



# **Global Change and Health Security**

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8. Top-down and bottom-up strategies to health security

# What is security?

- Arnold Wolfers (1962), realist pointed to two sides of security concept: “Security, in an **objective sense**, measures the absence of **threats** to acquired values, in a **subjective sense**, the absence of **fear** that such values will be attacked”.
- Absence of “threats”: interest of policy-makers
- Absence of “fears”: interest of social scientists, especially of constructivists: “Reality is socially constructed” and is **intersubjective**.

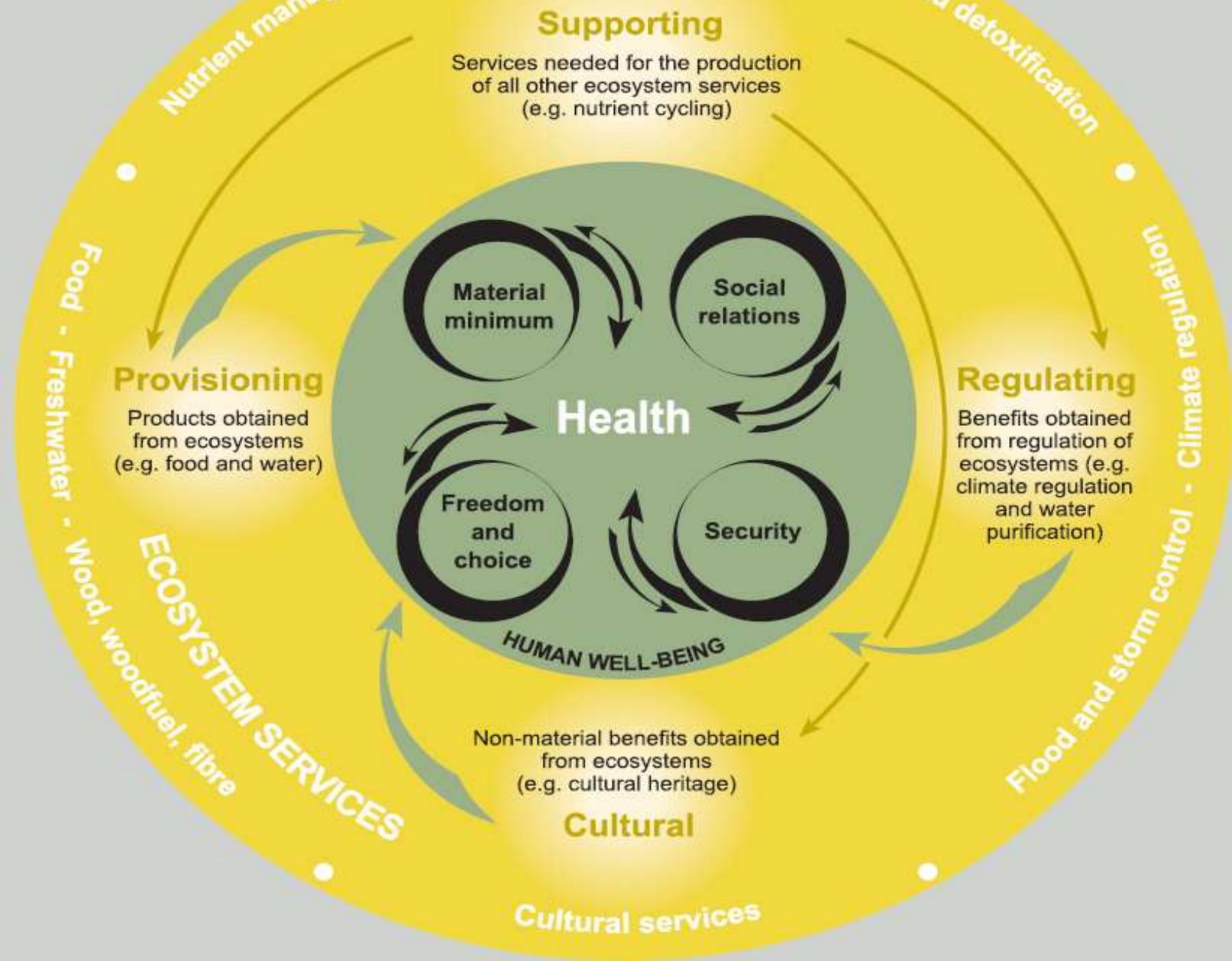
# Definitions of Health Security

- Governments prepared to cooperate to prevent the emergence and spread of infectious disease and provide public health security, **defined as the provision and maintenance of measures aimed at preserving and protecting the health of the population (WHO, 2007).**
- Public health security is also defined as the policy areas in which **national security and public health concerns overlap (USA: bioterrorism).**
- Broader dimensions of cross-border health risks: **transmission of anti-microbial resistant organisms**, as well as health risks associated with **non-communicable diseases, environmental degradation and conflict.**
- **UNDP: inadequate health care and diseases**
- **Ogata/Sen: spread of HIV/AIDS**
- **Wikipedia:** Health Security aims to guarantee a minimum protection from diseases and unhealthy **lifestyles**. In developing countries, the major causes of death are **infectious and parasitic diseases**, which kill 17 million people annually. In industrialized countries, the major killers are diseases of the **circulatory system**, killing 5.5 million every year.
- In developing and industrial countries, threats to health security are usually greater for **poor people in rural areas**, particularly **children**, due to **malnutrition**, lack of medicine, clean water and healthcare.

# Definition of Health Security: WHO

- Critics: various and incompatible **definitions**, incomplete elaboration of the concept of health security in public health operational terms, and insufficient reconciliation of the health security concept with community-based primary health care.
- Policymakers in industrialized countries emphasize protection of their populations especially against external threats, for example **terrorism and pandemics**
- **Health** workers and policymakers in developing countries and within the United Nations system understand the term in a broader public **health** context. Some developing countries: doubt that internationally **shared health surveillance data** is used in their best interests.
- UN agencies e.g. World **Health** Organization's restrictive use of the term 'global **health security**'.
- Divergent understandings of '**health security**' by WHO's member states, coupled with **fears** of hidden national **security** agendas, are leading to a breakdown of mechanisms for global cooperation such as the International Health Regulations (**William Aldis, 2008**) .

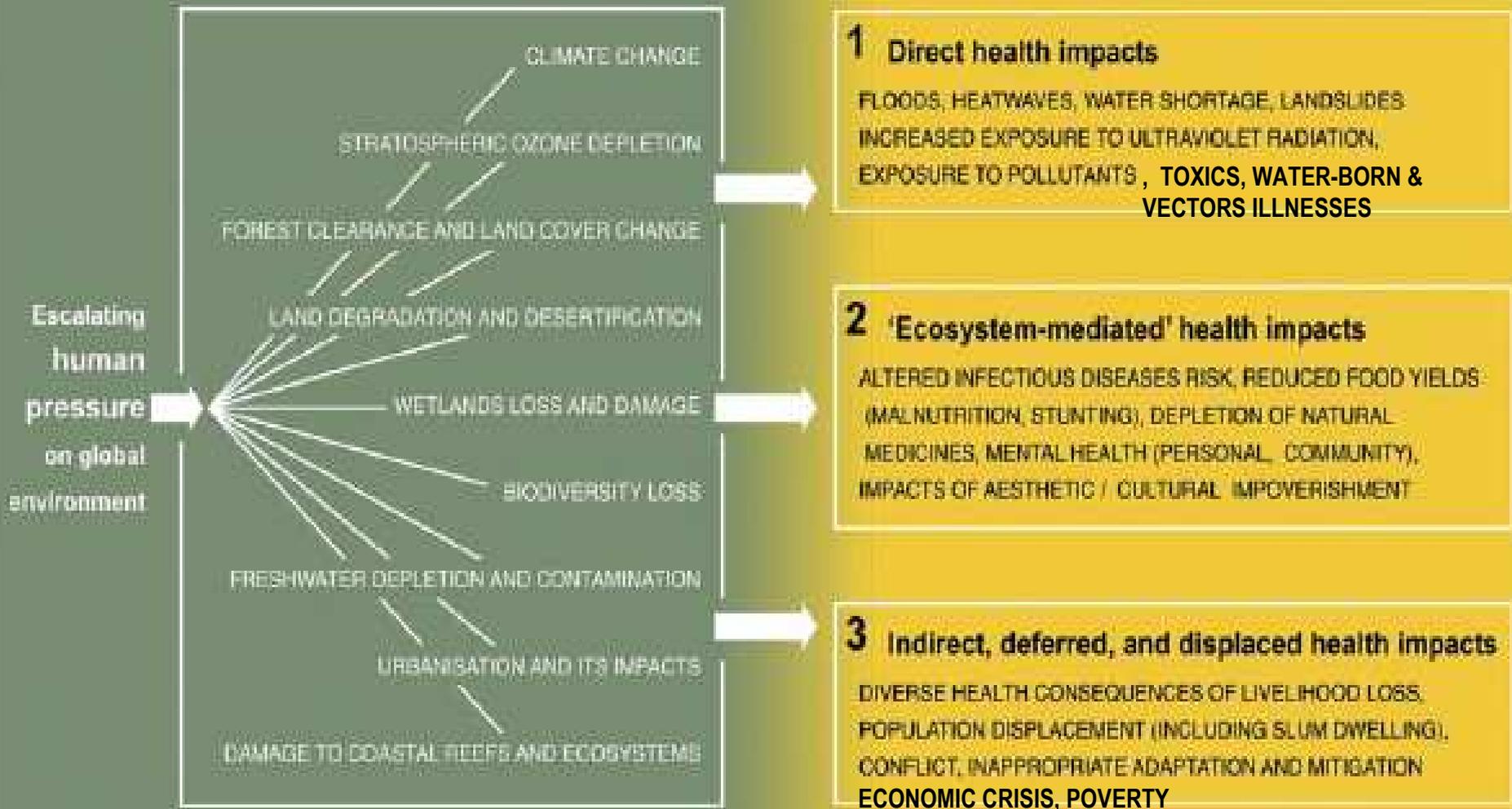
# How is environment related to health security?



# How could GEC affect health?

Environmental changes and ecosystem impairment

Examples of health impacts



*This figure describes the causal pathway from escalating human pressures on the environment through to ecosystem changes resulting in diverse health consequences. Not all ecosystem changes are included. Some changes can have positive effects (e.g. food production).*

