



Global Change and Health Security

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Index

1. Health security: some definitions
2. How could GEC affect health?
3. Population growth and human wellbeing
4. GEC and threats to health
5. Water-born and vectors illnesses
6. Air pollution and health effects
7. Public policy of mitigation and adaptation
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**.

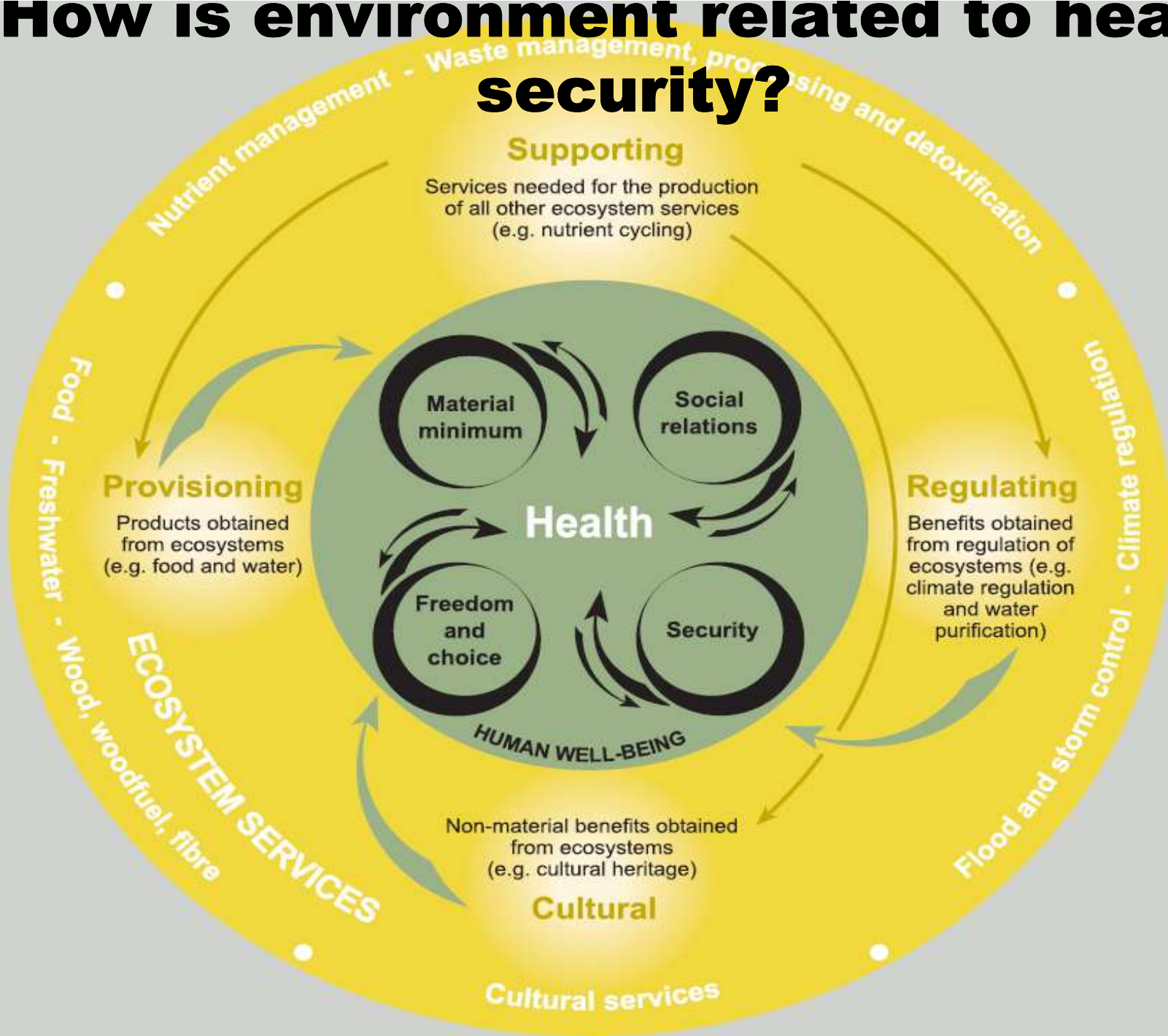
Definitions of Health Security

- 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**) .

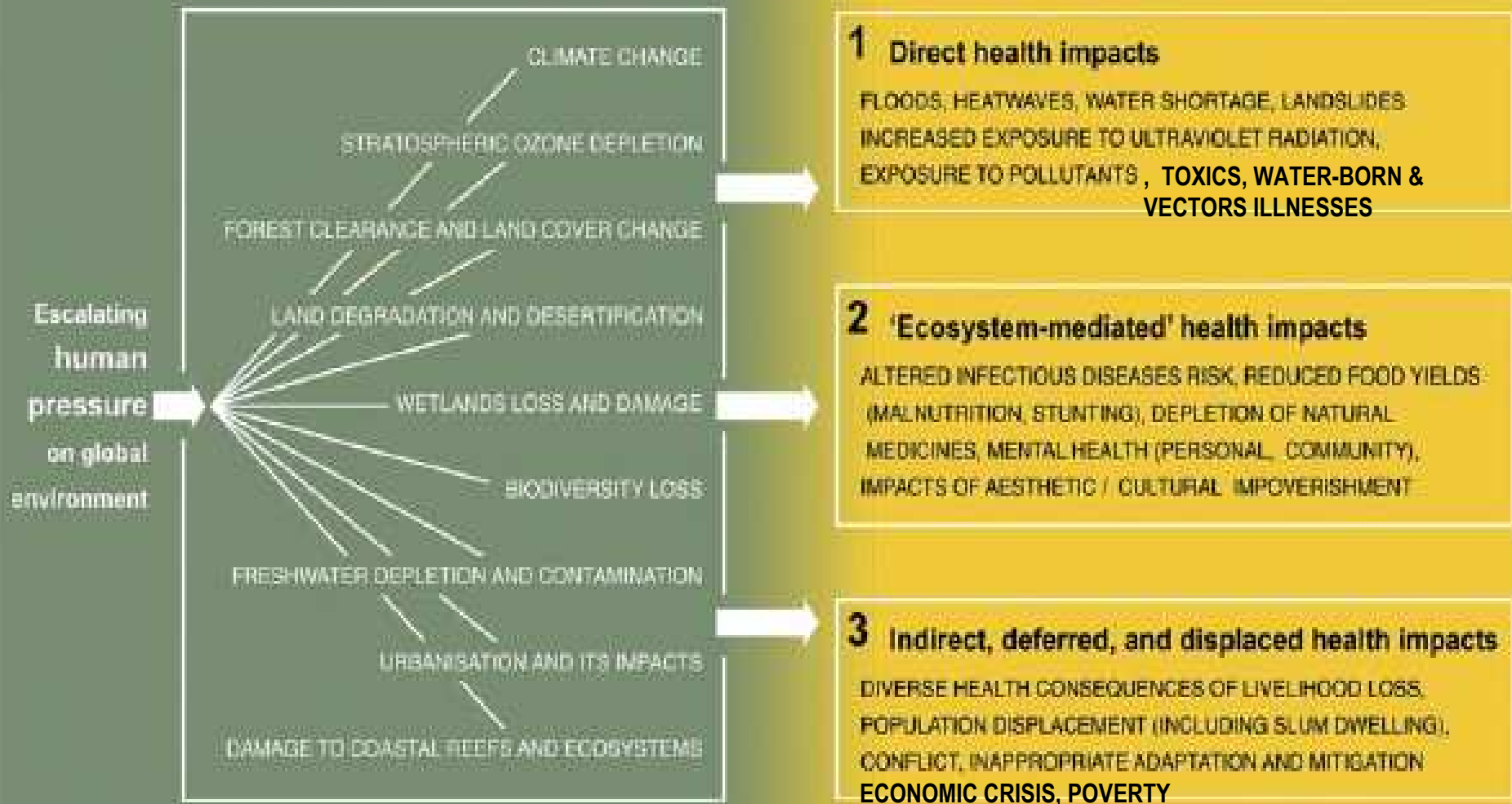
How is environment related to health security?



