmosphere load - 775B tons
 - Total earth load with oceans - 42,000B tons

Sources of Carbon Dioxide

- ⊕ Transportation
- ⊕ Space and water heating
- ⊕ Electric generation and other industrial/manufacturing processes



Associated Climate Changes

- ⊕ Global sea-level has increased 1-2 mm/yr
- ⊕ Duration of ice cover of rivers and lakes decreased by 2 weeks in N. Hemisphere
- ⊕ Arctic ice has thinned substantially, decreased in extent by 10-15%
- ⊕ Reduced permafrost in polar, sub-polar, mountainous regions
- ⊕ Growing season lengthened by 1-4 days in N. Hemisphere
- ⊕ Retreat of continental glaciers on all continents
- ⊕ Poleward shift of animal and plant ranges
- ⊕ Snow cover decreased by 10%
- ⊕ Earlier flowering dates
- ⊕ Coral reef bleaching

Source: Intergovernmental Panel on Climate Change, 2001 Report

Some Expected Impacts of Climate Change

- ⇒ **Warming:** Heat waves and periods of unusually warm weather
- ⇒ **Sea level rise:** In Recife, Brazil, shoreline has receded by more than 2.4m/yr since 1985, due to sea level rise and loss of sediment supply)
- ⇒ **Glaciers melting:** Europe's Alpine glaciers have lost half their volume since 1850. US Government predicts no glaciers left in Montana's Glacier National Park by 2030
- ⇒ **Human Health:** Weather related mortality, infectious disease, decreasing air quality - respiratory illnesses

Global Mean Reference Height Temperature (K)