# Interactions of GEC and health

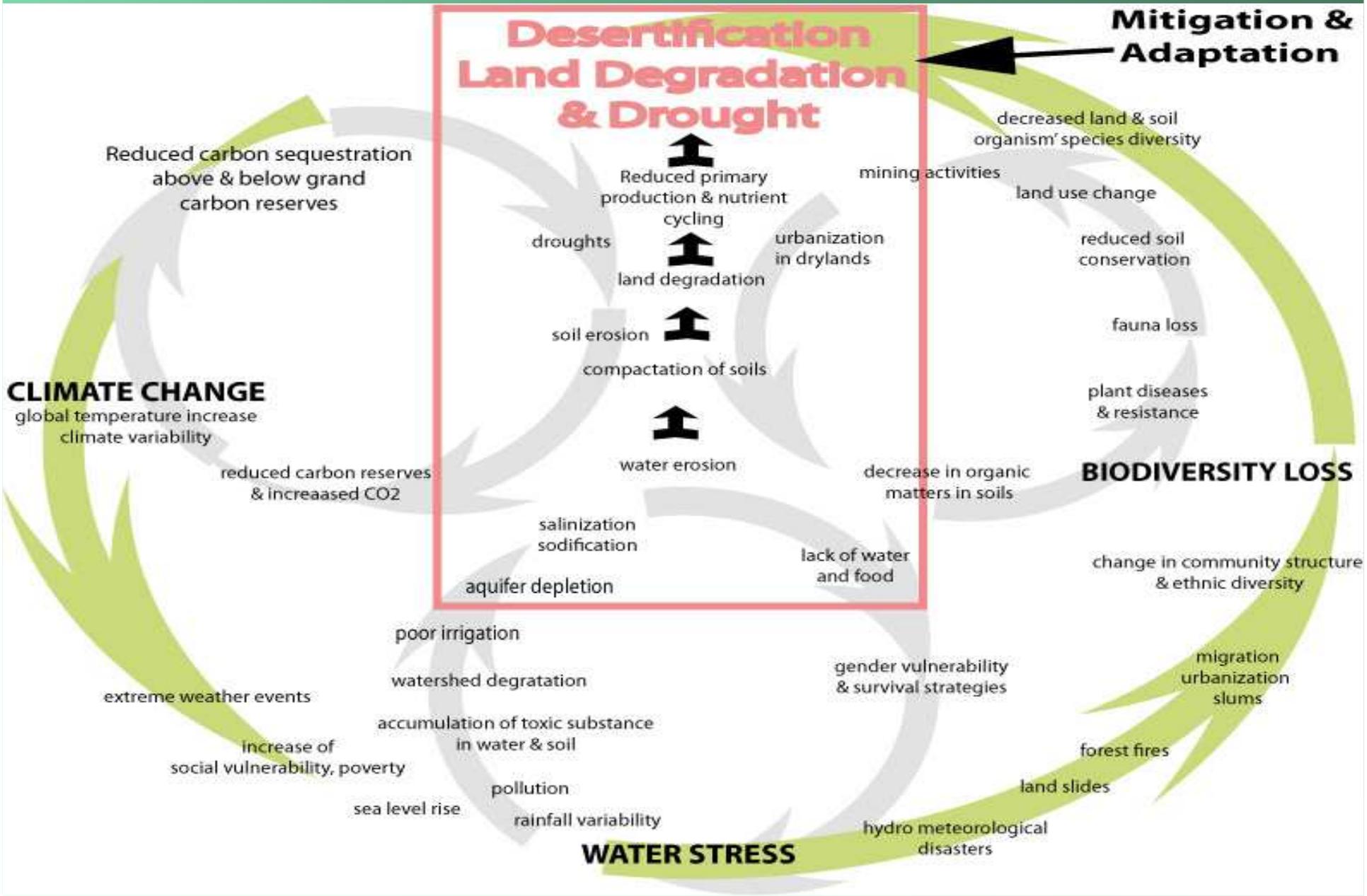
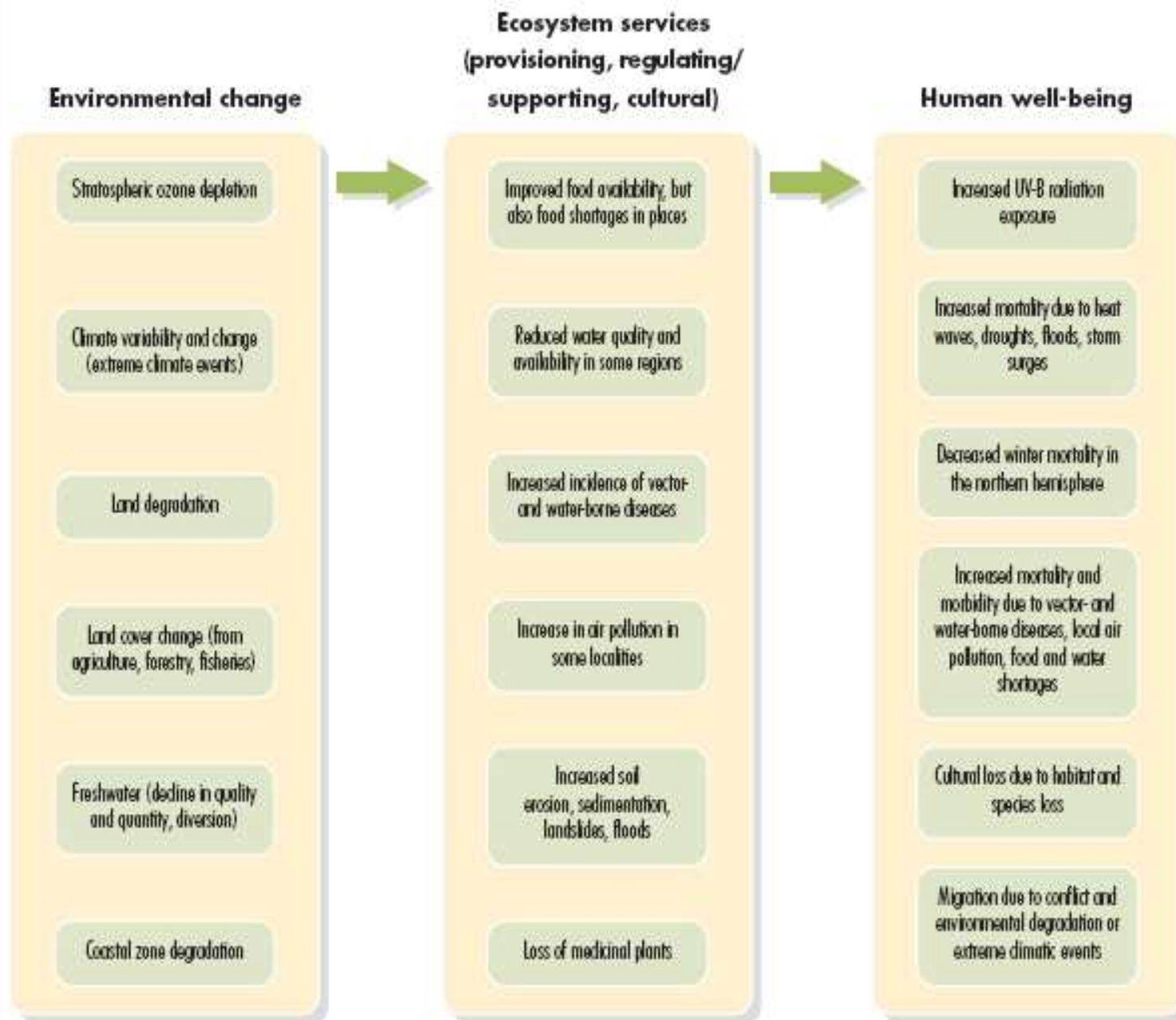
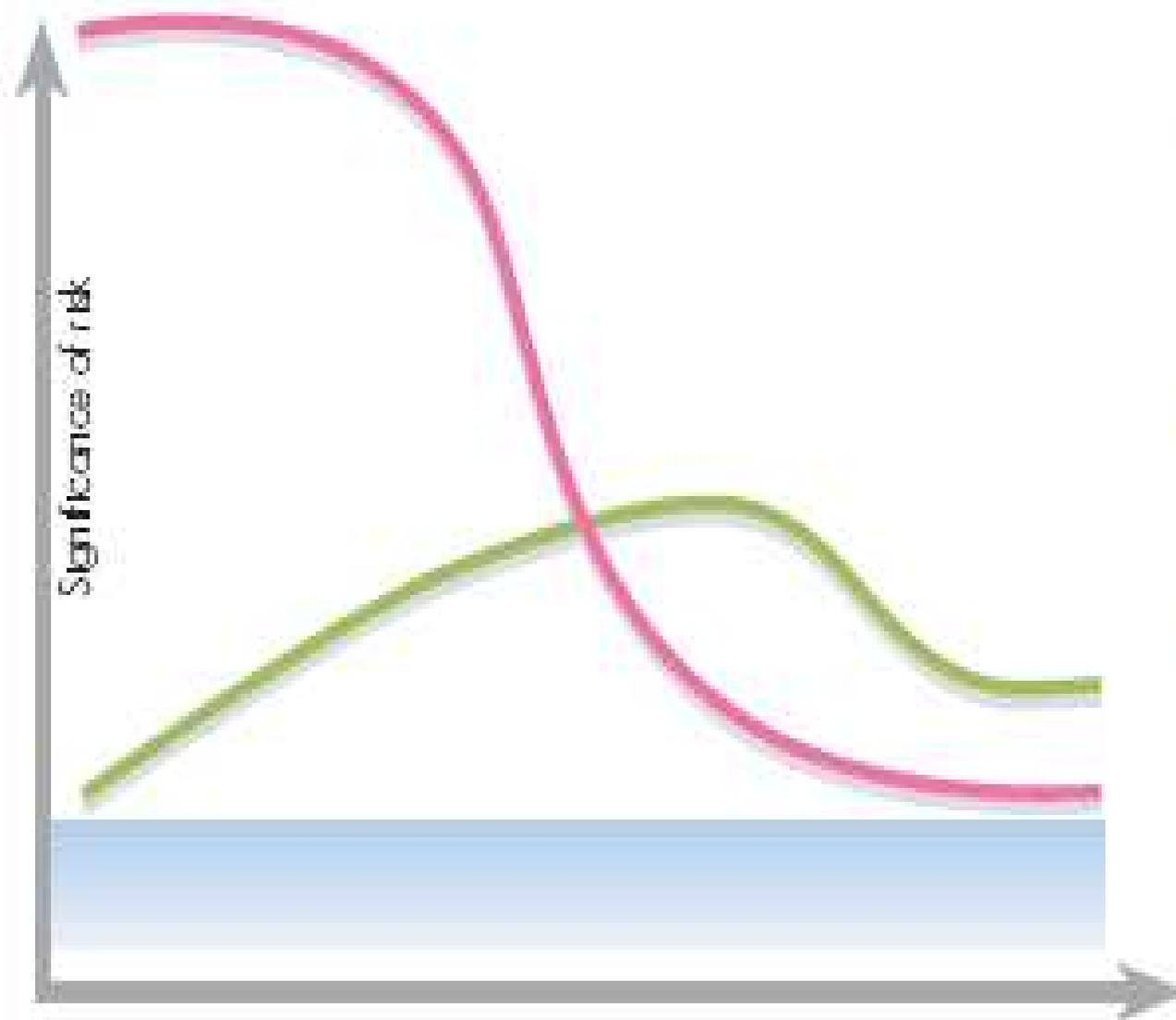


Figure 8.6 Multiple environmental changes and their effects on human well-being constituents and determinants



Source: based on WHO 2003

Figure 7.7 Environmental health risk transitions



Summary of risks by income 2004

- Basic risks: lack of safe water, sanitation and hygiene, indoor air pollution, vector-borne diseases, hazards that cause accidents and injuries
- Modern risks: unsafe use of chemicals, environmental degradation
- Emerging risks: climate change, persistent organic pollutants, endocrine disruptors

Low income  
populations  
in poverty

Middle income  
populations  
in transition

High income  
industrialized  
societies

Source: Adapted from Gordon  
and others 2004

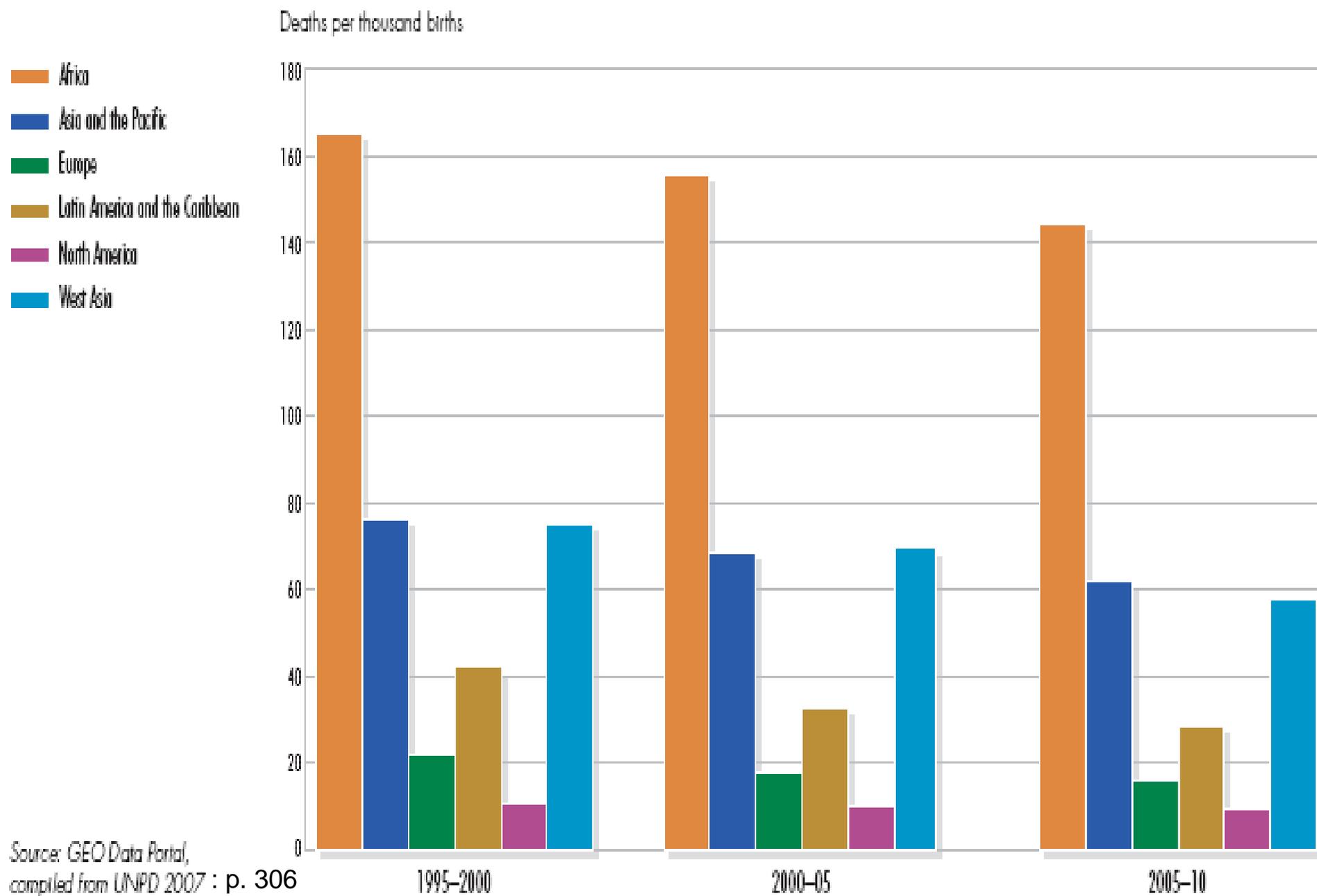
# 10 leading risk factors

Table 7.1 Estimated attributable and avoidable burdens of 10 leading selected risk factors

Developing countries high mortality (per cent)		Developing countries low mortality (per cent)		Developed countries (per cent)	
Underweight	14.9	Alcohol	6.2	Tobacco	12.2
Unsafe sex	10.2	Blood pressure	5.0	Blood pressure	10.9
Unsafe water, sanitation and hygiene	5.5	Tobacco	4.0	Alcohol	9.2
Indoor smoke from solid fuel	3.6	Underweight	3.1	Cholesterol	7.6
Zinc deficiency	3.2	Overweight	2.4	Overweight	7.4
Iron deficiency	3.1	Cholesterol	2.1	Low fruit and vegetable intake	3.9
Vitamin A deficiency	3.0	Low fruit and vegetable intake	1.9	Physical inactivity	3.3
Blood pressure	2.5	Indoor smoke from solid fuel	1.9	Illicit drugs	1.8
Tobacco	2.0	Iron deficiency	1.8	Unsafe sex	0.8
Cholesterol	1.9	Unsafe water, sanitation and hygiene	1.8	Iron deficiency	0.7

Note: percentage causes of disease burden expressed in Disability Adjusted Life Years.

Figure 7.2 Regional trends and projections for 2005–10 in under-five mortality rates



# Limits of Growth: threats to humans and environment

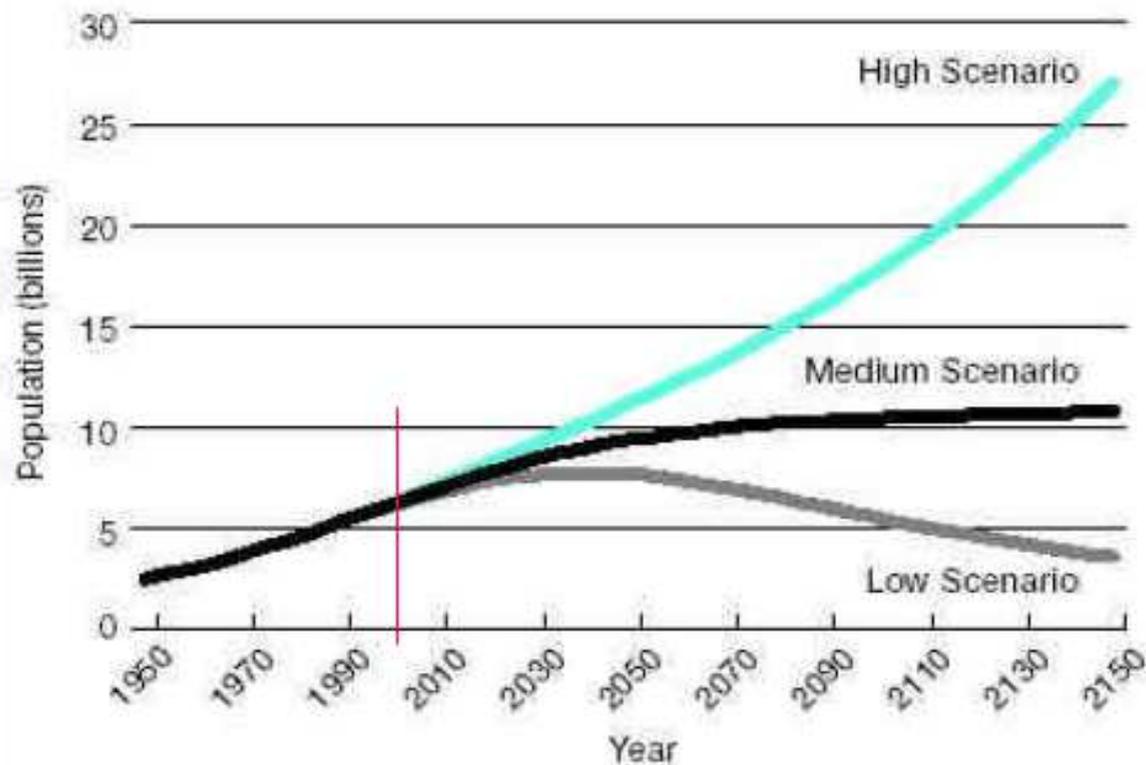
1. Metabolism of populations
2. Charge and transformation of an ecosystem
3. Capacity of biomass to produce prime material and ecosystem services
4. Ecological footprint