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

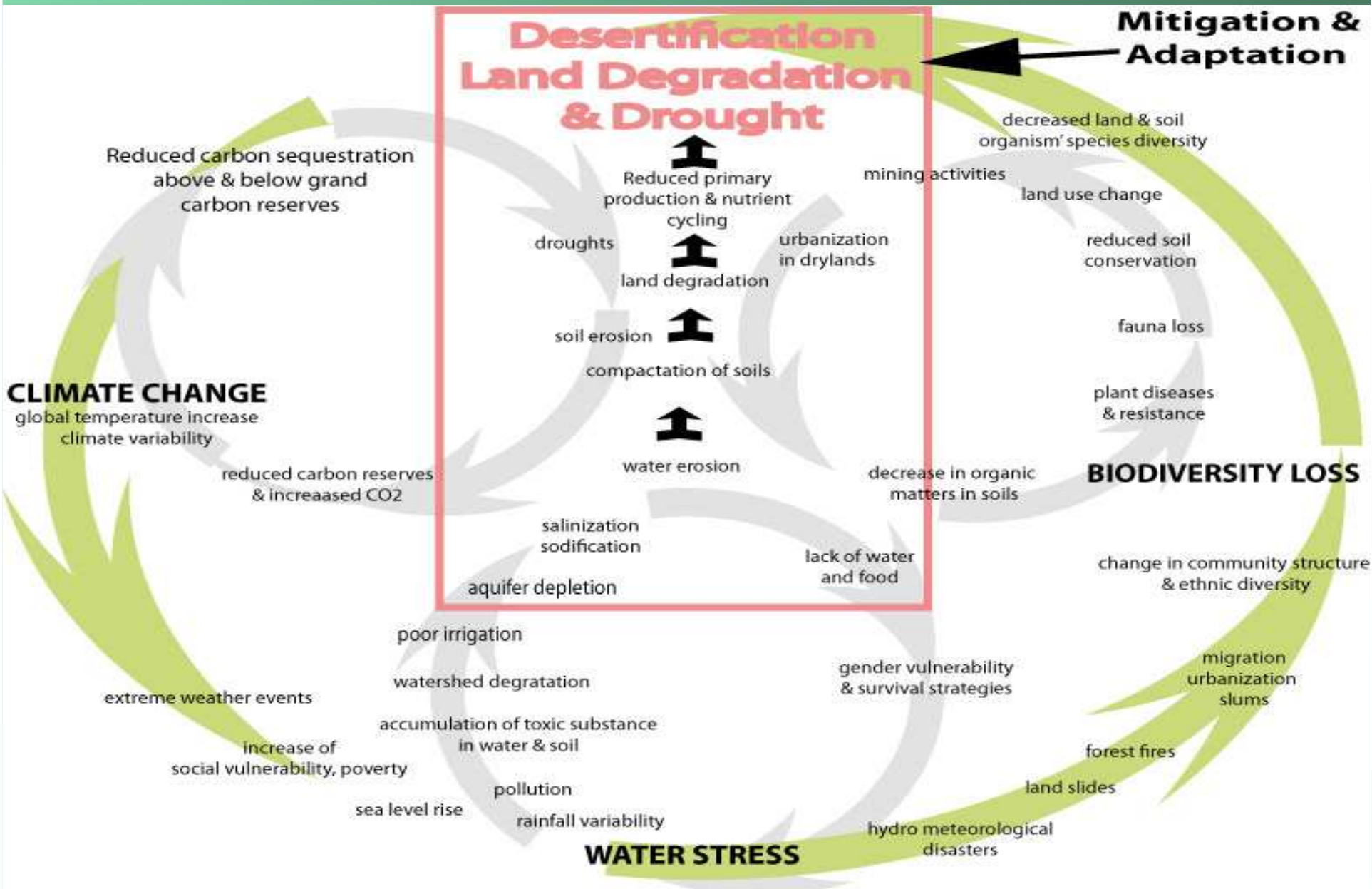
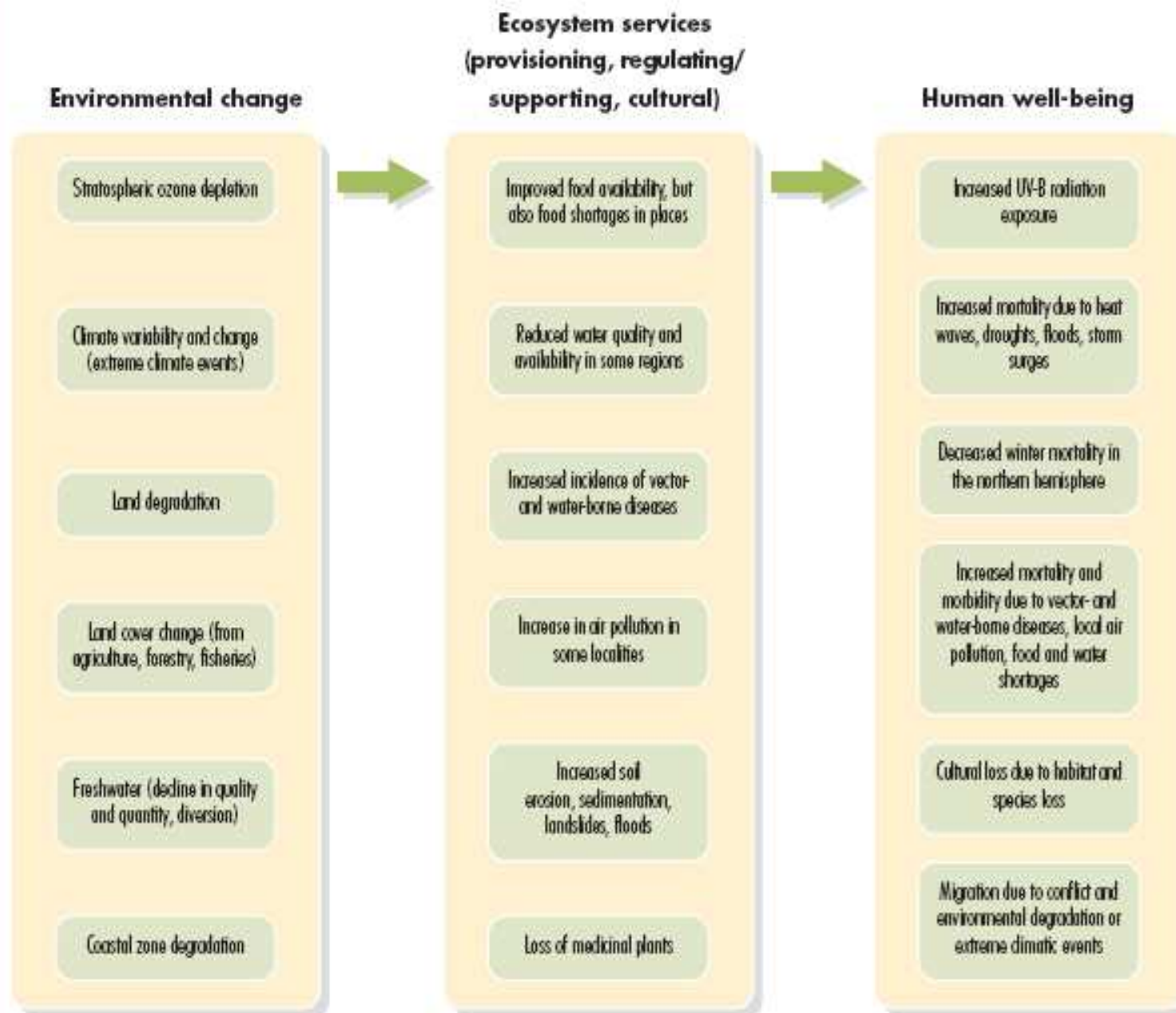
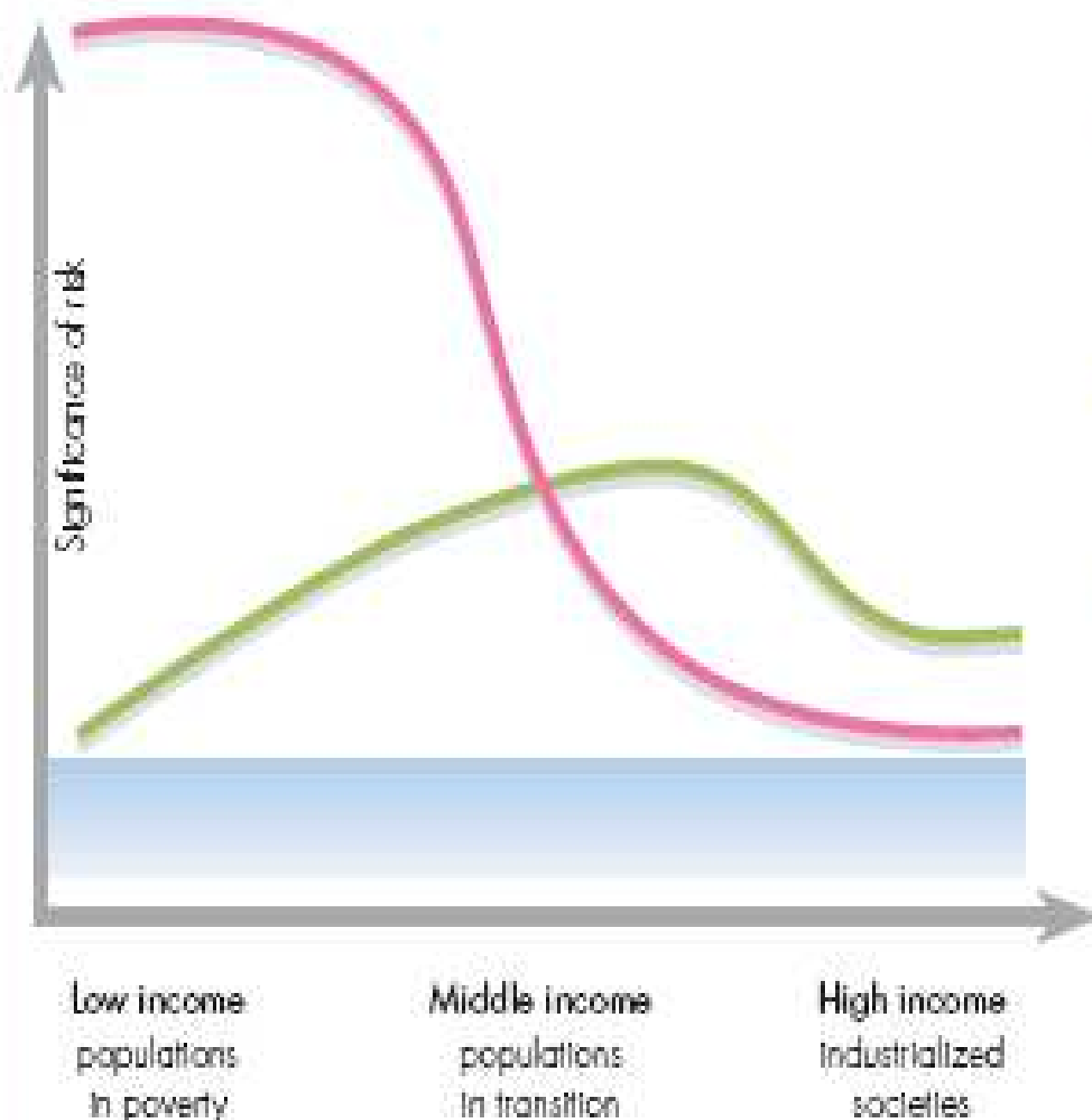


Figure 8.6 Multiple environmental changes and their effects on human well-being constituents and determinants



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

Source: Adapted from Gordon and others 2004

10 leading risk factors

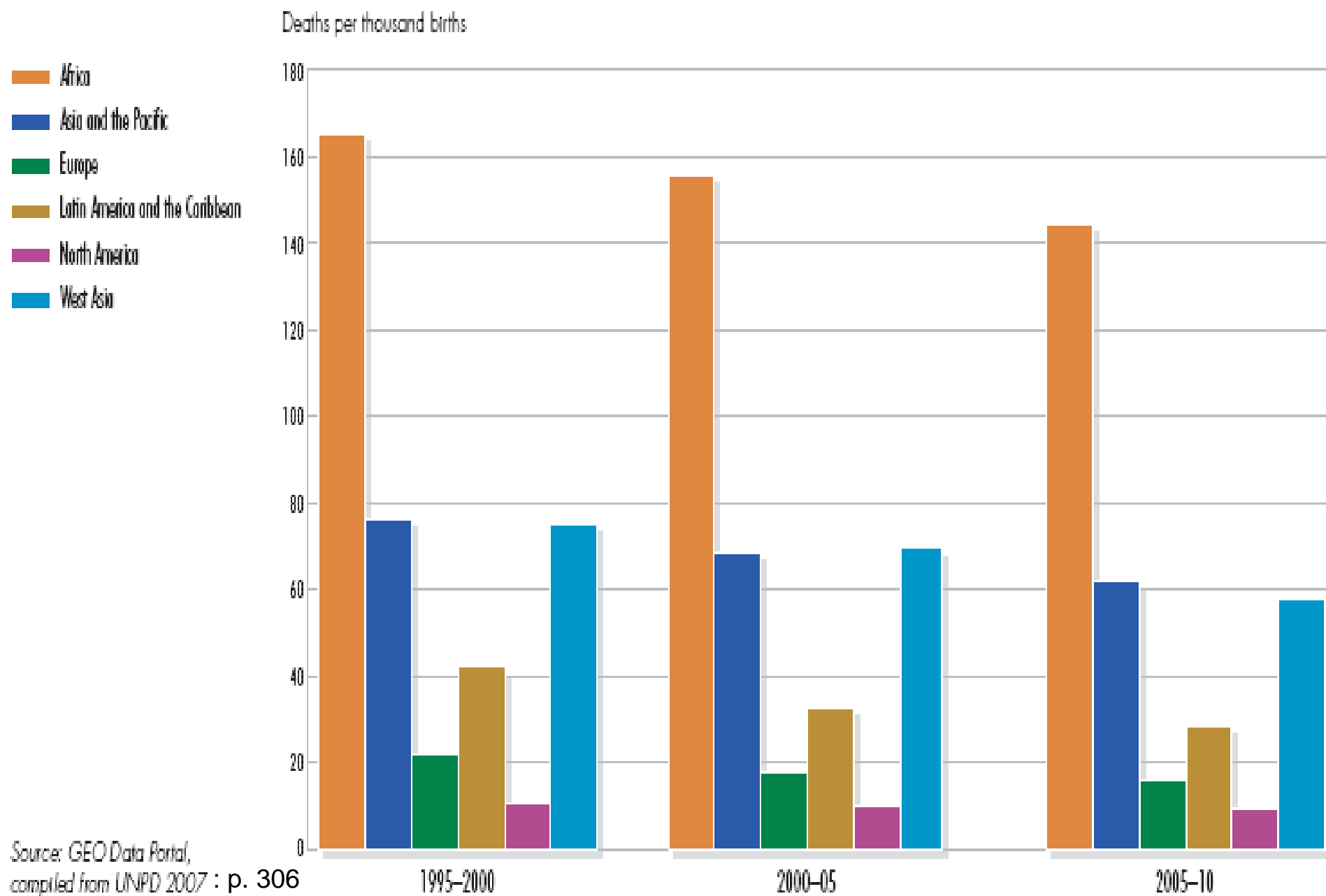
Table 7.1 Estimated attributable and avoidable burdens of 10 leading selected risk factors

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.