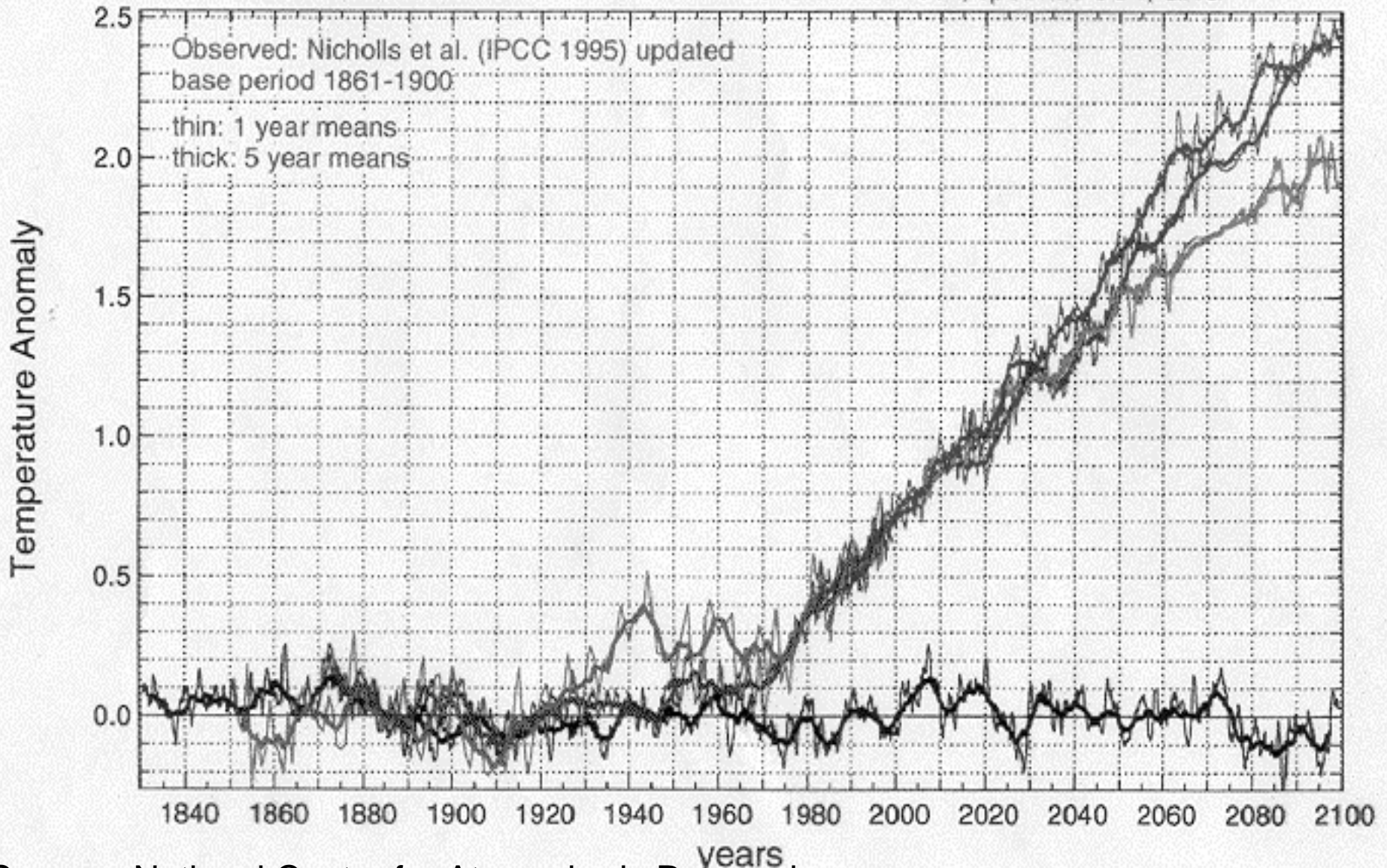
b030.04: IPCC SRES scenario A1

s020.02: BAU scenario, interactive SO4

b018.16l: Control: constant 1870

s020.04: 550 ppmv scenario, interactive SO4

b018.15: 20th cen, specified SO4, GHG



Source: National Center for Atmospheric Research

Intergovernmental Panel on Climate Change (*IPCC*) *Summary for policy Makers*

- An increasing body of observations gives a collective picture of a warming world and other changes in the climate system
- Emissions of greenhouse gases and aerosols due to human activities continue to alter the atmosphere in ways that are expected to affect the climate

*Intergovernmental Panel on Climate Change IPCC
Summary for Policy Makers,*

- ⊕ Confidence in the ability of models to project future climate has increased
- ⊕ There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities

*Intergovernmental Panel on Climate Change IPCC
Summary for Policy Makers, cont'd*

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Summary for Policy Makers, cont'd*