Club of Rome, 1972

5. What about consumerism? What model of production and consumption is sustainable?

## World Population: Three Alternative Scenarios

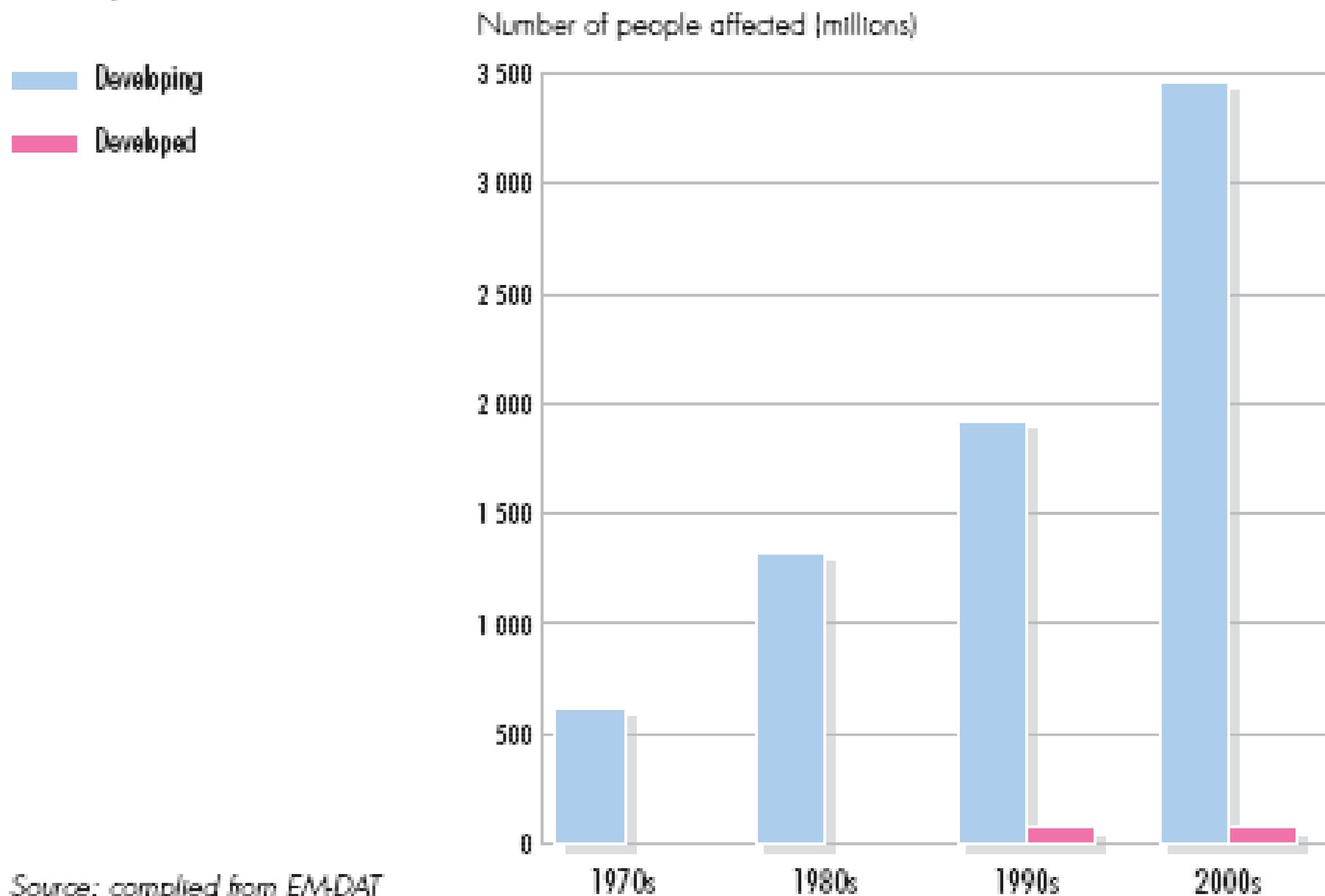
This chart shows three possible paths of future population growth.



Source: United Nations.



**Figure 8.5 Number of people affected by climate-related disasters in developing and developed countries**

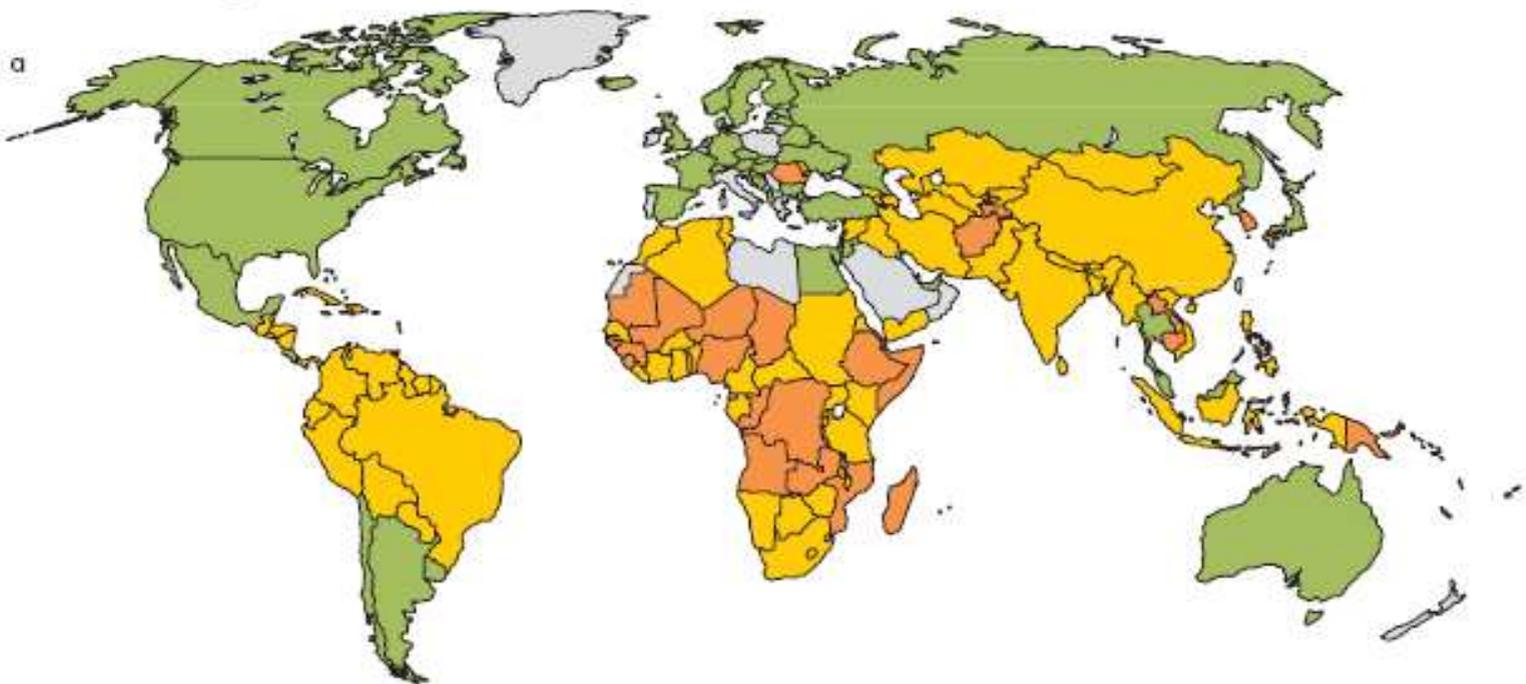


A photograph of a person in a room. The person is wearing a light green shirt and a patterned sarong. They are standing in a room with a wooden wall on the left. A large, light pink mosquito net is hanging from the ceiling, partially obscuring the person. In the background, there are several items of clothing hanging on a rack, including a red shirt and a blue shirt. The floor is covered with a patterned rug. The text "Water-born and Vectors illnesses" is overlaid in green on the image.

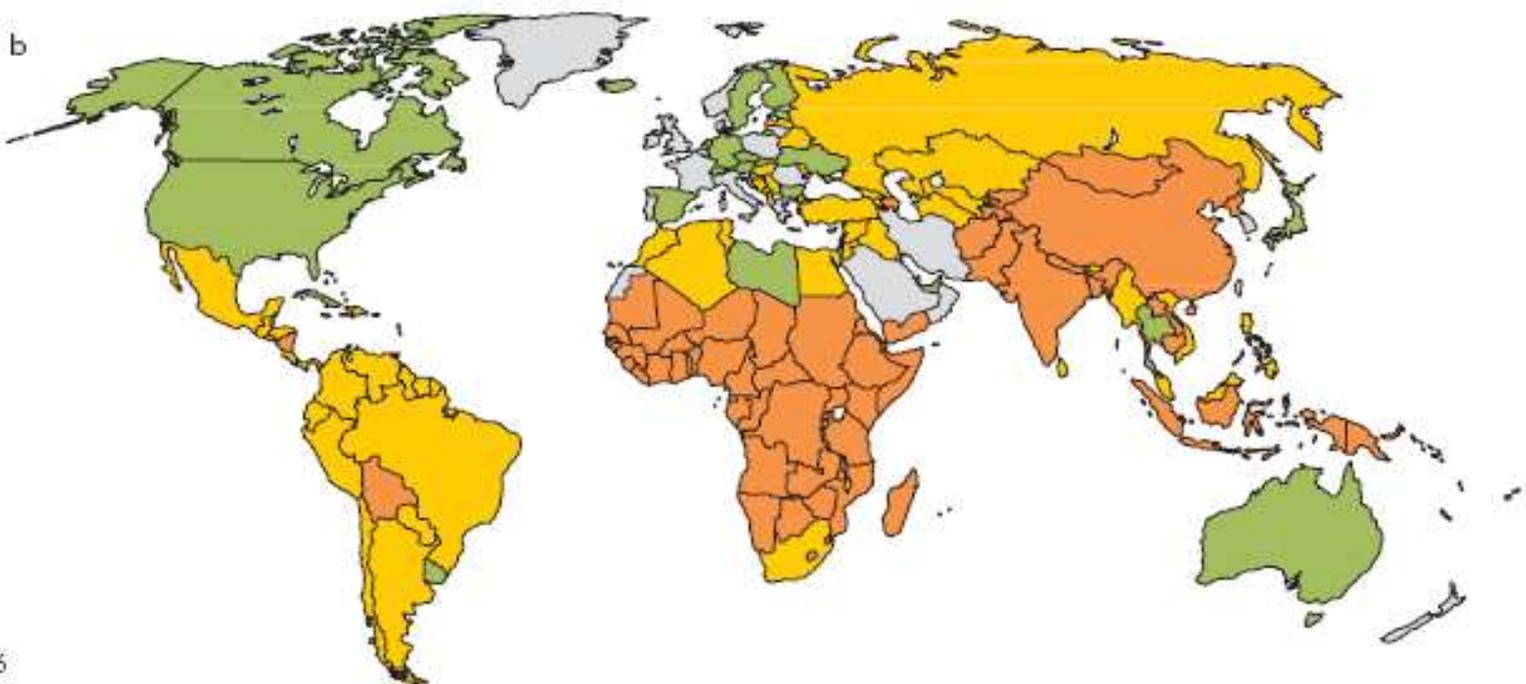
**Water-born and Vectors illnesses**

Figure 4.3 The situation in relation to (a) drinking water and (b) sanitation coverage, 2004

- Coverage is 96% or higher
- Coverage is 60–95%
- Coverage is less than 60%
- Insufficient data

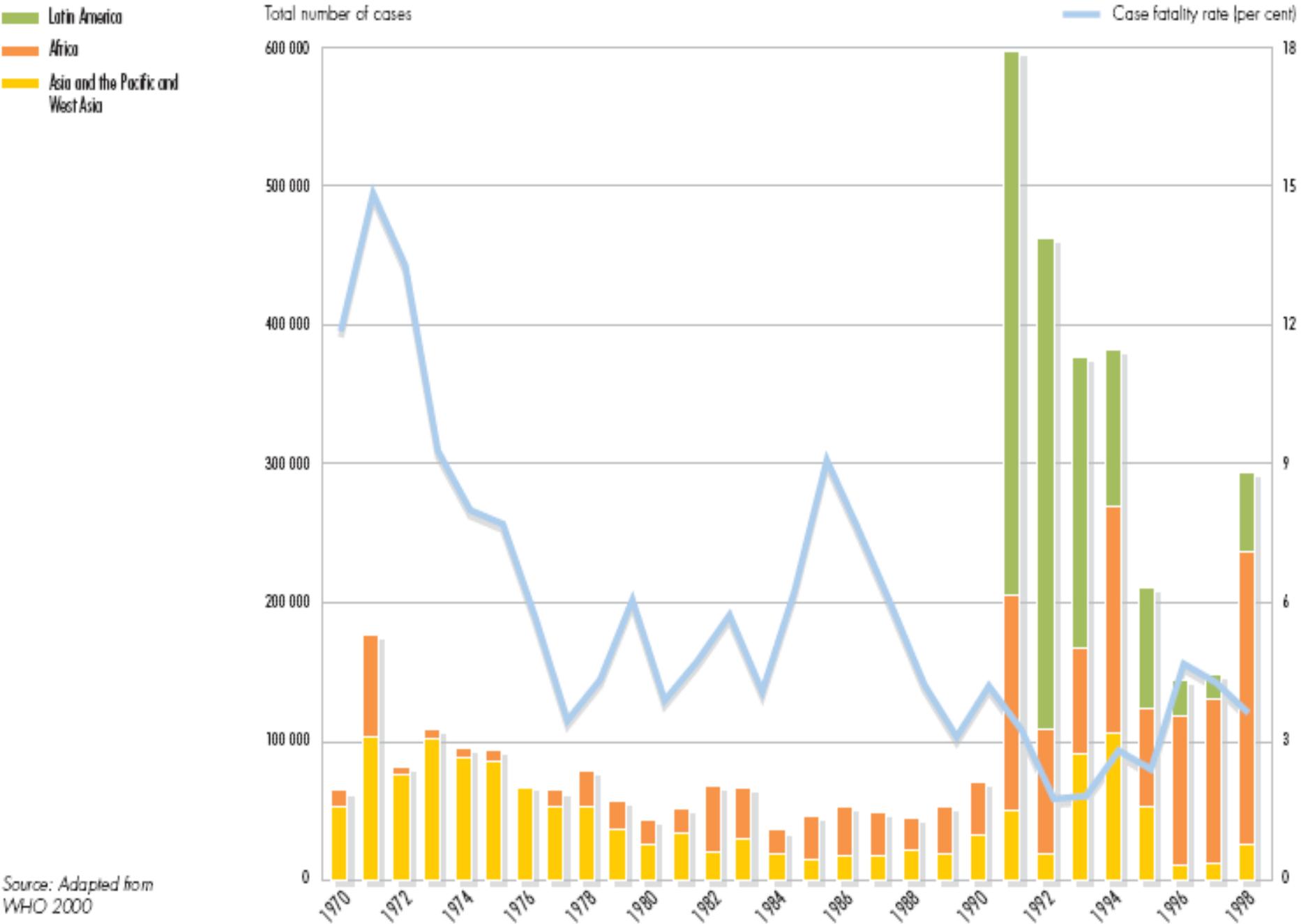


- Coverage is 96% or higher
- Coverage is 60–95%
- Coverage is less than 60%
- Insufficient data