Source: WHO 2002

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



Limits of Growth: threats to humans and environment

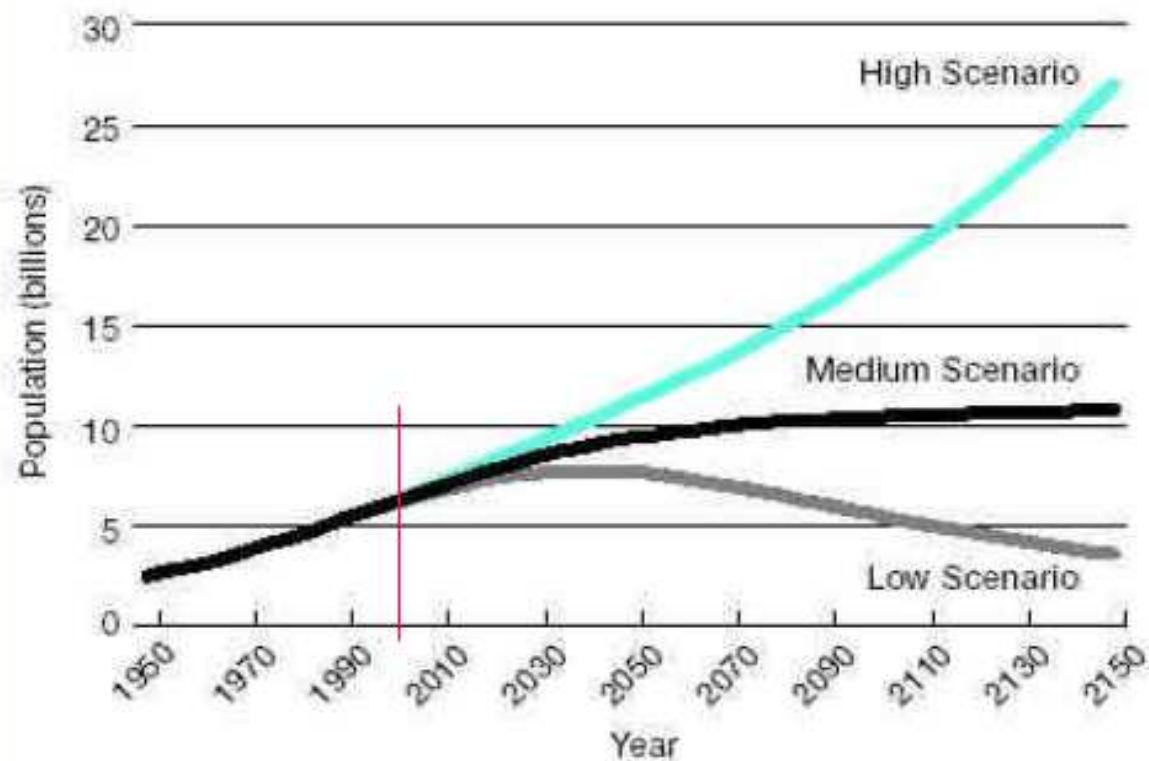
1. Metabolism of populations
2. Charge and transformation of an ecosystem
3. Capacity of biomass to produce prime material and ecosystem services
4. Ecological footprint

Club of Rome, 1972

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

World Population: Three Alternative Scenarios

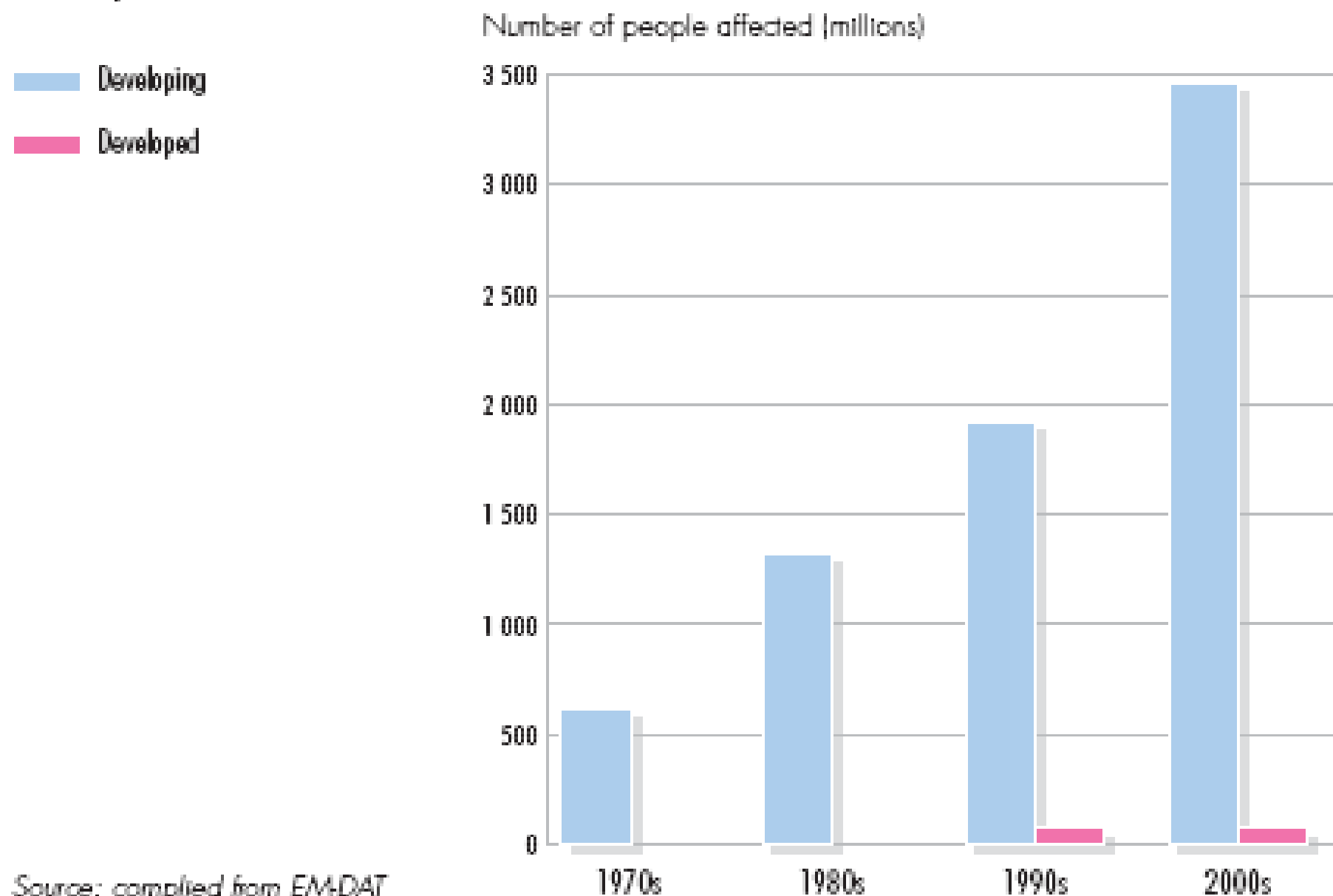
This chart shows three possible paths of future population growth.



Source: United Nations.



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

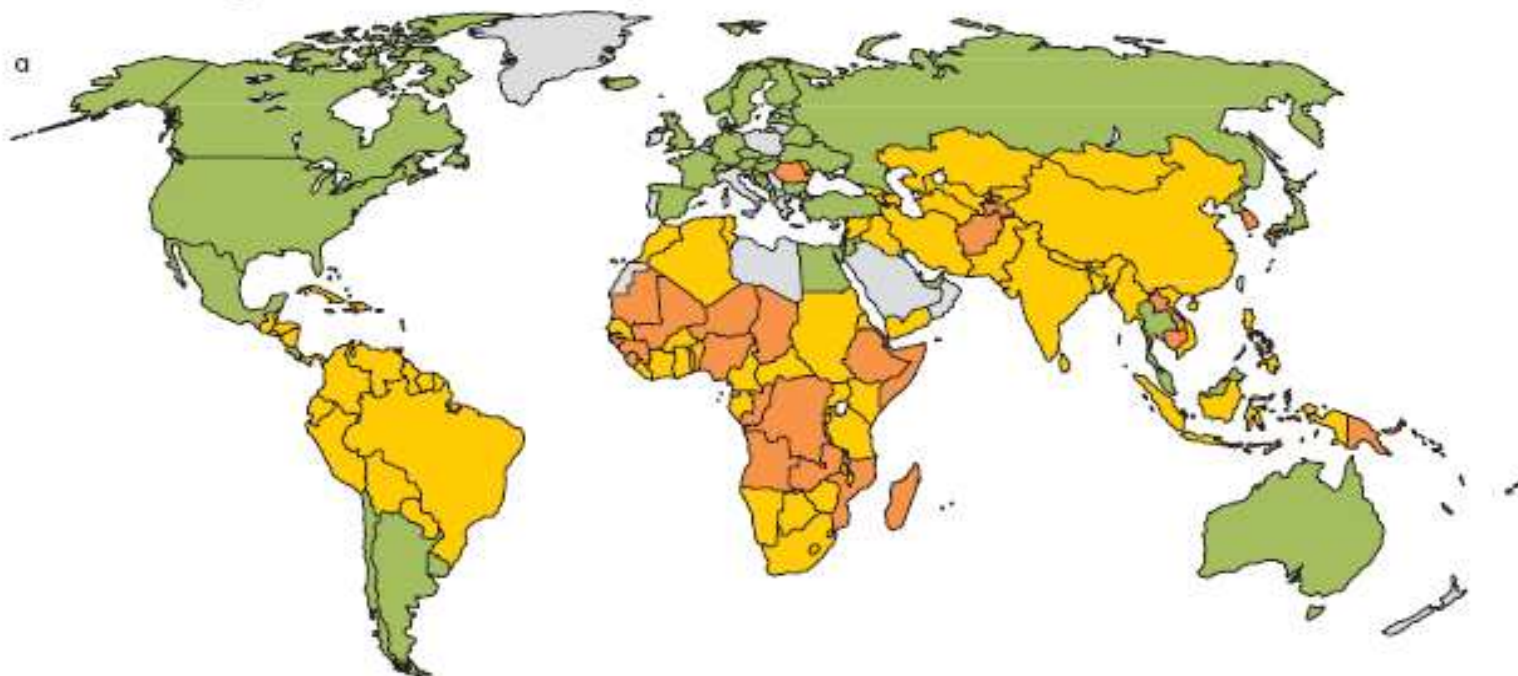


A photograph of a person, likely a woman, sitting under a large, pink mosquito net. The net is draped over her head and body, leaving only her face visible. She is wearing a light-colored, patterned shirt. The background is dark and cluttered, with various items hanging on the wall, including a red cloth and a blue cloth. The overall lighting is dim, suggesting an indoor setting at night or in a shaded area.