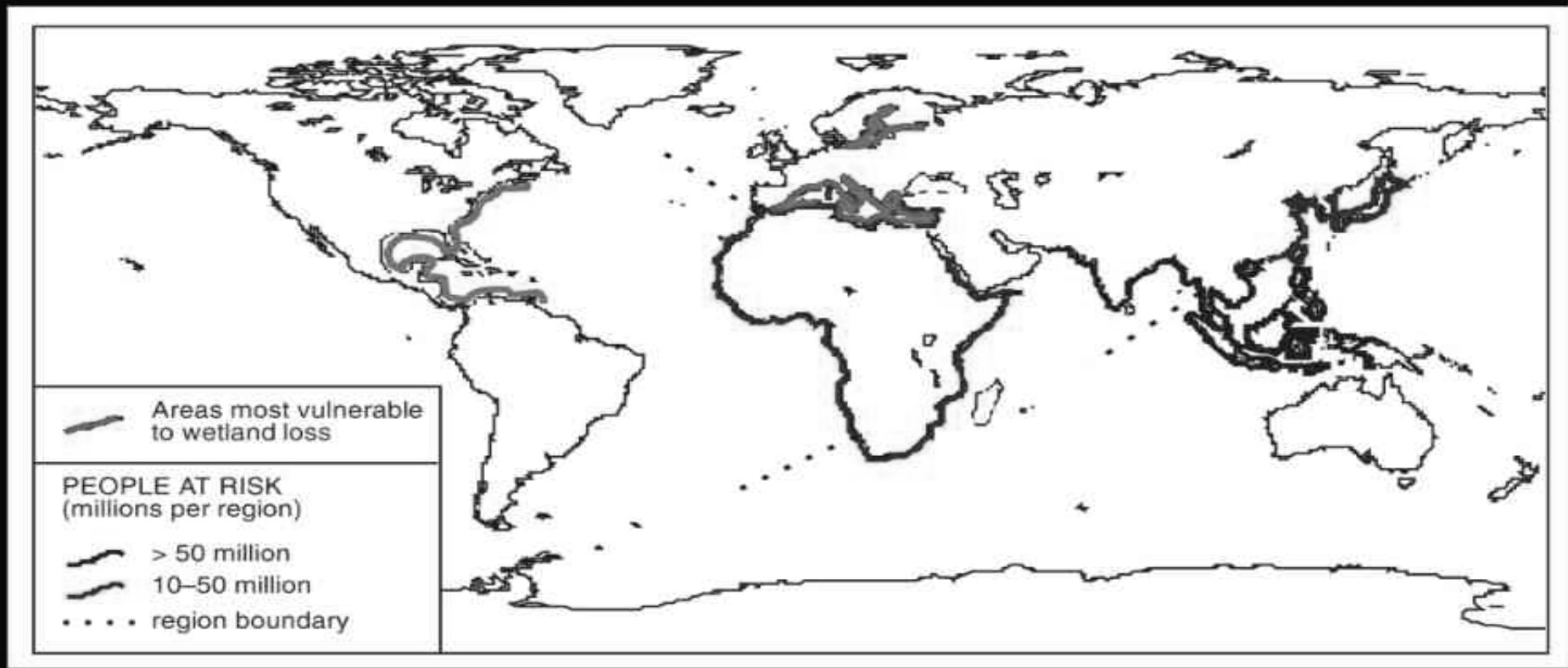
- ⊕ Anthropogenic climate change will persist for many centuries
- ⊕ Further action is required to address remaining gaps in information and understanding

For the North America

- ❖ Warming will be greater for winter than summer
- ❖ Warming will be greater at night than during the day
- ❖ A 3°F rise in summer daytime temperature triples the probability of a heat wave
- ❖ Growing season will be longer (8-9 days longer now than in 1950)
- ❖ More precipitation
- ❖ Likely more soil moisture in summer
- ❖ More rain will come in intense rainfall events
- ❖ Higher stream flow, more flooding

People at Risk from a 44 cm sea-level rise by the 2080s

Assuming 1990s Level of Flood Protection



Source: R. Nicholls, Middlesex University in the U.K. Meteorological Office, 1997. *Climate Change and Its Impacts: A Global Perspective*.

The Bruntland Report (1987)

The Commission called for ;

“A form of sustainable development which meets the needs of the present without compromising the ability of future generations to meet their own needs”