Source: WHO and UNICEF 2006

**Figure 4.7 Reported cholera cases and fatalities by region**

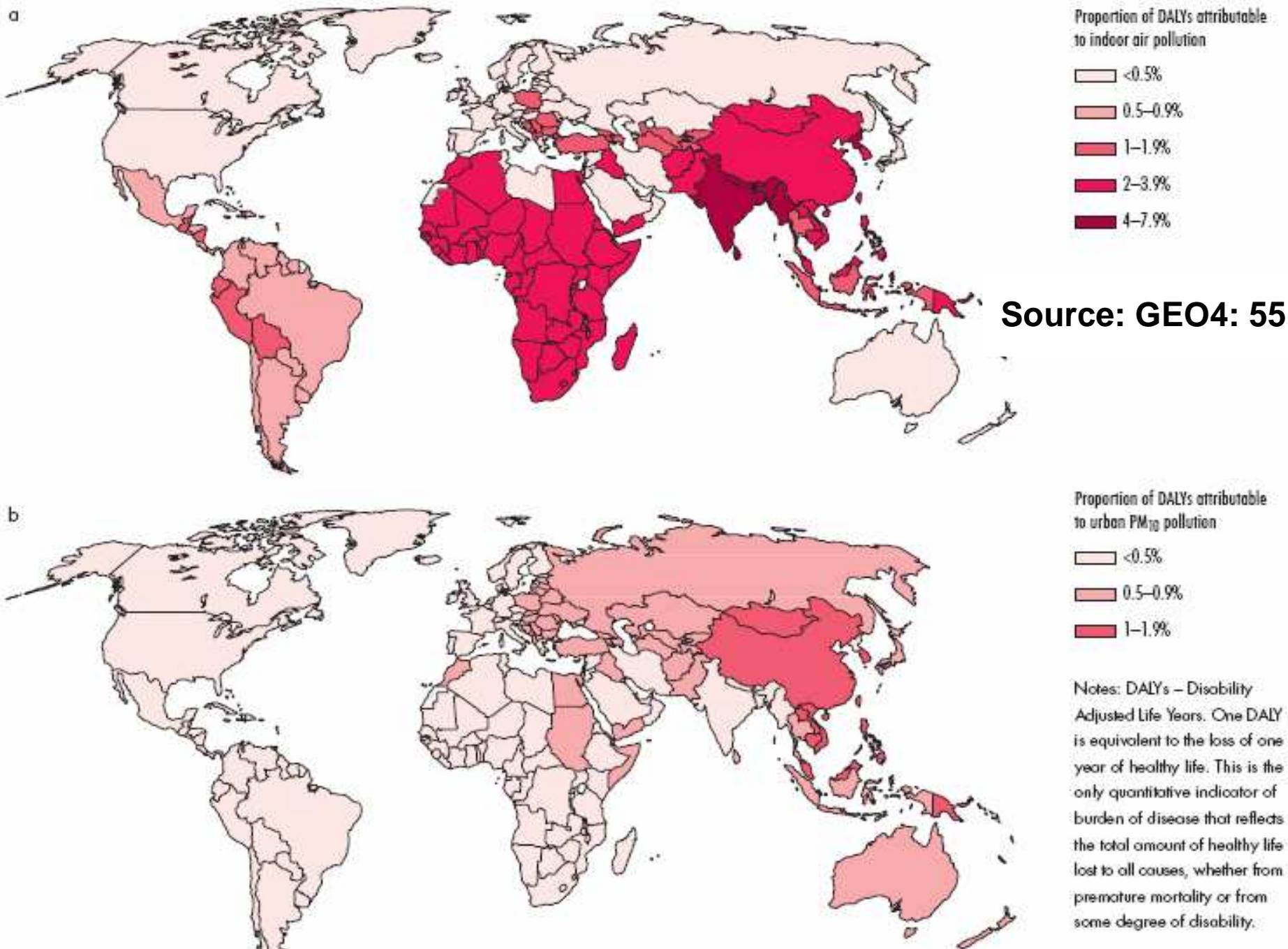


Source: Adapted from WHO 2000

# Water-born illnesses in Mexico

- 1. Arsenic** pollution affects 400,000 people in Mexico (Source: Millennium Environmental Assessment, 2005)
- 2. Diarrhea:** dead: 1984: 212.3; 1993: 60.4/100,000 mostly children less than 5 years old
- 3. Malaria:** 2.77 to 7.27 cases by 100 000 people/year between 2000 a 2005; estimation: 30% of people are at risk.
- 4. Dengue:** 2004 to 2008: increase in Mexico: 800%: 80% in South-Southeast: 6 months 2007: 5,520 cases: 4,359 classic type; 1,161 hemorrhagic type (Source: General Direction of Epidemiology 1984-2008)

Figure 2.12 Global estimates of disease attributed to (a) indoor and (b) urban PM<sub>10</sub> pollution, measured in DALYs



# Air pollution and health effects, Mexico

## Effects in Health

Mortality  
Chronic Bronchitis  
Hospitalization due to air-born illness  
Hospitalization due to cardio-vascular illn.  
Loss of working days

## Economic Impacts (US\$)

11, 066'610  
2,754,470  
4,456  
65,851  
46,908

(Pulmonary atrophy in children in Netzahualcoyotl & Iztapalapa)

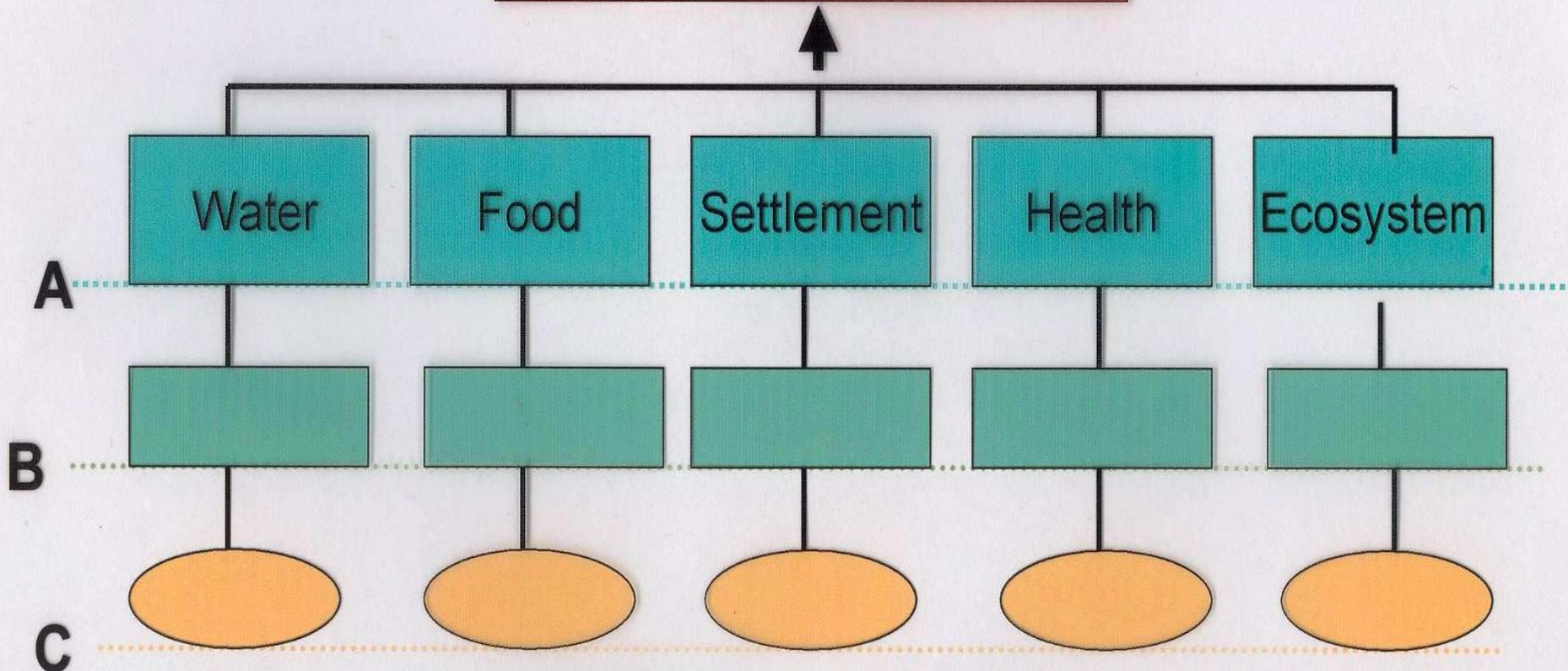
**Very high, when living beside roads**

Microbus drivers in Morelos

**98% of drivers**

Assessing Vulnerability (R.T. Watson, et al. 1998. IPCC)

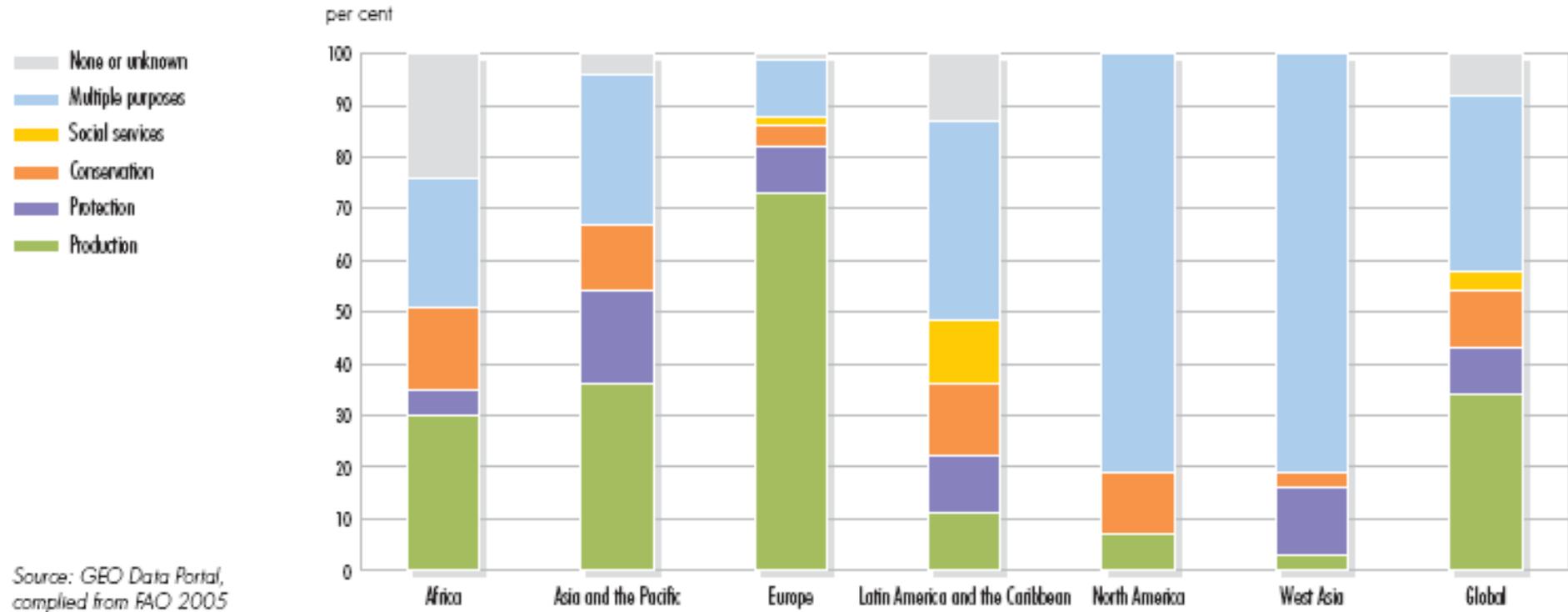
**Vulnerability to Global Environmental Change**



A: Sectoral level; B: Coping level; and C: Sensitivity level

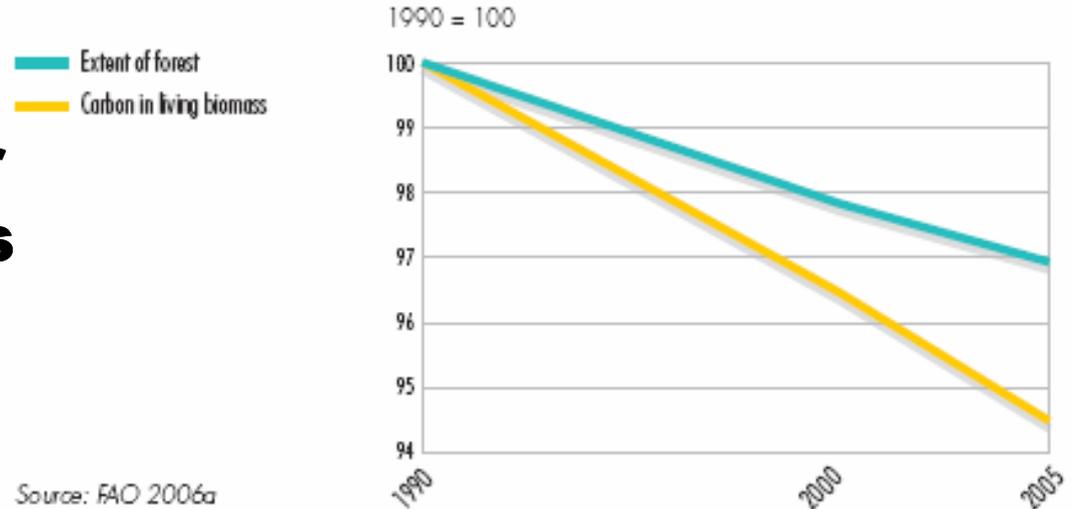
**Vulnerability =  $f$ ( sensitivity, adaptability, exposure)**

Figure 3.4 Designation of forests by region, 2005



**Forests: purification  
of air and livelihood for  
wild animals and plants**  
GEO-4, 2007: 90

Figure 3.5 Declines in carbon in living biomass and in extent of forest



## Vulnerable cities

<b>Urban complexity</b>	<b>Threats for Vulnerable</b>	<b>Mitigating vulnerability</b>	<b>Adaptation mechanisms</b>
Social, political, economic, technological conflicts	Physical infrastructure, economic model, public insecurity	Insurance, urban planning, tax reform, science and technological applications, PPP	Urban management, subregional political & social integration, public transportation
Center of production, consumption and services	Critical/life-support infrastructure, slums, improvement of infrastructure, micro-business to create jobs,	Mega and micro-projects, improvement of public transportation, connection between suburban areas	Decentralization of production, service and consumption system, suburban integration with greater equity
Migration as survival strategy for livelihood	The urban poor, precarious houses, risky land, missing livelihood	Poverty alleviation, popular construction programs, food subsidies, land regularization, infrastructure	Livelihood improvement, subsidies, self-employment, complex survival strategies
Political, social and cultural meltpot	Center of intellectual & political activity, social inconformity, opportunities, inequality, immigration, chaotic growth	Democratization processes, struggle for social and human rights, descentralization of production and political decision making	Regional urban planning and development, reinforcement of state of law, political democratic participation, equity
Housing and critical/life-support infrastructure	Slum dwellers, immigrants, extreme poor, small children and air pollution, waste management	Safe construction and land-use planning, promotion of self-construction, long-term credits	Risk reduction through integral urban management, poverty alleviation and income increase, reduction of social inequality