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



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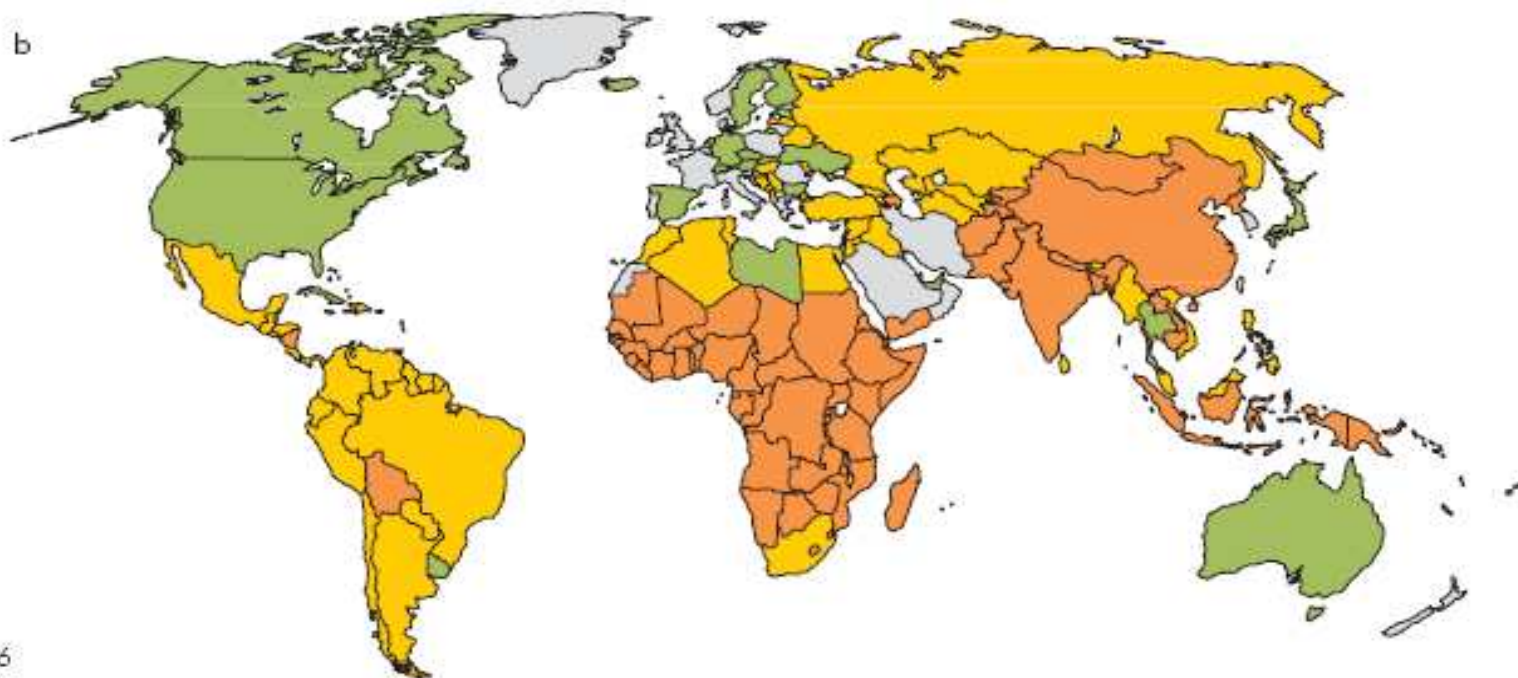
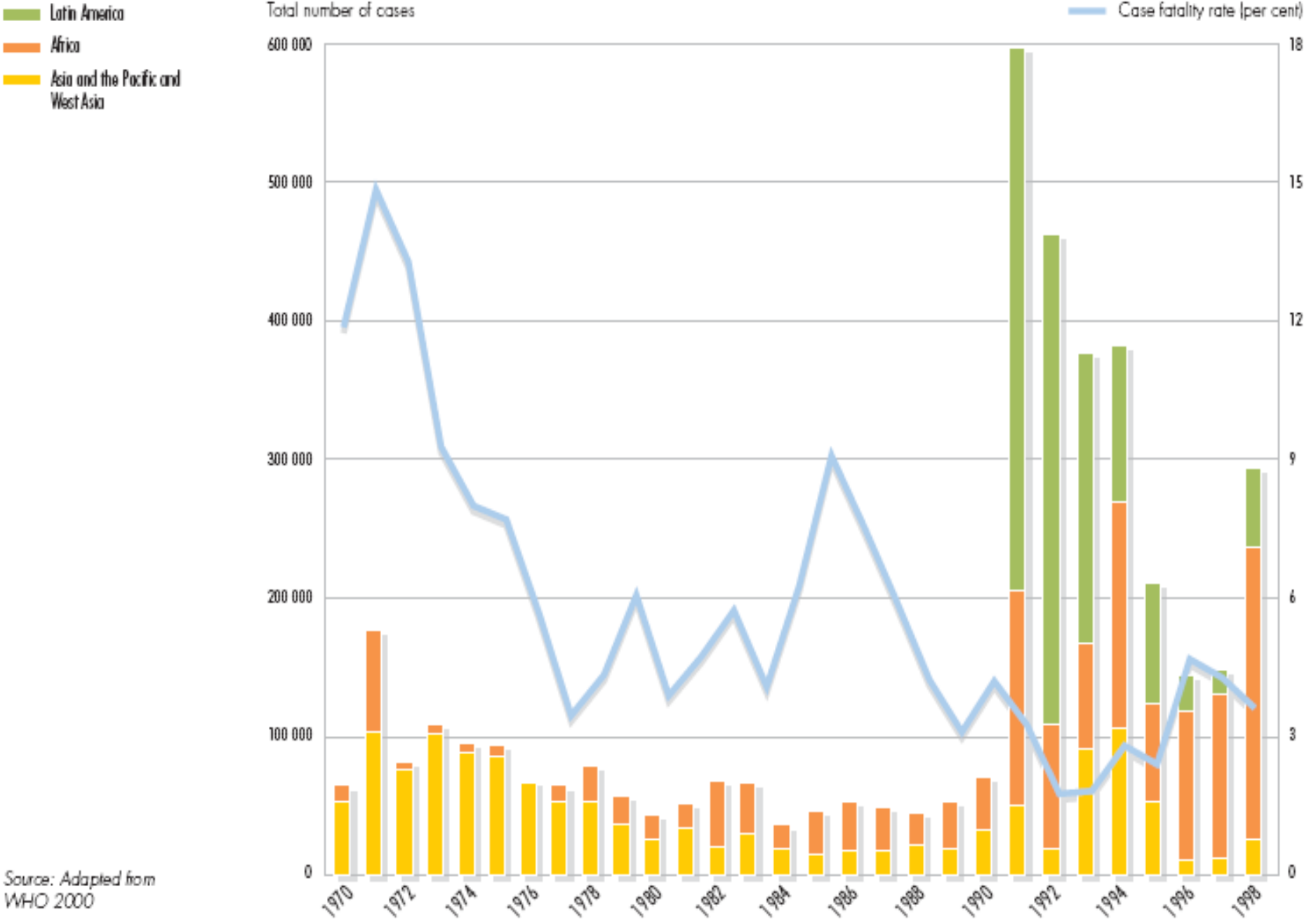


Figure 4.7 Reported cholera cases and fatalities by region

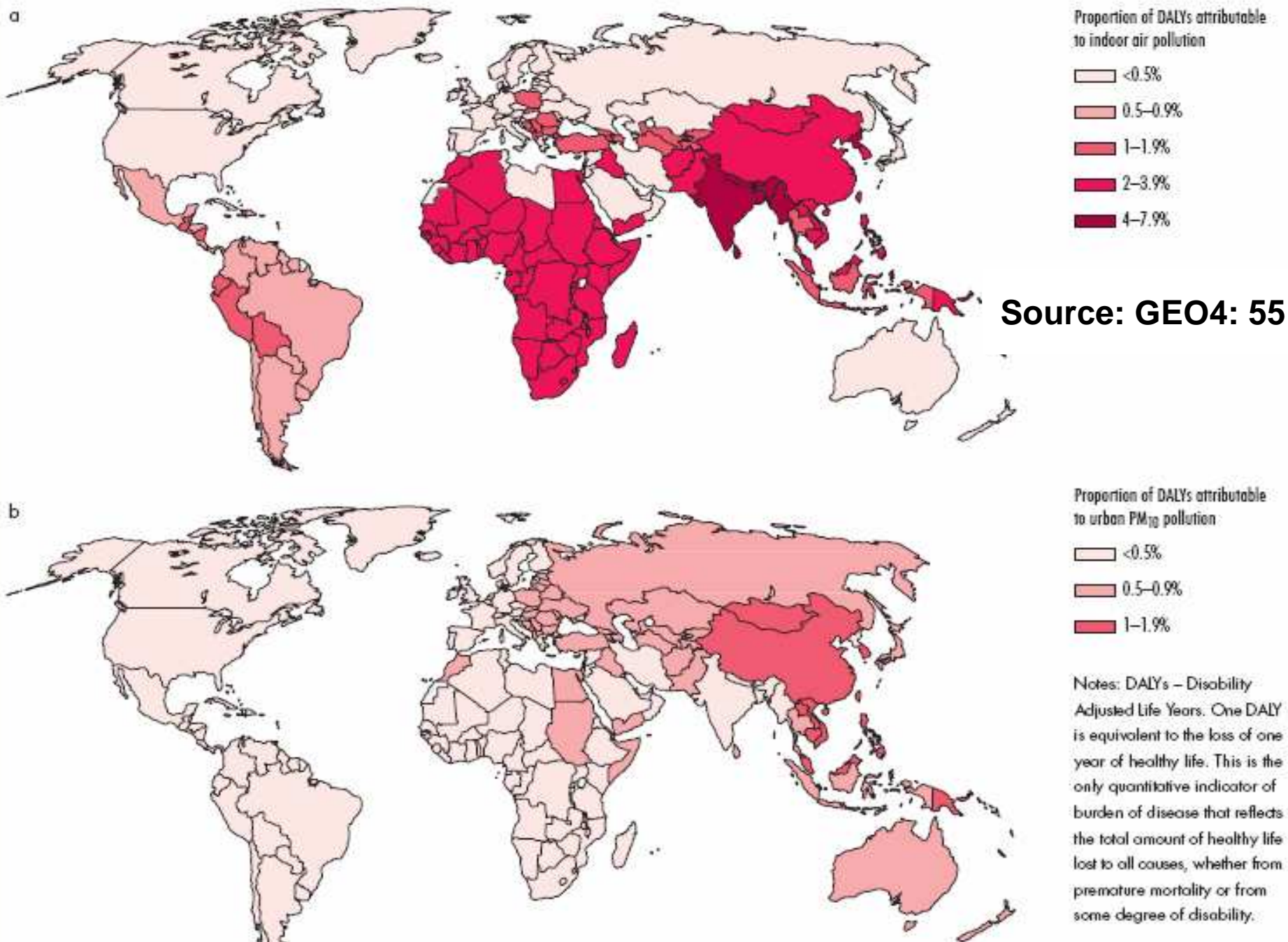


Source: Adapted from WHO 2000

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 PM₁₀ pollution, measured in DALYs