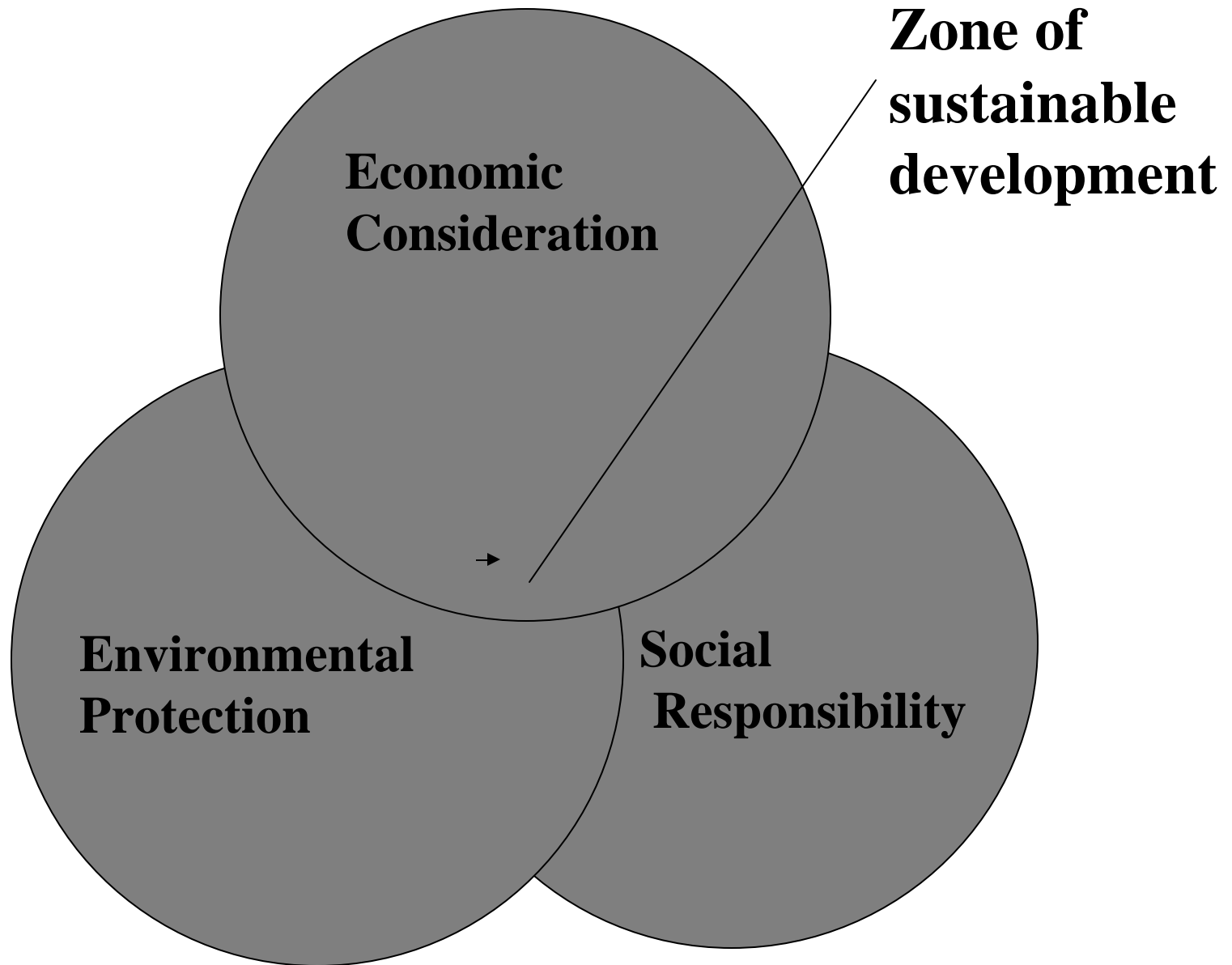
Two key issues :

Development is not just about bigger profits and higher standards of living for a minority

It should be about

- ⊕ **Making life better for everyone and**
- ⊕ **This should not involve destroying or recklessly using up our natural resources, nor should it involve polluting the environment.**

The interactive model of sustainability



current Issues

⊕ Jobs

⊕ Economy

⊕ National security, terrorism

⊕ War

⊕ Environment

- **⊕ The average North American changes jobs about every ? 7 years?**
- **⊕ Tenured position at a university ~ 35 years**
- **⊕ Outsourcing work to overseas countries**
- **⊕ Exploitation of foreign workers**
- **⊕ New slavery !!!!!**

Time scale of jobs 7-35 years

Economy

- ⊕ Economic cycles last about 5 years
 - ⊕ Home mortgage lasts about 20 years
 - ⊕ Factory is productive ~50 years
- > Time scale of economic decisions: 5-50 years**