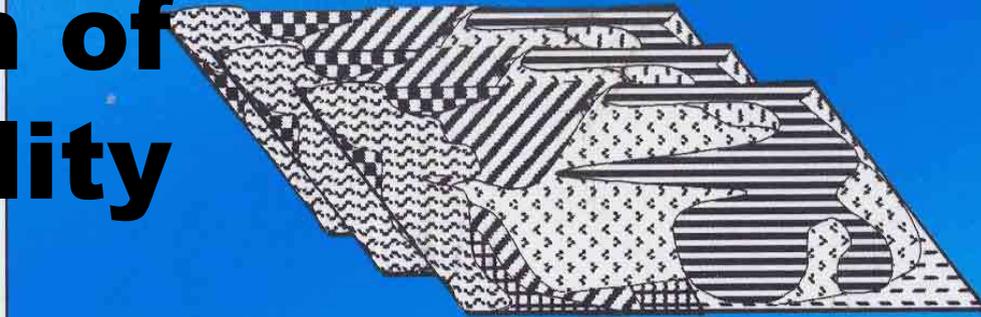


# Public Policy of Mitigation and Adaptation

# Reduction of Vulnerability

Kasperson, 2006

VULNERABILITY MAPS



INDICATORS

DIMENSIONS OF VULNERABILITY

FEEDBACK TO VULNERABILITY

EXPOSURE

SENSITIVITY  
(INCLUDING  
COPING)

RESILIENCE

CAUSAL EVOLUTION OF HAZARD

HUMAN  
NEEDS

HUMAN  
WANTS

TECHNOLOGY  
OR  
PRODUCTION  
SYSTEM

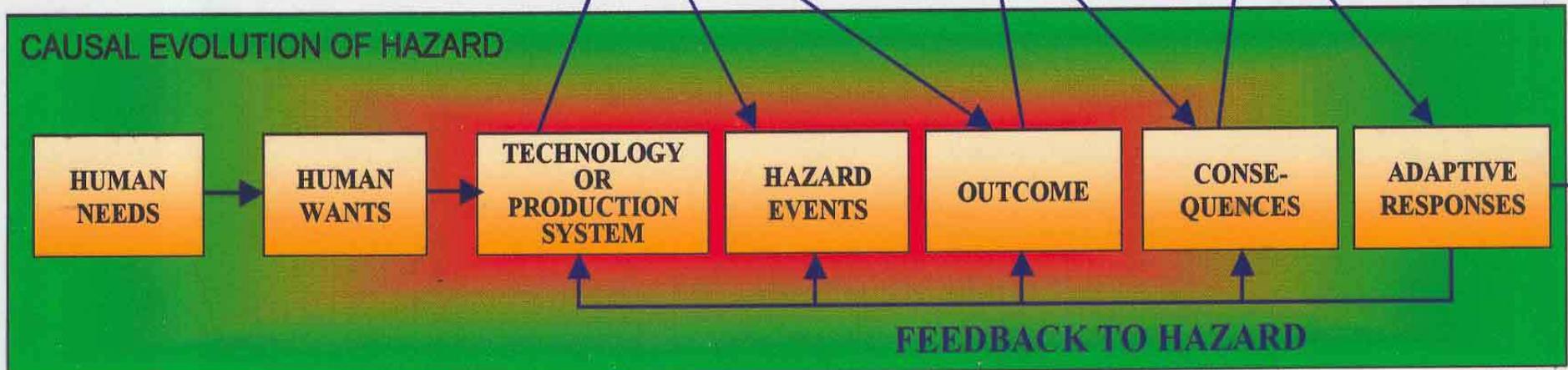
HAZARD  
EVENTS

OUTCOME

CONSE-  
QUENCES

ADAPTIVE  
RESPONSES

FEEDBACK TO HAZARD

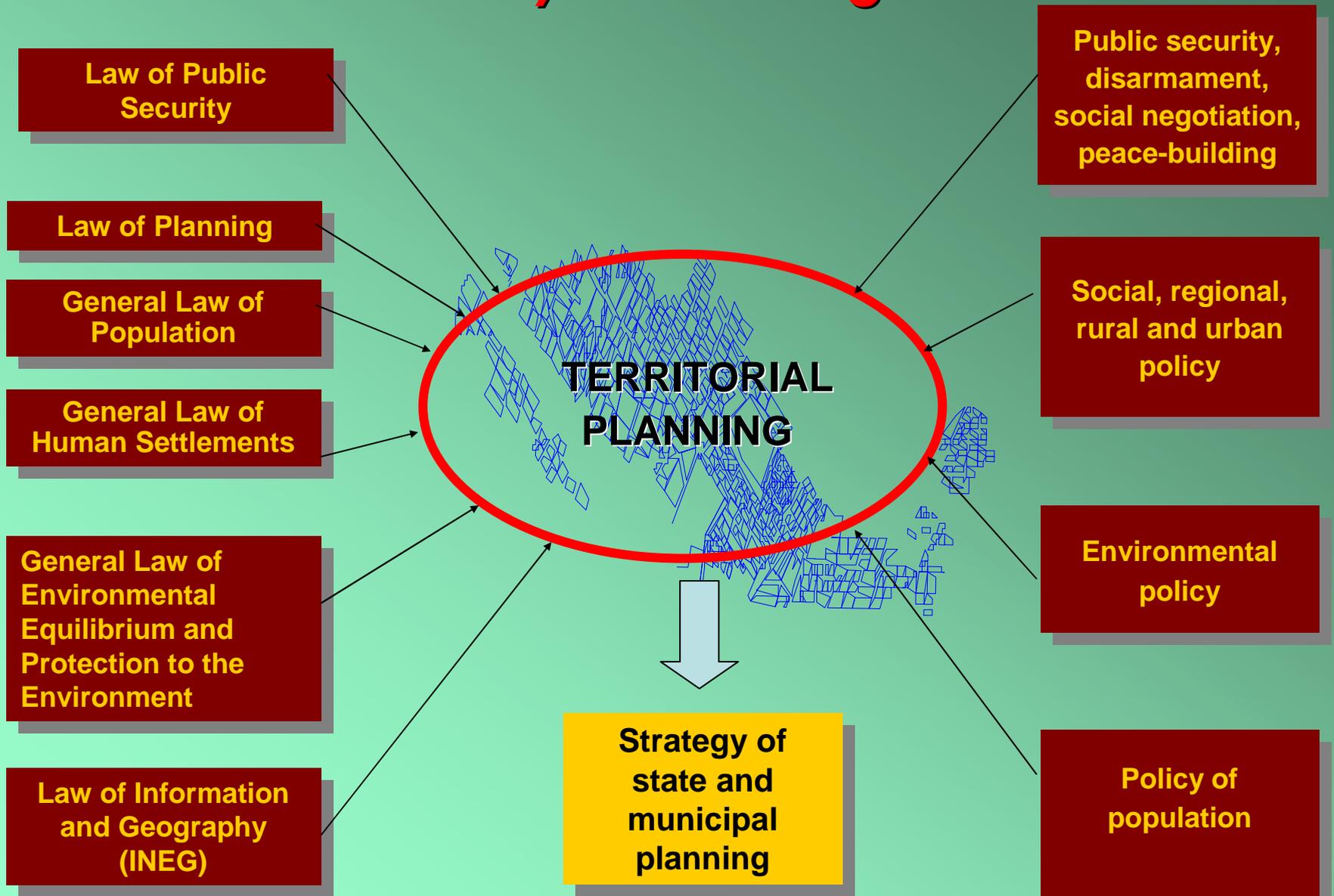




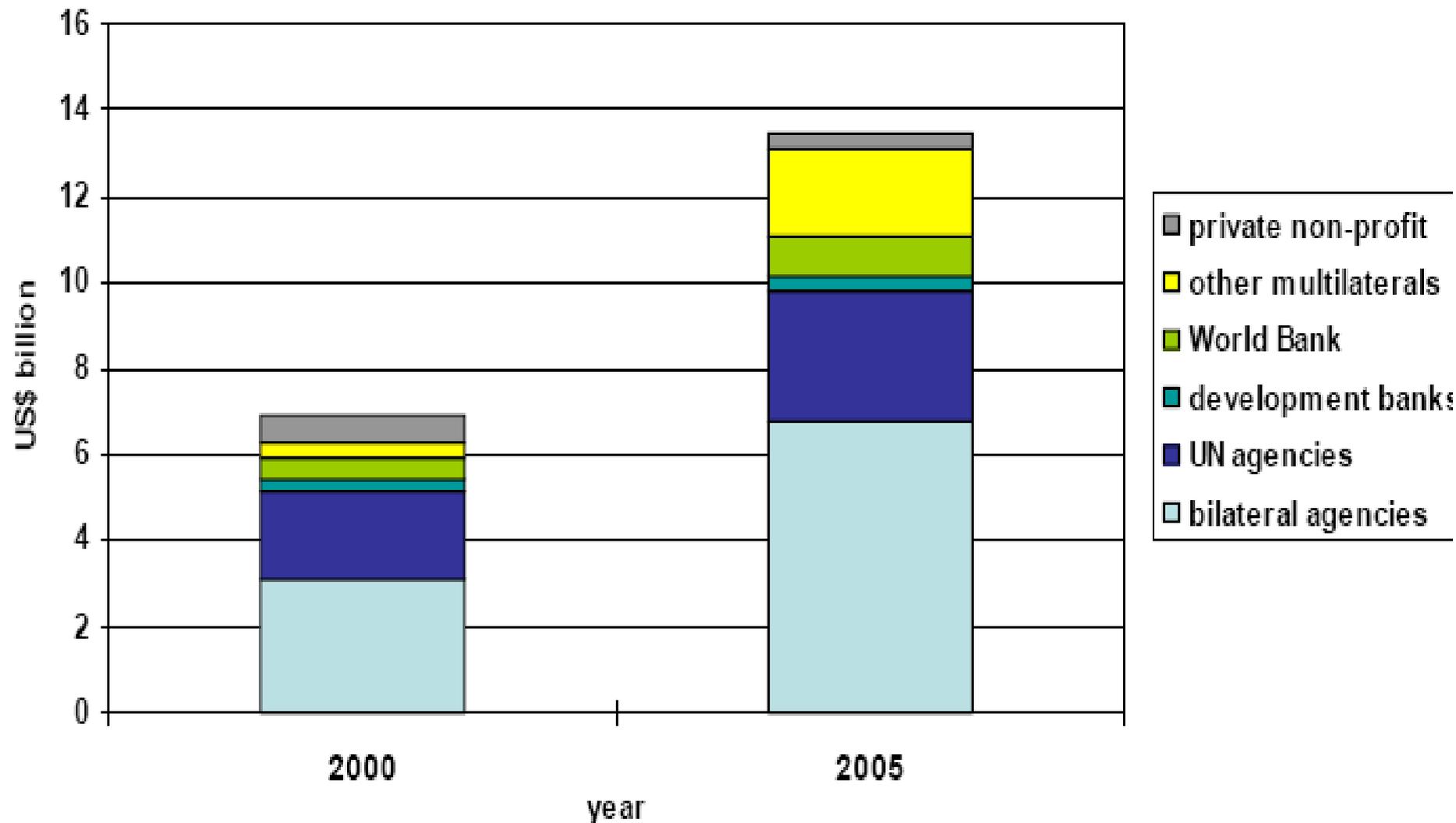
*Vaccination campaign in El Salvador.*

- Provide technical and financial assistance to implement the Global Strategy for Health for All, including health information systems and integrated databases on development hazards.
- Strengthen advocacy for the provision of basic preventive and curative health care at all levels. Review delivery of basic health services at the local level to ensure that priority problems of poor people are addressed adequately.
- Make essential drugs affordable and available to the world's poorer nations including, where necessary, alterations in the multilateral trade system, national policies and institutional drug supply management.
- Implement long-range health and human resource planning to train, recruit and retain staff. Develop codes of conduct for international recruitment of health professionals.
- Strengthen health services for displaced communities and those affected by war, famine or environmental degradation.
- Implement health impact assessment of major development projects, policies and programmes and monitor indicators for health and sustainable development.

# Policy of Planning



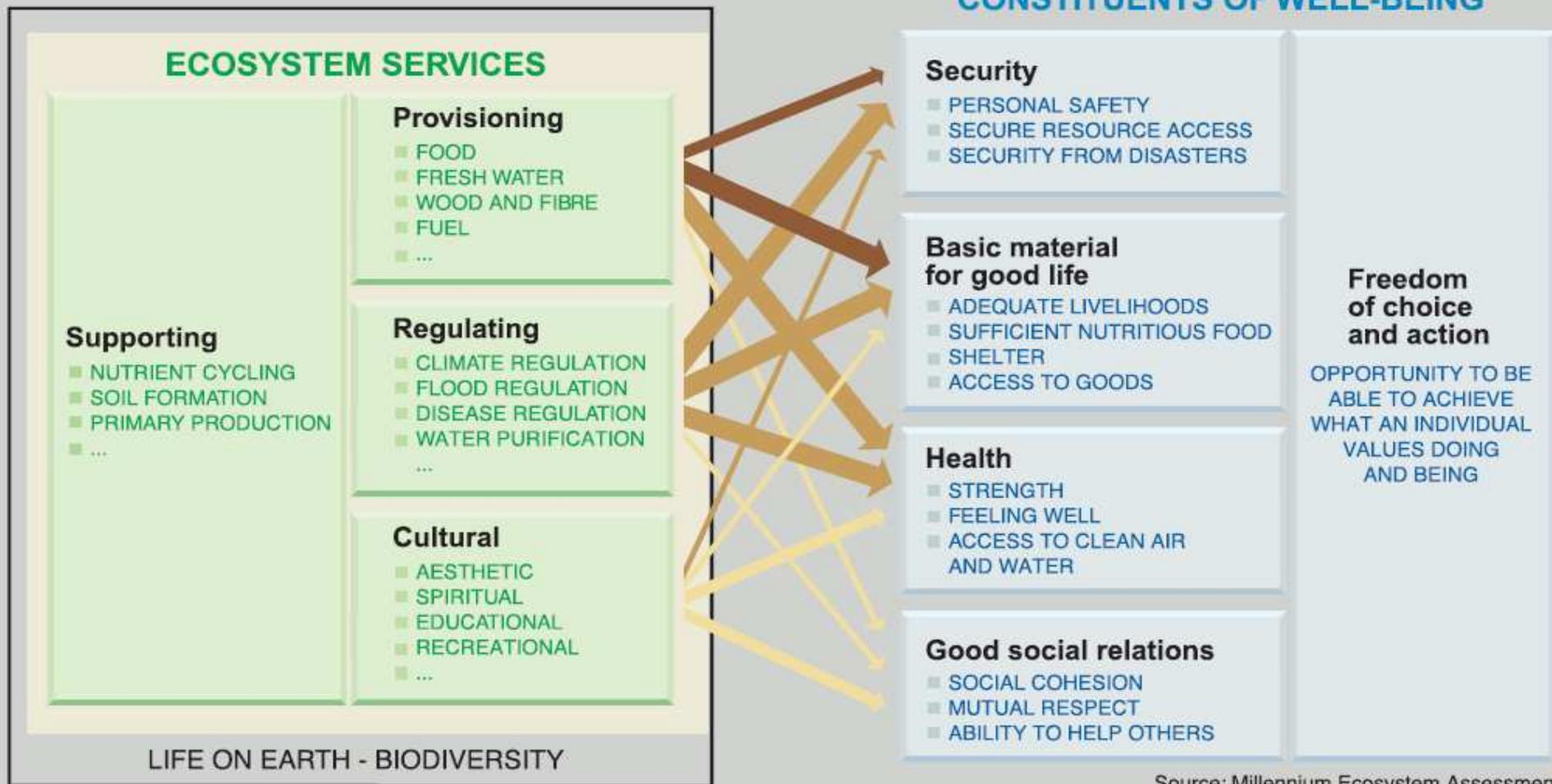
## Development Assistance for Health by Source, 2000 and 2005



Source: Catherine M. Michaud, Harvard School of Public Health, January 2007.