Air pollution and health effects, Mexico

Effects in Health

Mortality	11, 066'610
Chronic Bronchitis	2,754,470
Hospitalization due to air-born illness	4,456
Hospitalization due to cardio-vascular illn.	65,851
Loss of working days	46,908

Economic Impacts (US\$)

(Pulmonary atrophy in children in Netzahualcoyotl& Iztapalapa)

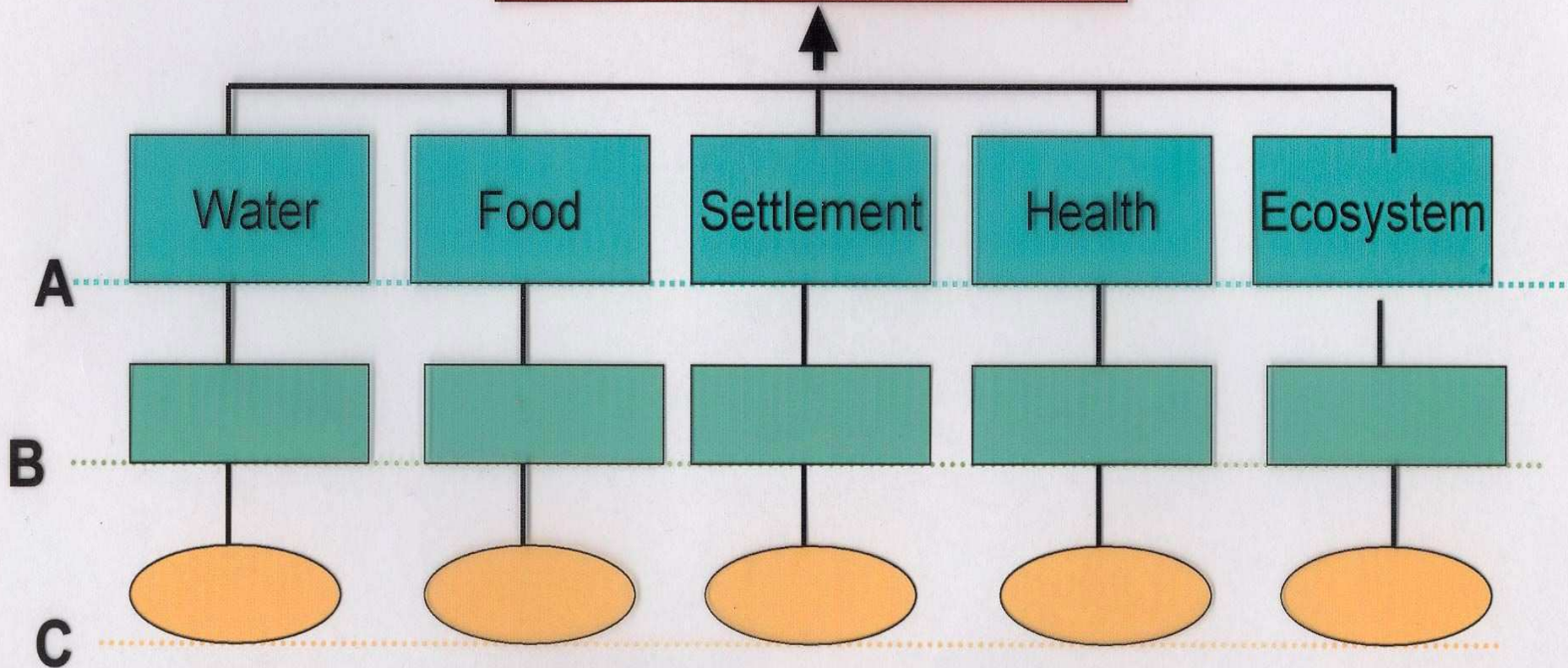
Microbus drivers in Morelos

Very high, when living beside roads

98% of drivers

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

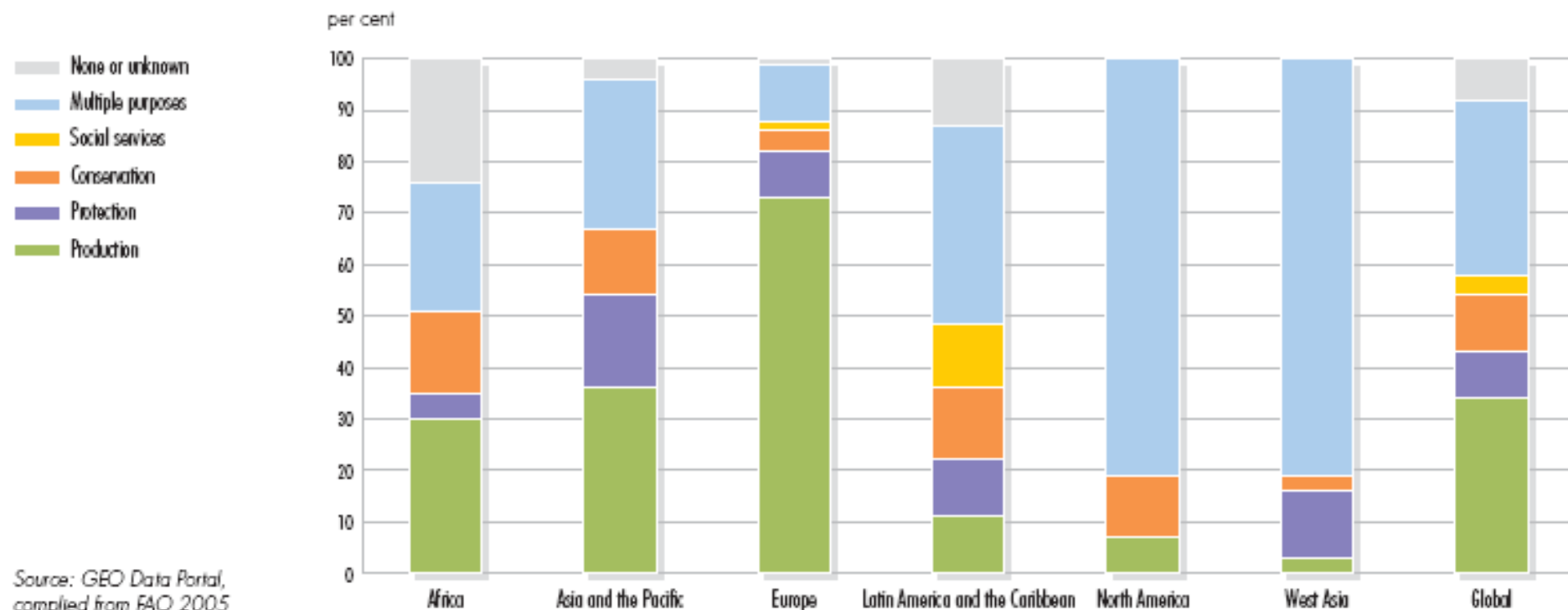
Vulnerability to Global Environmental Change



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

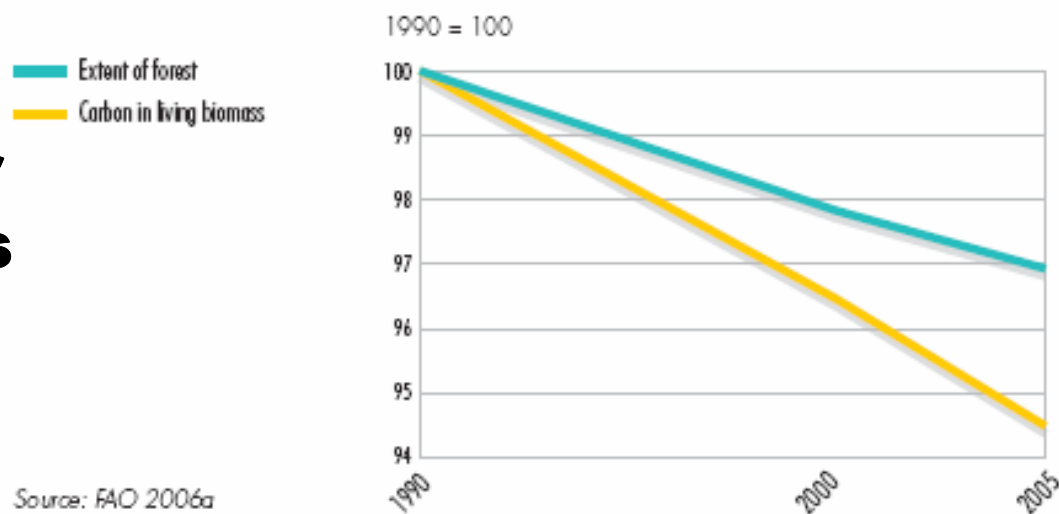
$$\text{Vulnerability} = f(\text{sensitivity, adaptability, exposure})$$