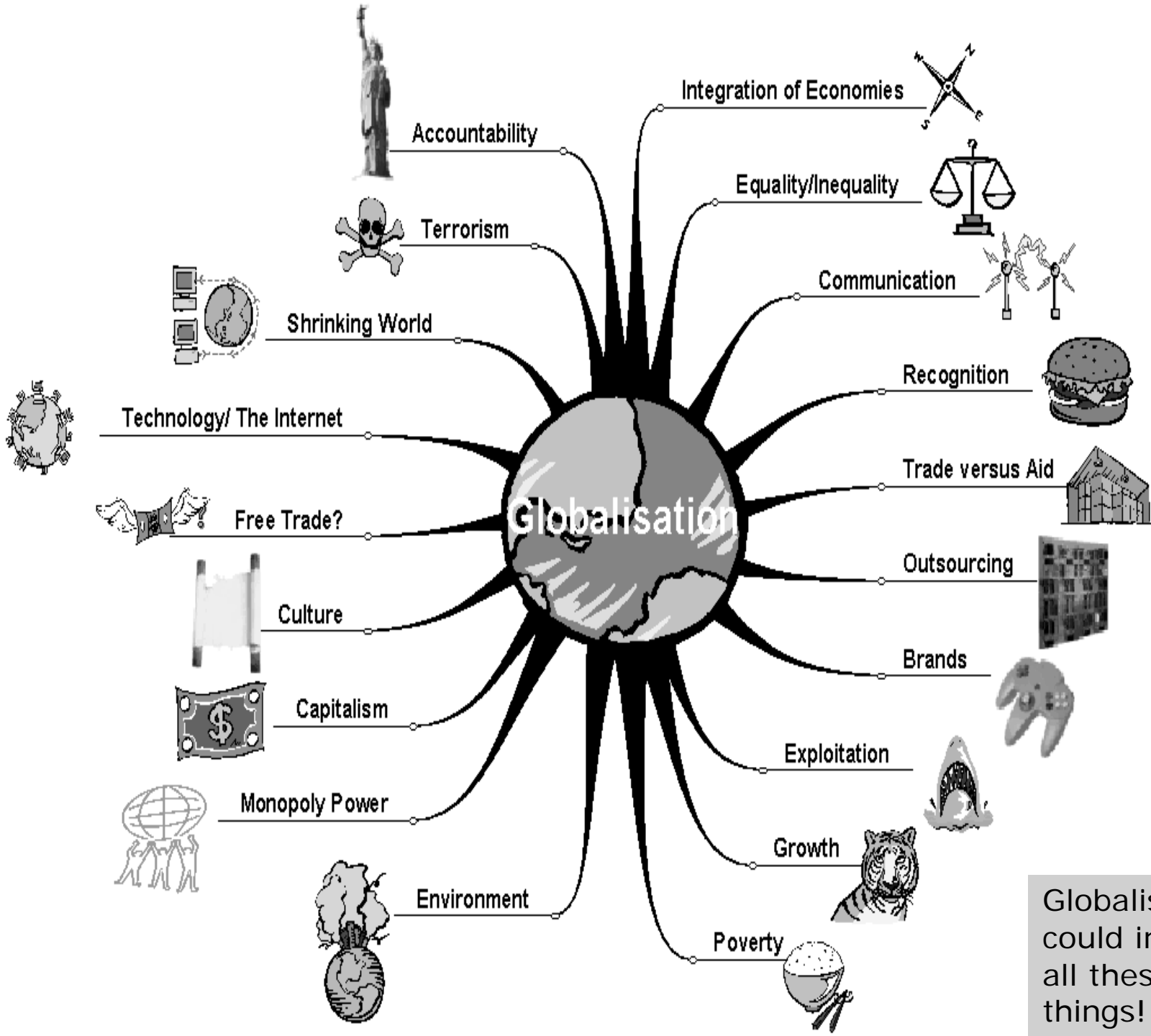
Globalisation

Globalisation

⊕ **Definition:**

- ❏ An economic phenomenon?
- ❏ A social phenomenon?
- ❏ A cultural phenomenon?

- ⊕ The movement towards the expansion of economic and social ties between countries through the spread of corporate institutions and the capitalist philosophy that leads to the shrinking of the world in economic terms.



Globalisation could involve all these things!