Fig Notes: (1) The category of 'other multilateral' includes the European Union, the Global Alliance for Vaccines and Immunization (GAVI), and the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM). (2) World Bank total includes only IDA lending.

**Figure 1.3**



Source: Millennium Ecosystem Assessment

**ARROW'S COLOR**  
Potential for mediation by socioeconomic factors

- Low
- Medium
- High

**ARROW'S WIDTH**  
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

# Strategies of Adaptation: Top-down and bottom-up

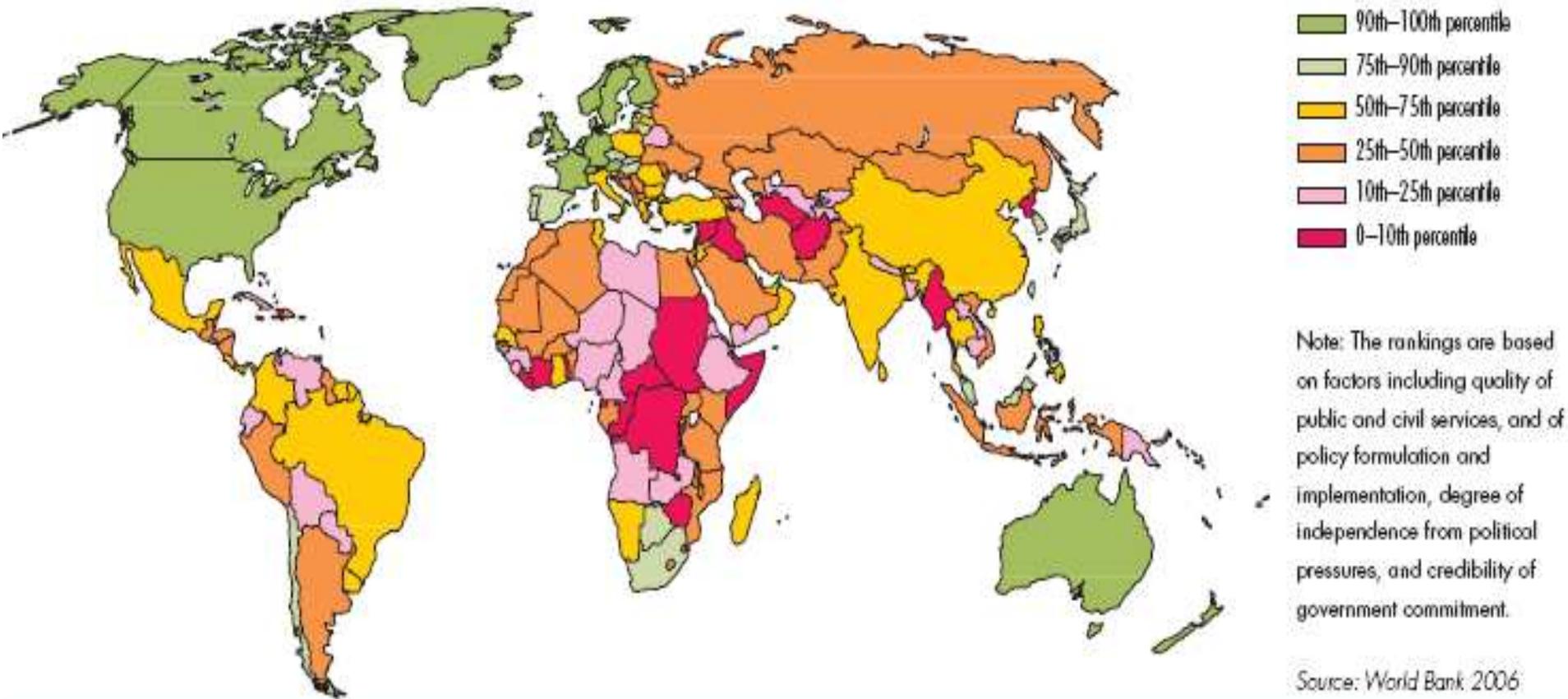


# Strategies of Adaptation

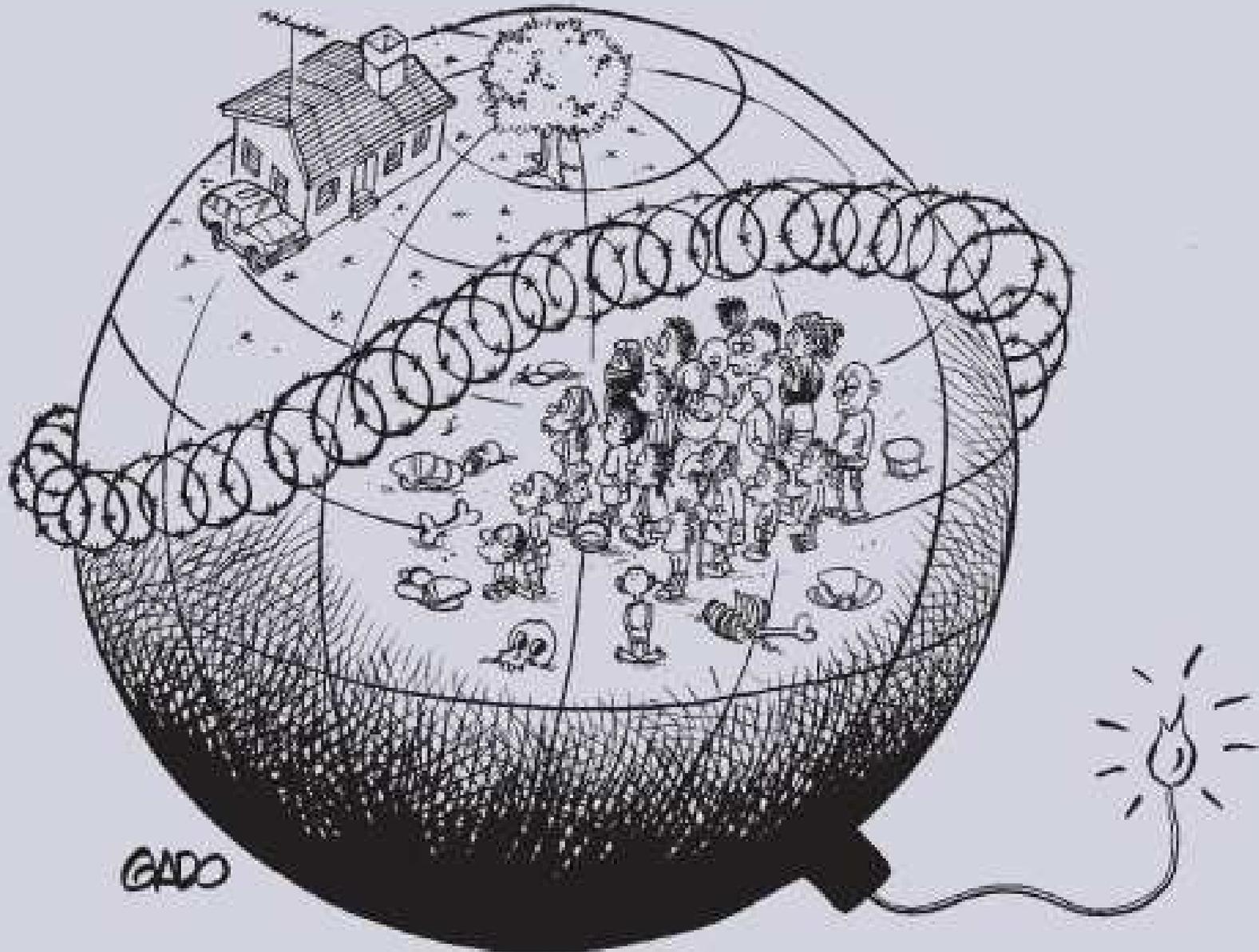
- Definition of resources:
  - **Economic:** financing, infrastructure, poverty alleviation, ethical business, international aid and compensation, participative budget, sustainable job creation, environmental services
  - **Social:** peasant organizations, research, science and technology, experts, NGO, Consultation Councils for Government, Public Private Partnership, sustainable livelihood, education and youth attention
  - **Environmental:** Strategy of holistic sustainable development, recuperation and protection of ecosystems, environmental protection, urban reorganization, combat to desertification, water integral management, waste recycling, alternative energy, prevention, Political: Transparency, state of law, governance, democratic participation in planning, execution and evaluation, food and health security, early warning, sustainable reconstruction
- Integration of National Plan of Development with **Sectorial Plans, State and Municipal Plans**
- Prevention and permanent monitoring
- Rigorous evaluation and modification

# Government effectiveness

Figure 7.5 Government effectiveness (2005)



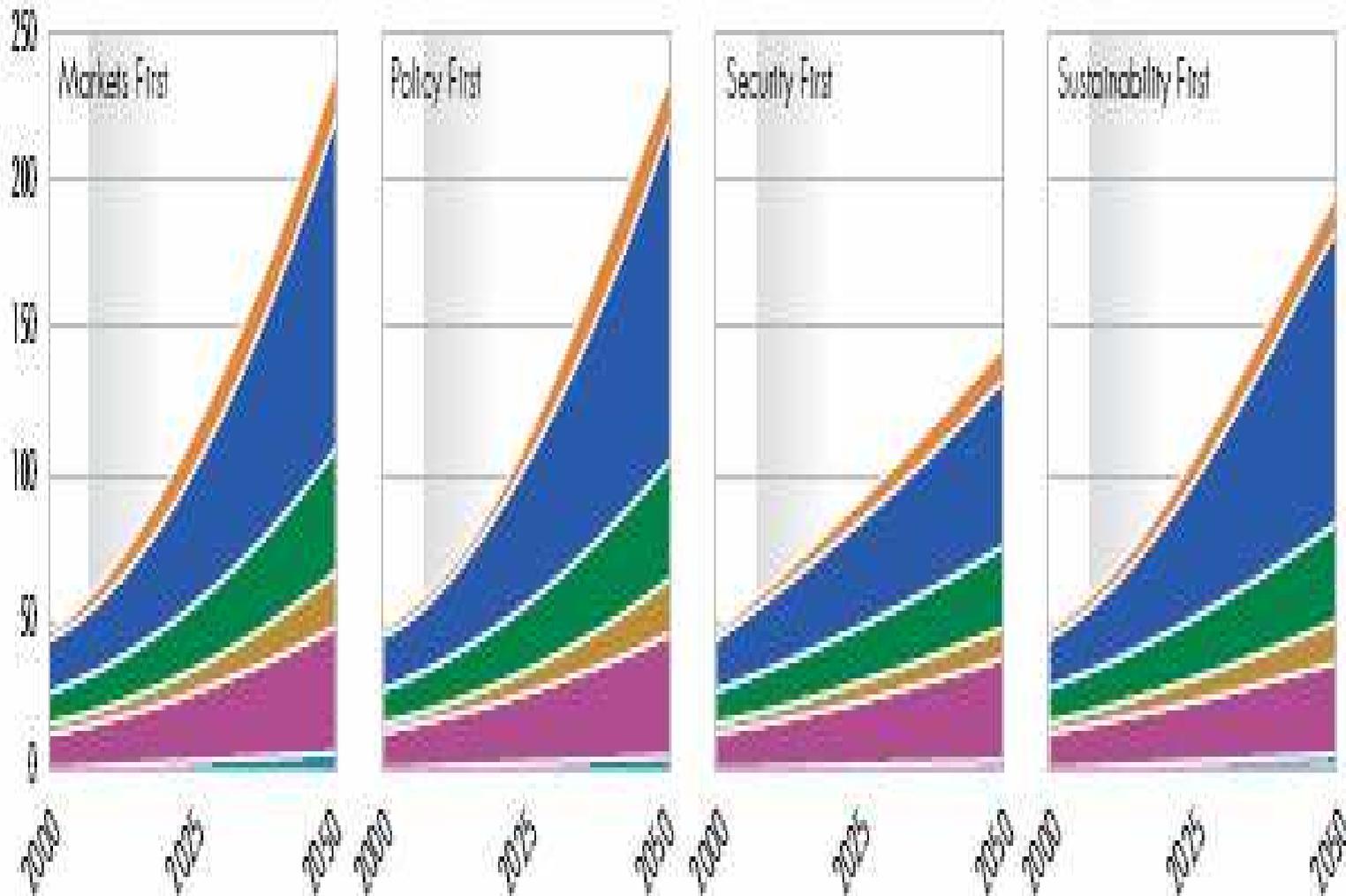
# Future Scenario?