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

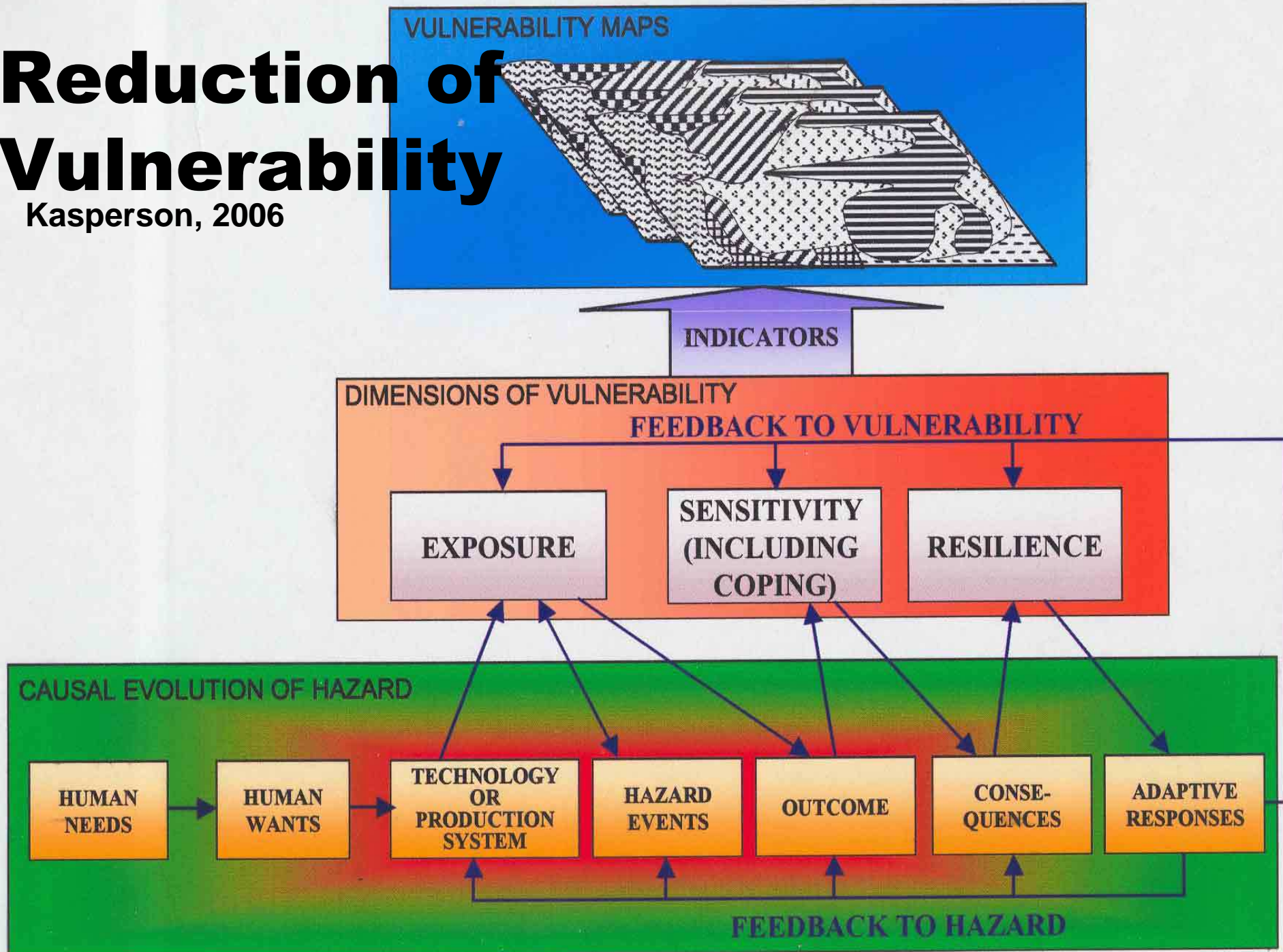
Urban complexity	Threats for Vulnerable	Mitigating vulnerability	Adaptation mechanisms
Social, political, economic, technological conflicts	Physical infrastructure, economic model, public insecurity	Insurance, urban planning, tax reform, science and technological applications, PPP	Urban management, subregional 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

A photograph of a train at a station platform. The train is silver and black, with the number 'E231-001' visible on its front. It is stopped at a platform where several people are waiting. The platform has a yellow tactile paving strip along the edge. In the background, there are some buildings and a blue tarp covering some equipment. The text 'Public Policy of Mitigation and Adaptation' is overlaid in yellow on the lower part of the image.

Public Policy of Mitigation and Adaptation

Reduction of Vulnerability

Kasperson, 2006





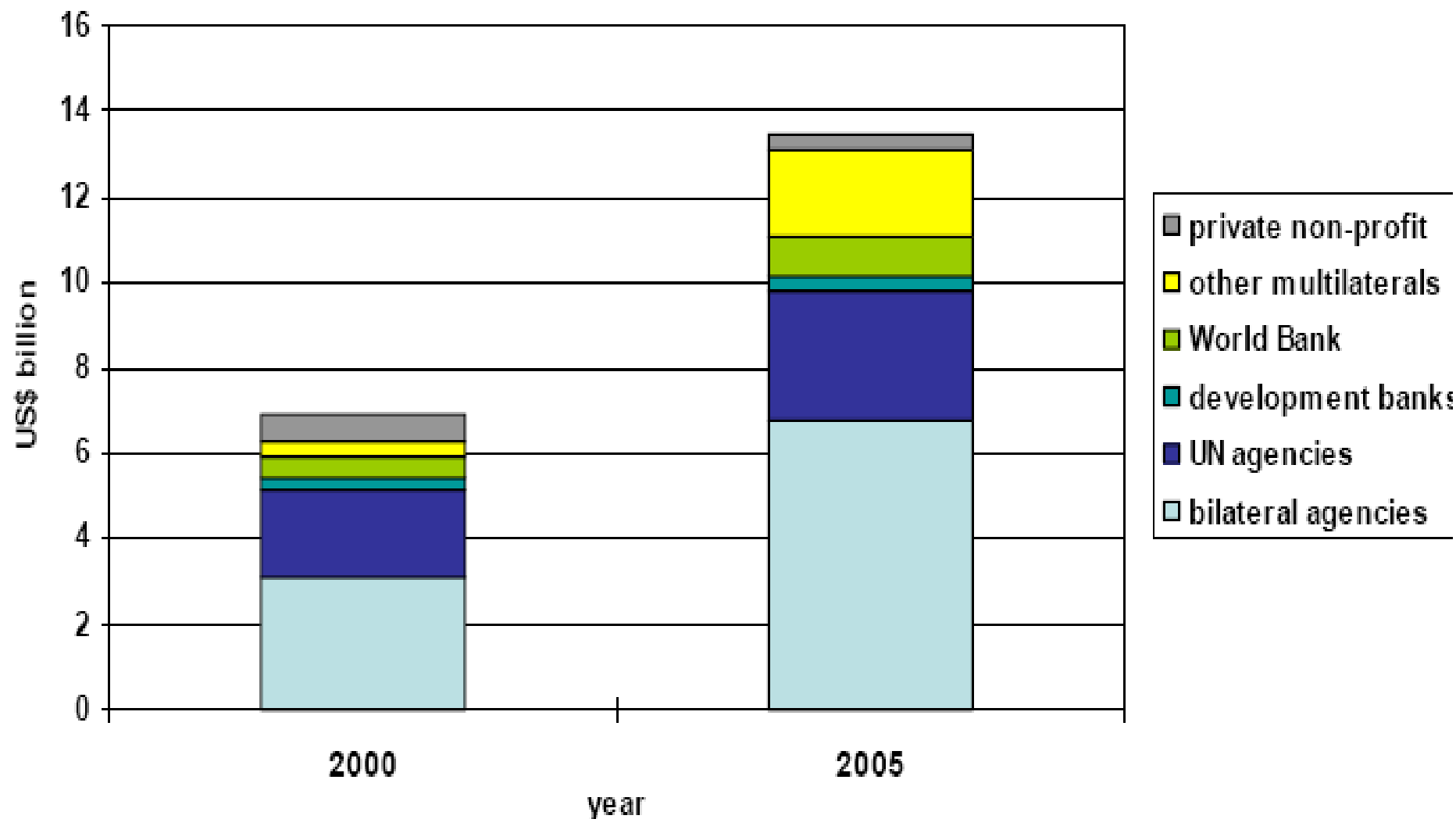
Vaccination campaign in El Salvador.

- 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



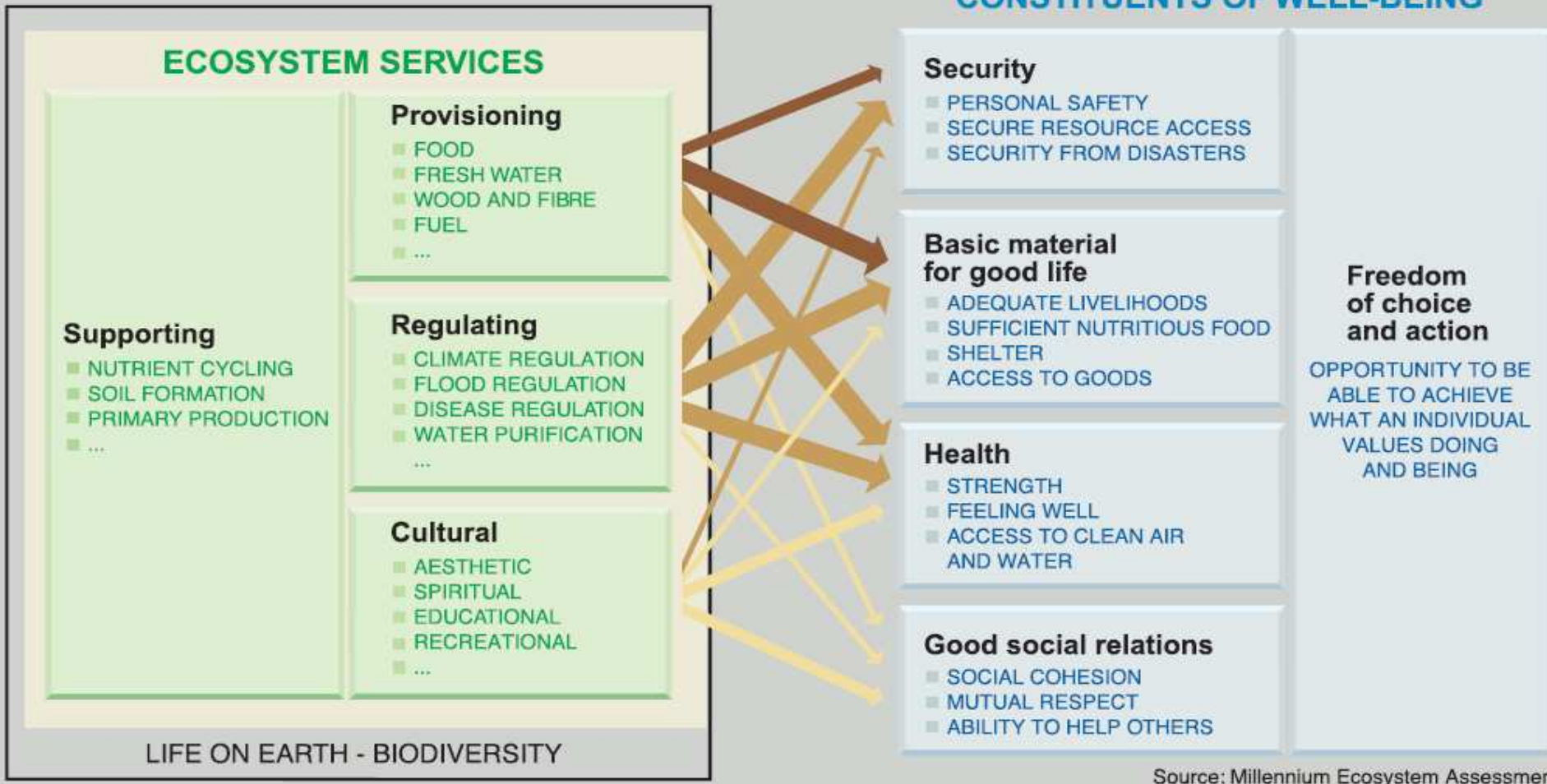
Development Assistance for Health by Source, 2000 and 2005



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 CATEGORIES OF ECOSYSTEM SERVICE



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

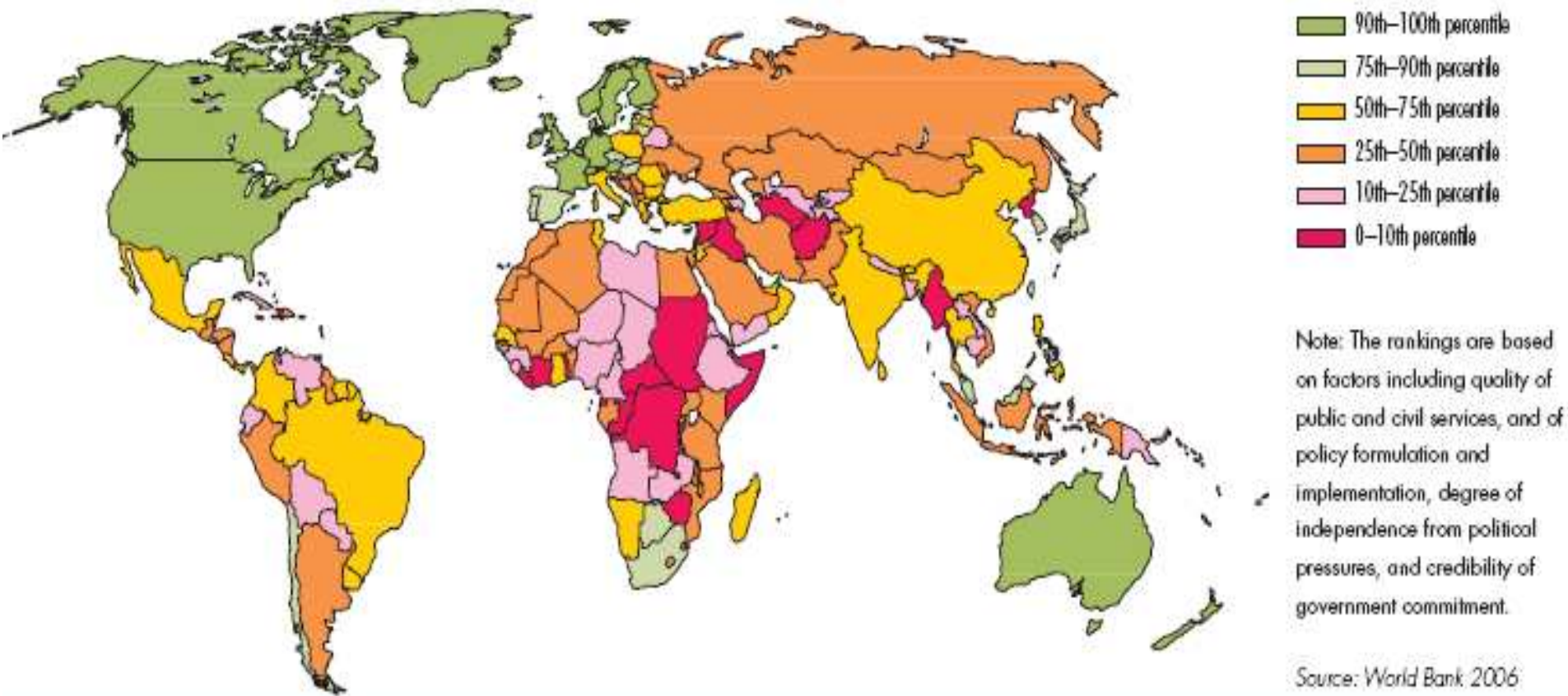
Integration of National Plan of Development with **Sectorial Plans, State and Municipal Plans**

Prevention and permanent monitoring

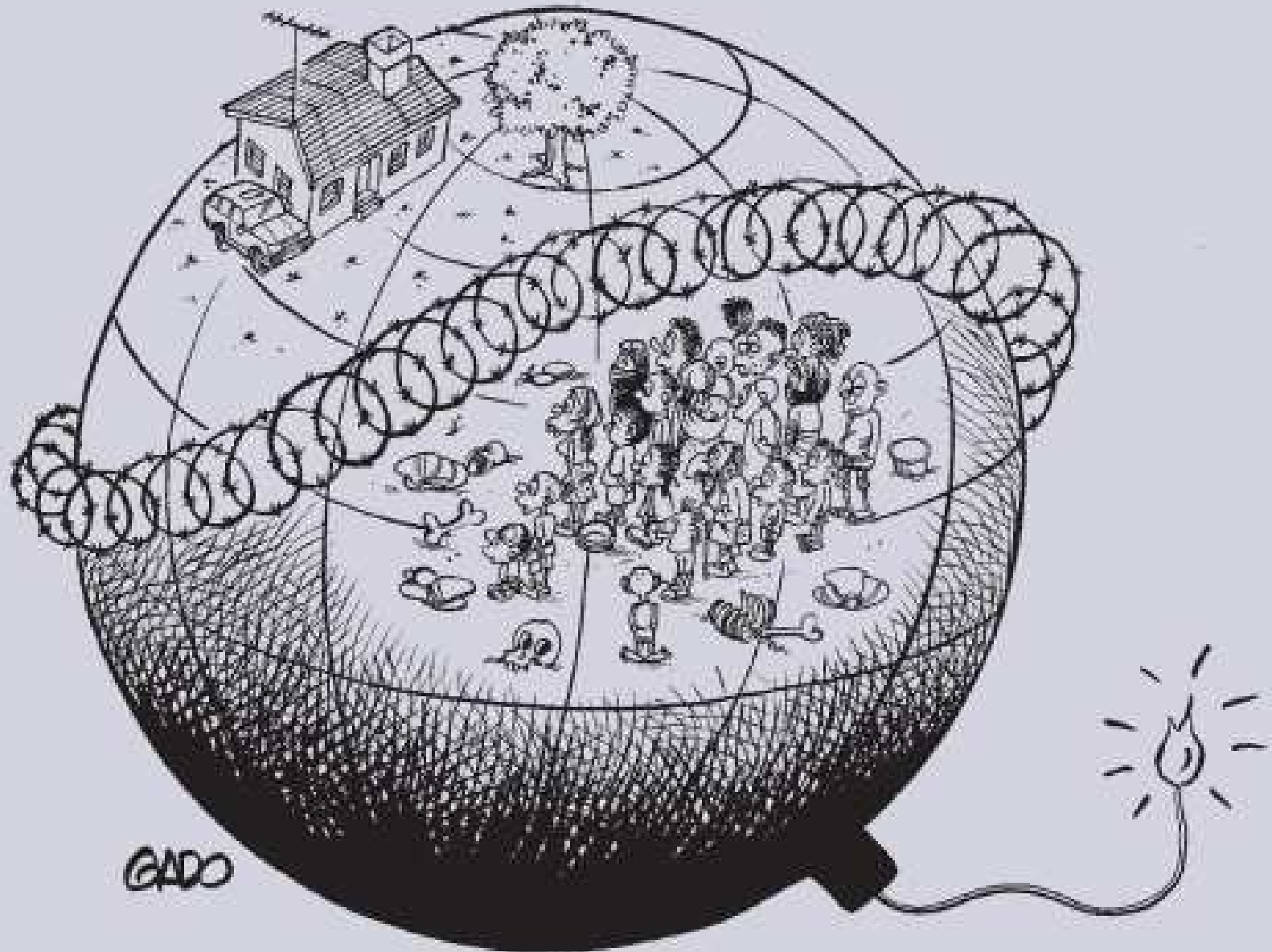
Rigorous evaluation and modification

Government effectiveness

Figure 7.5 Government effectiveness (2005)

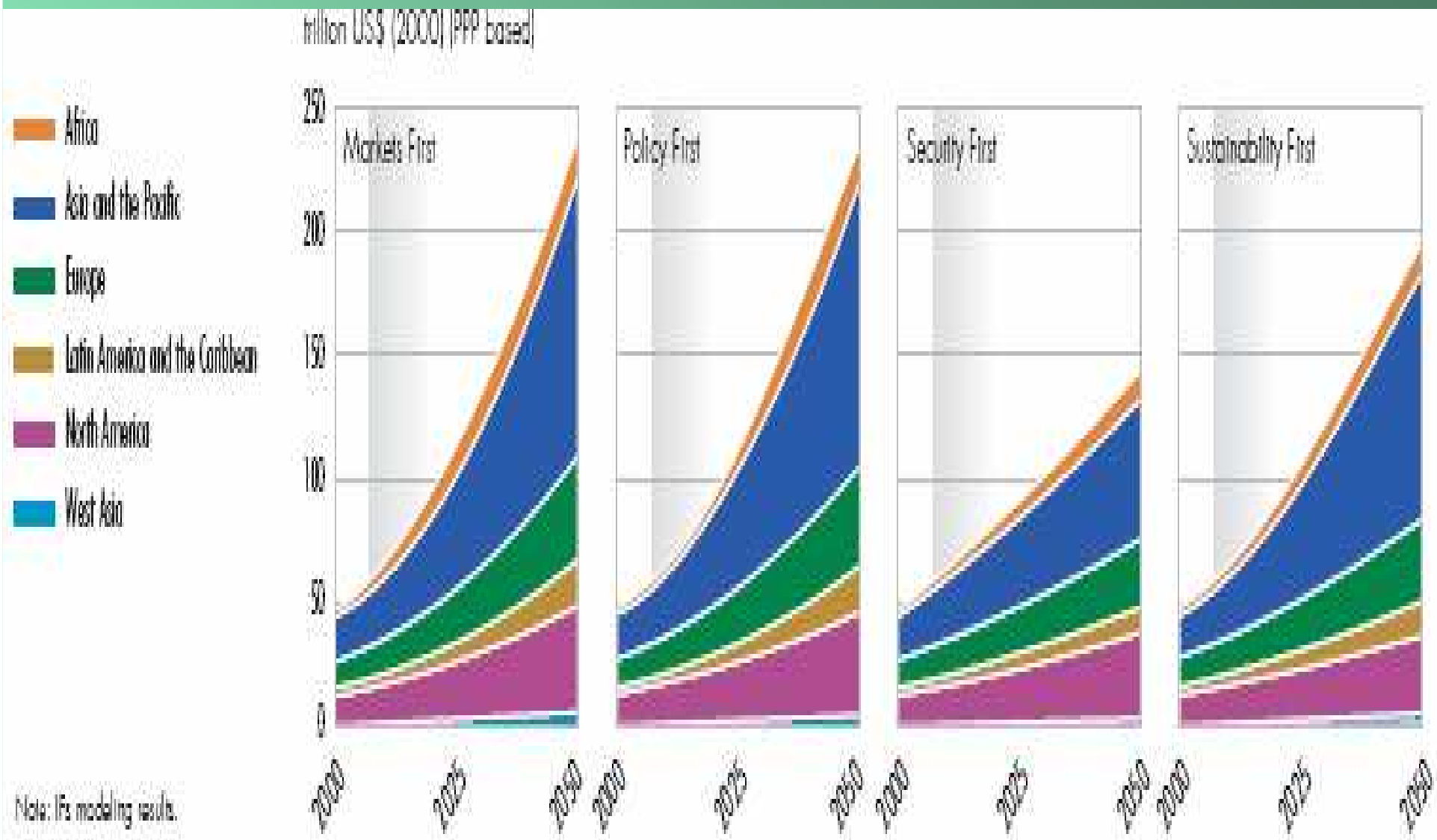


Future Scenario?