# Four Models of Development

(Source: UNEP, GEO-4, 2007)

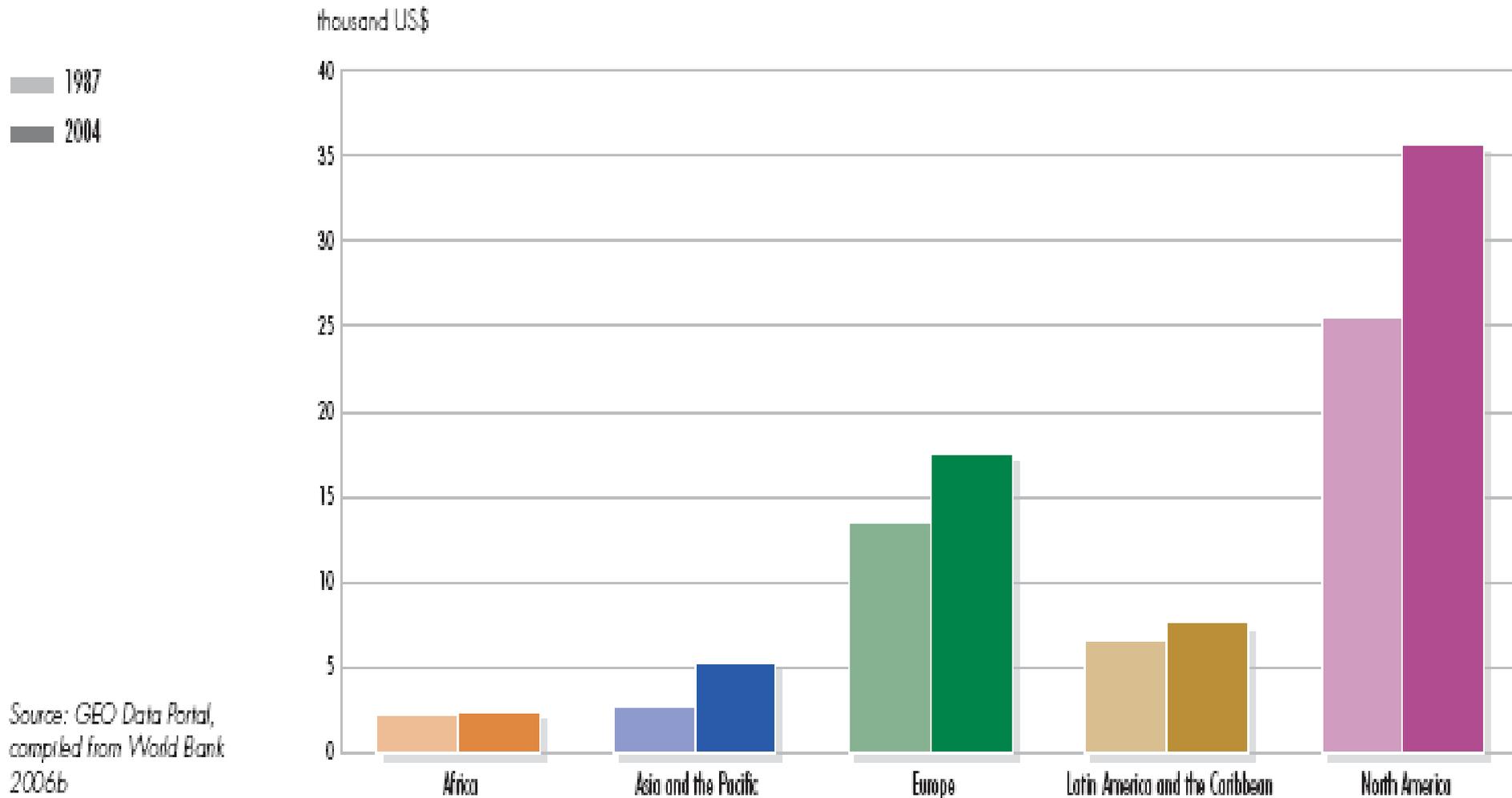
trillion US\$ (2000) (PPP based)



Note: IFS modeling results.

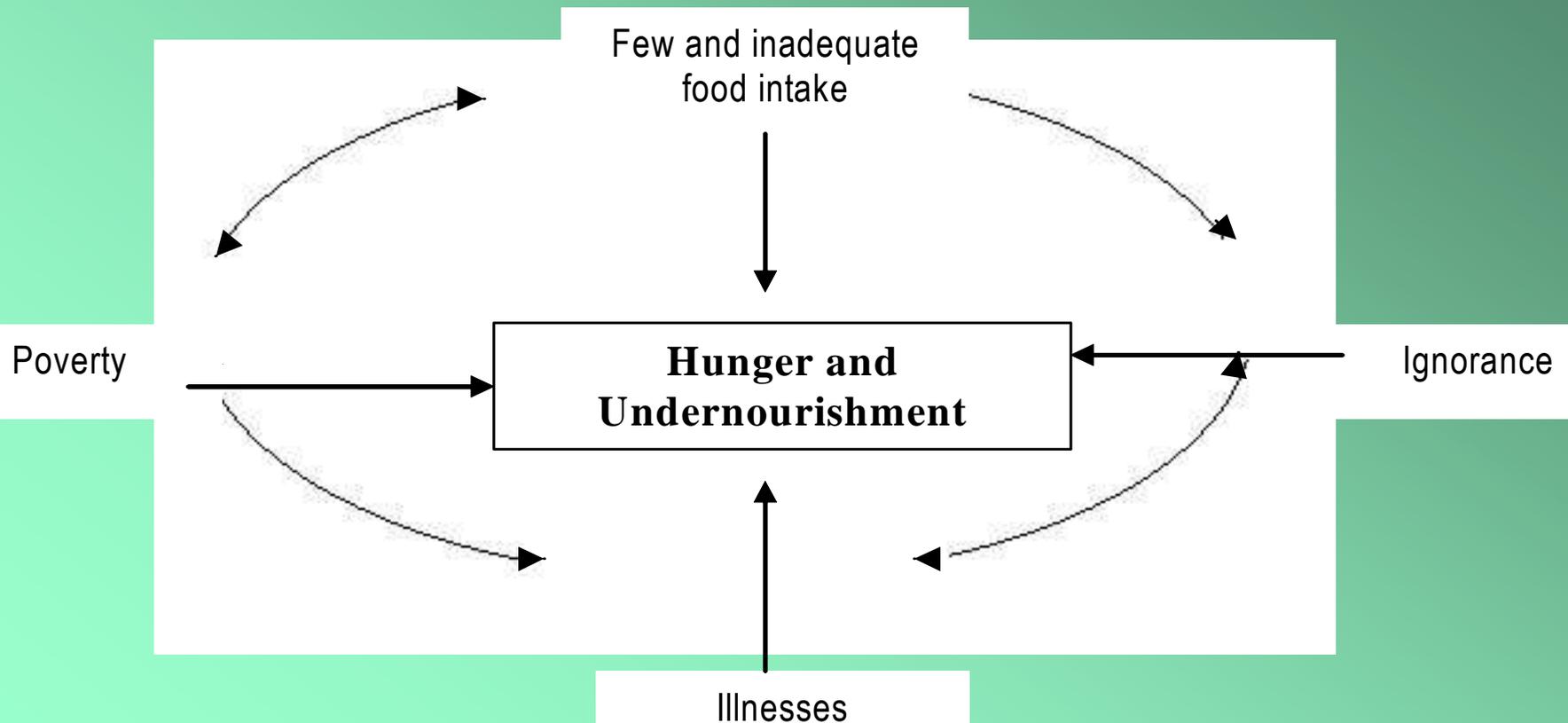
# Poverty alleviation? GEO-4, 2007: 23

Figure 1.7 Gross domestic product – purchasing power parity per capita

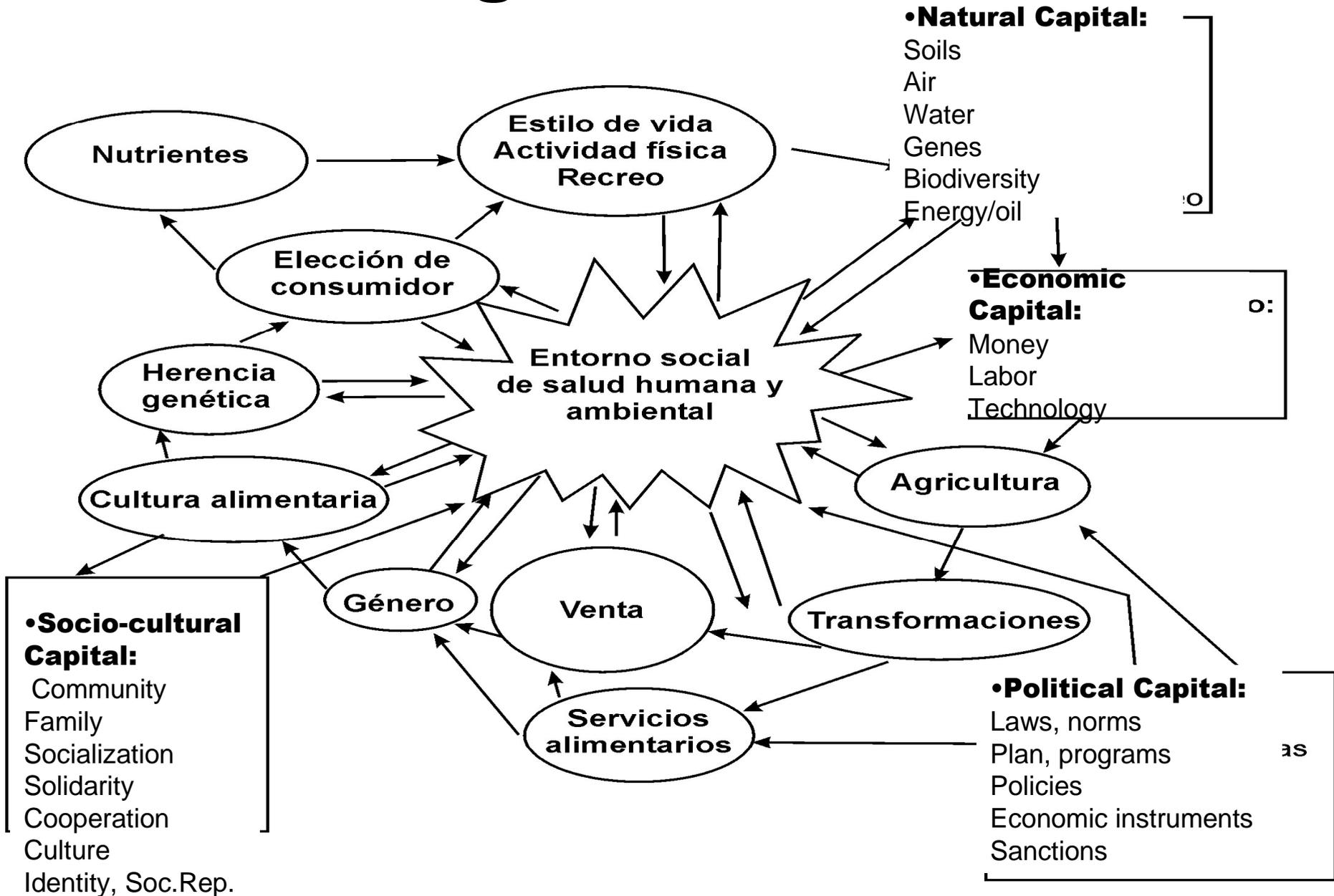


# Survival strategies, micro business and local food sovereignty

Vicious circle of hunger, undernourishment, poverty, and ignorance. Source: Chávez/Ávila/Shamah (2007: 208).



# Health integrated in Environment



**Thank you for your attention**

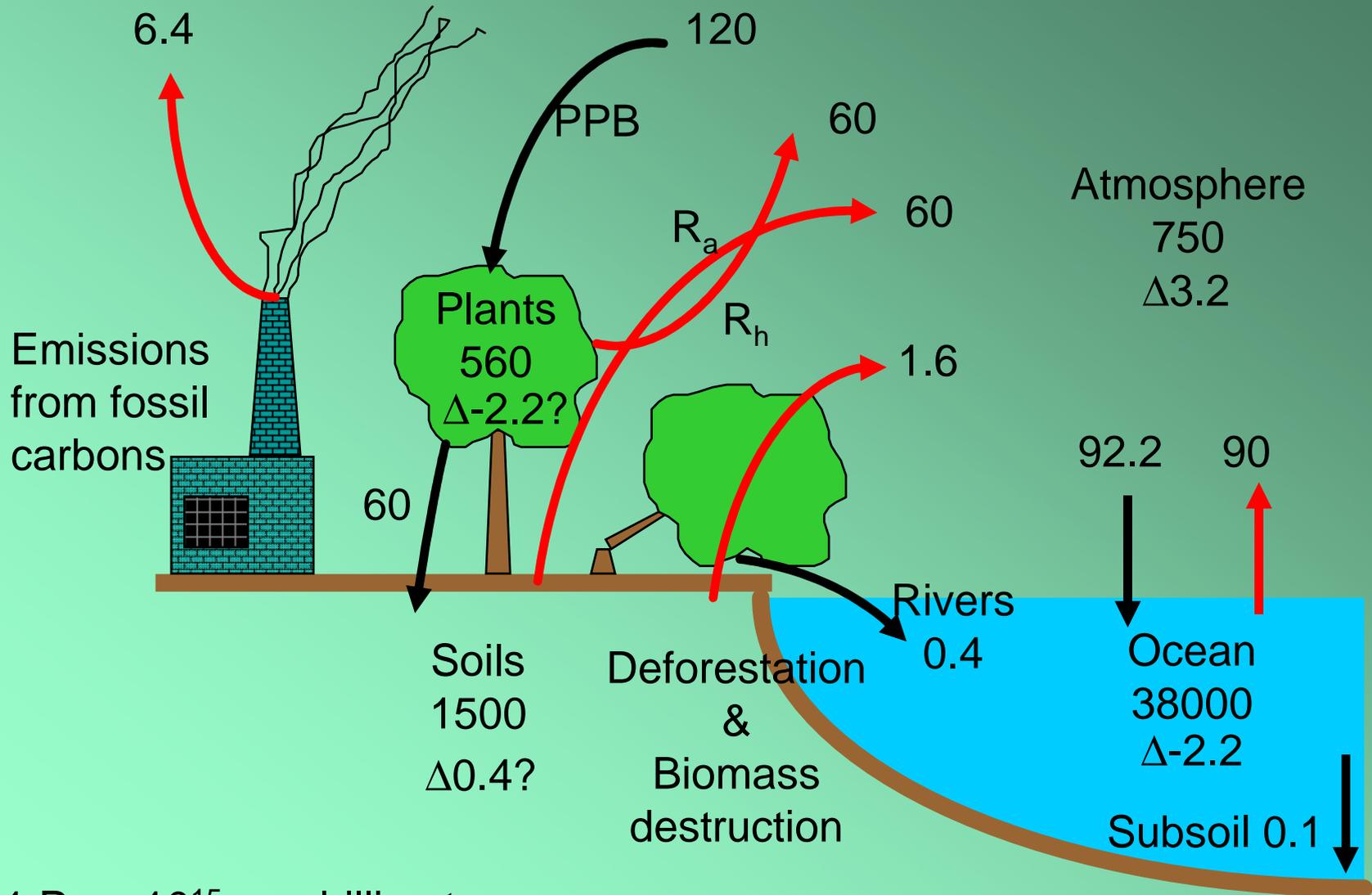
**[uoswald@gmail.com](mailto:uoswald@gmail.com)**

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download\\_oswald.html](http://www.afes-press.de/html/download_oswald.html)**



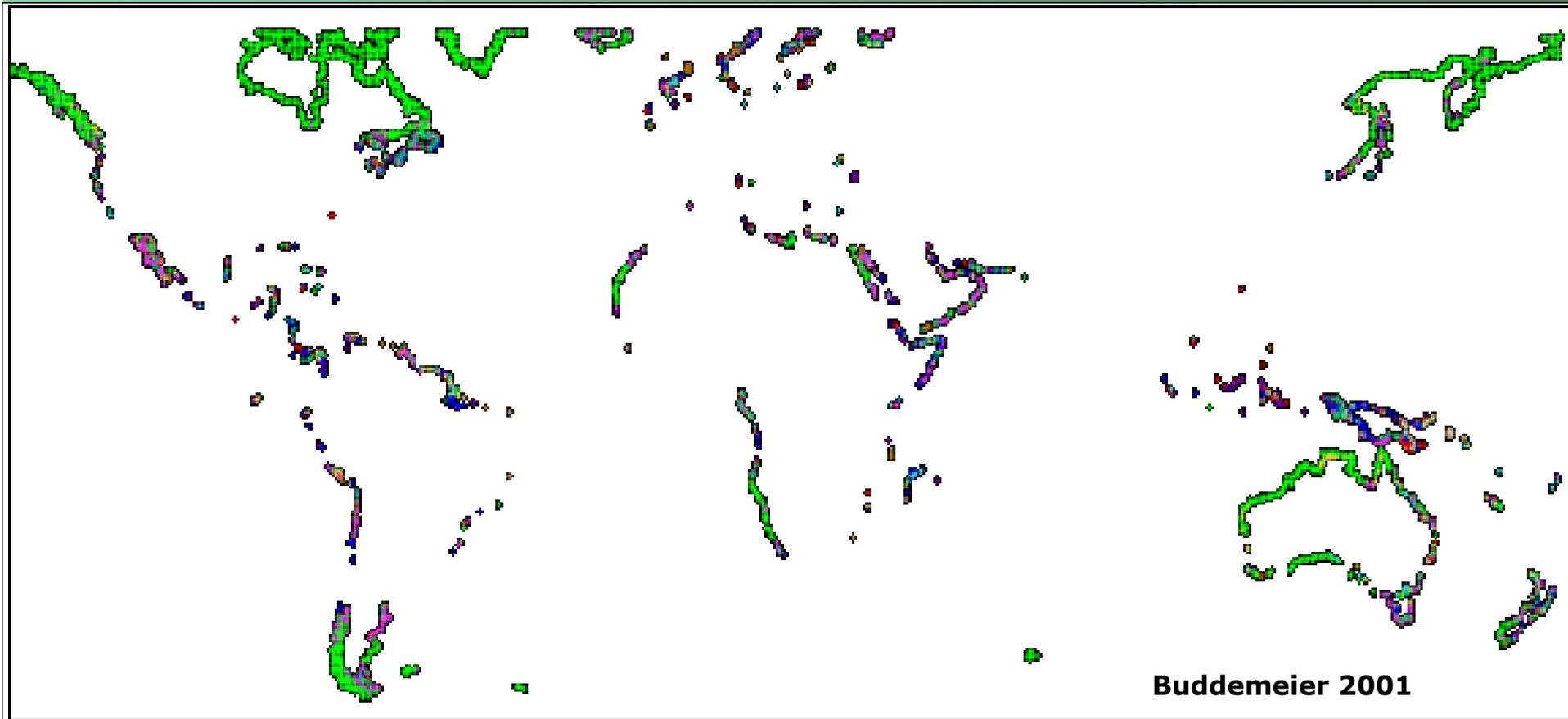
# GEC and threats to health

**Modern 7 Global Cycle of Global (Pg C)** based Schlesinger, 2003



1 Pg =  $10^{15}$  g = billion tons

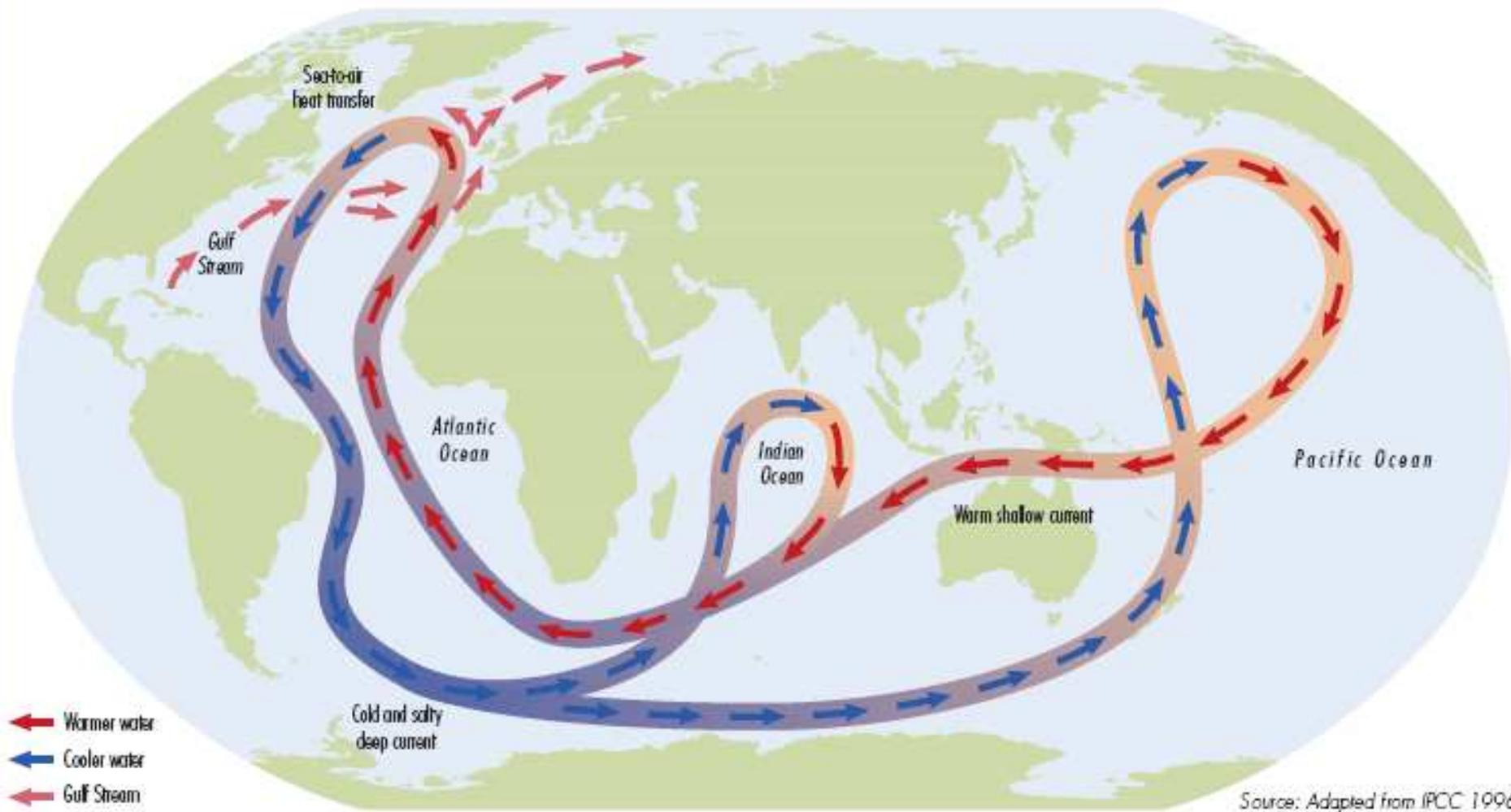
# Sea level rise and disappearance of coastal zones



Pristine coasts defined as low (<math><10/\text{km}^2</math>) with people and low agricultural use (<math><5\%</math>)

# Global Ocean Conveyor: heat wave and cold spill

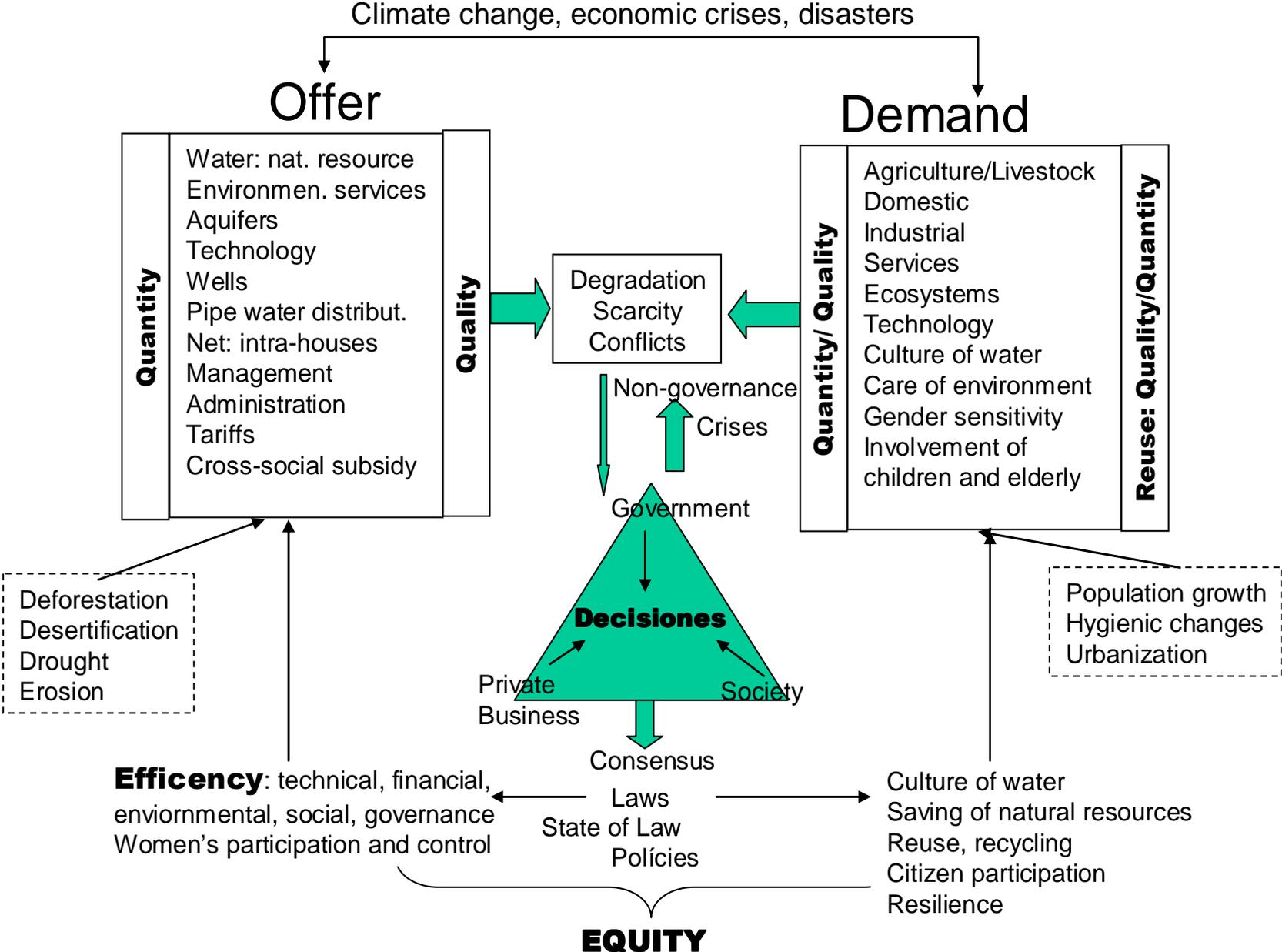
Figure 4.2 The Global Ocean Conveyor



Source: GEO-4, 2007:119



# Efficiency and Equity with Natural Resources



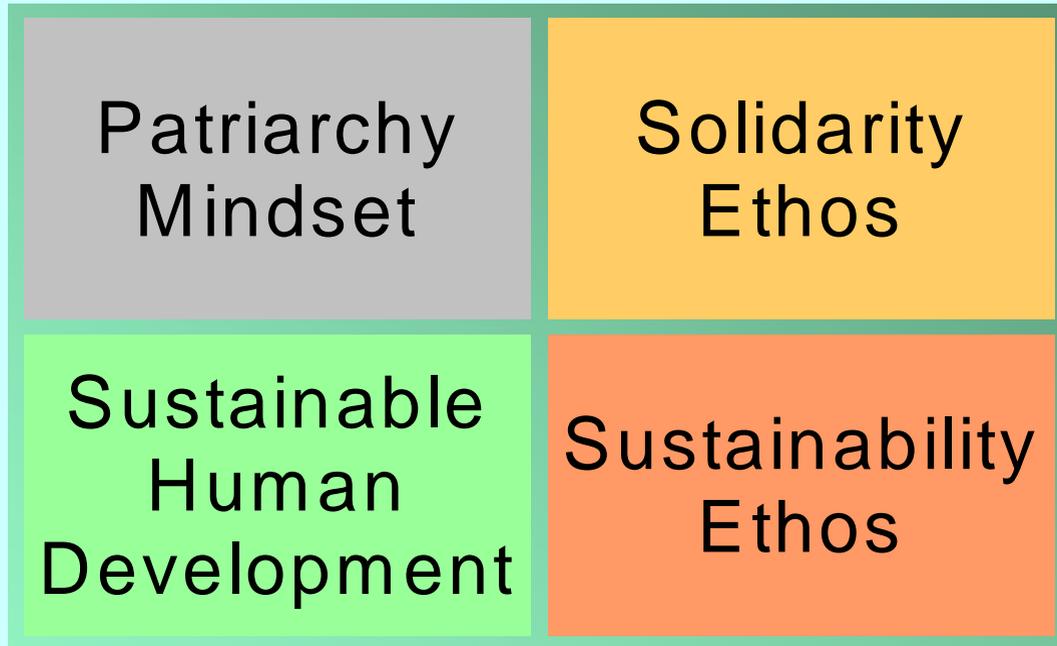
Fuente: Oswald y Sandoval, 2006

# Human, Gender, Environmental Security

<b>Determination</b> Which security?	<b>Reference object:</b> Security of whom?	<b>Value at risk:</b> Security of what?	<b>Source(s) of threat:</b> Security from whom or what?
<b>National security</b>	<b>The State</b>	<b>Territorial integrity</b>	<b>State, substate actors</b>
<b>Human security</b>	Individual, humankind	Survival of humankind people	Nature, state, globalization
<b>Environmental security</b>	Ecosystems, rural and urban systems, water and food	<b>Sustainability</b>	<b>Humankind, Nature</b>
<b>Gender security</b>	<b>Gender relations, indigenous people, minorities</b>	<b>Equity, identity, social relations, solidarity, tolerance</b>	<b>Patriarchy, totalitarian institutions (élites, governments, religious fundamentalism, dominant cultures), intolerance</b>

**Patriarchal Hegemony has a Negative Influence on Solidarity**  
 (i.e., as patriarchy increases, solidarity decreases)  
 ? ? ? ? ? ? ? ? ? ? (-)

(-)  
**Sustainable Human Development has a Negative Influence on Patriarchy**  
 (i.e., as human integral development increases, patriarchy decreases)  
 ?  
 ?  
 ?  
 ?  
 ?  
 ?  
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?  
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 ?  
 (+)

**Solidarity has a Positive Influence on Sustainability**  
 (i.e., as solidarity increases, sustainability increases)

(+)? ? ? ? ? ? ? ? ? ?  
**Sustainability has a Positive Influence on Human Development**  
 (i.e., as sustainability increases, human development increases)

Source: Luis T. Gutierrez, 2008