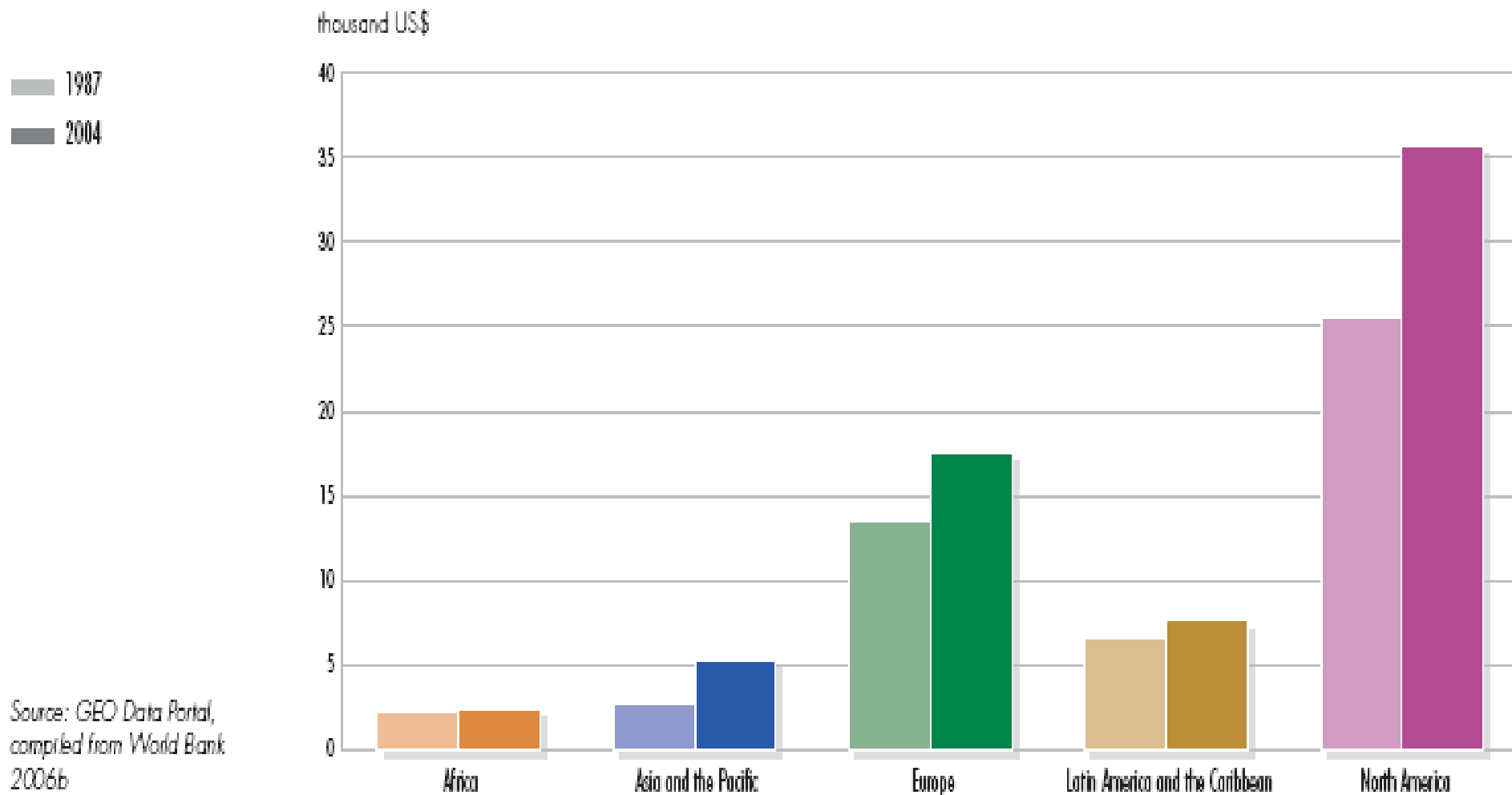
Four Models of Development

(Source: UNEP, GEO-4, 2007)



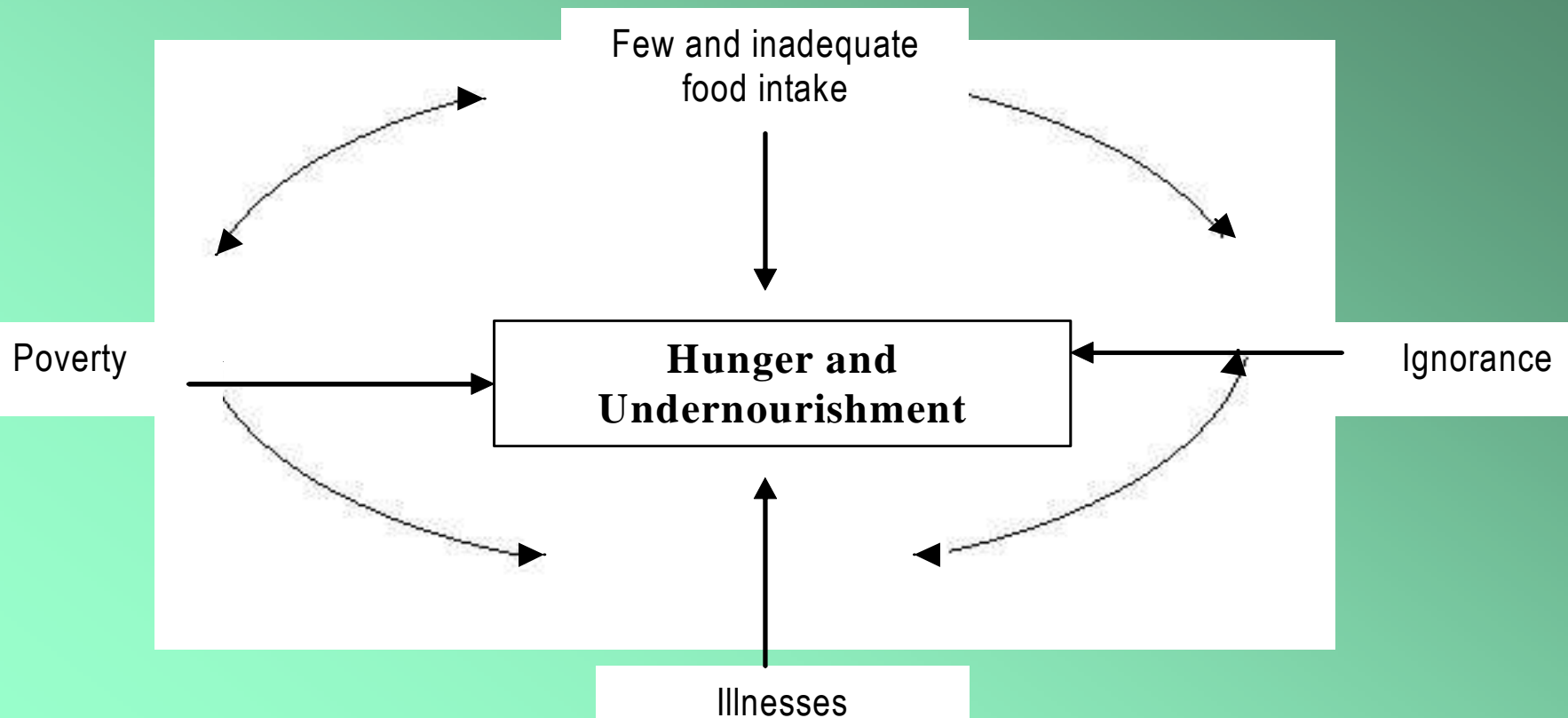
Poverty alleviation? GEO-4, 2007: 23

Figure 1.7 Gross domestic product – purchasing power parity per capita

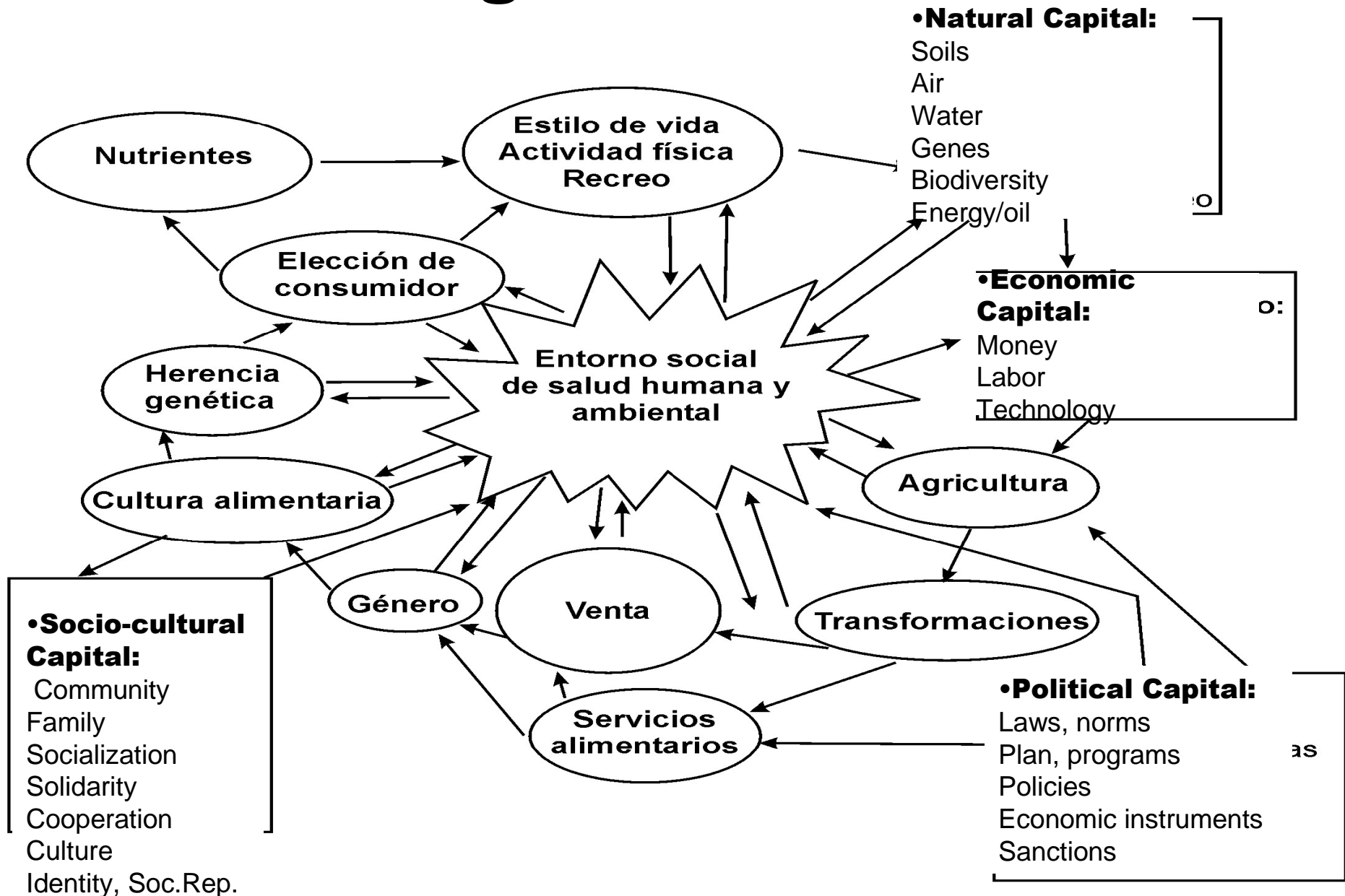


Survival strategies, micro business and local food sovereignty

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



Health integrated in Environment

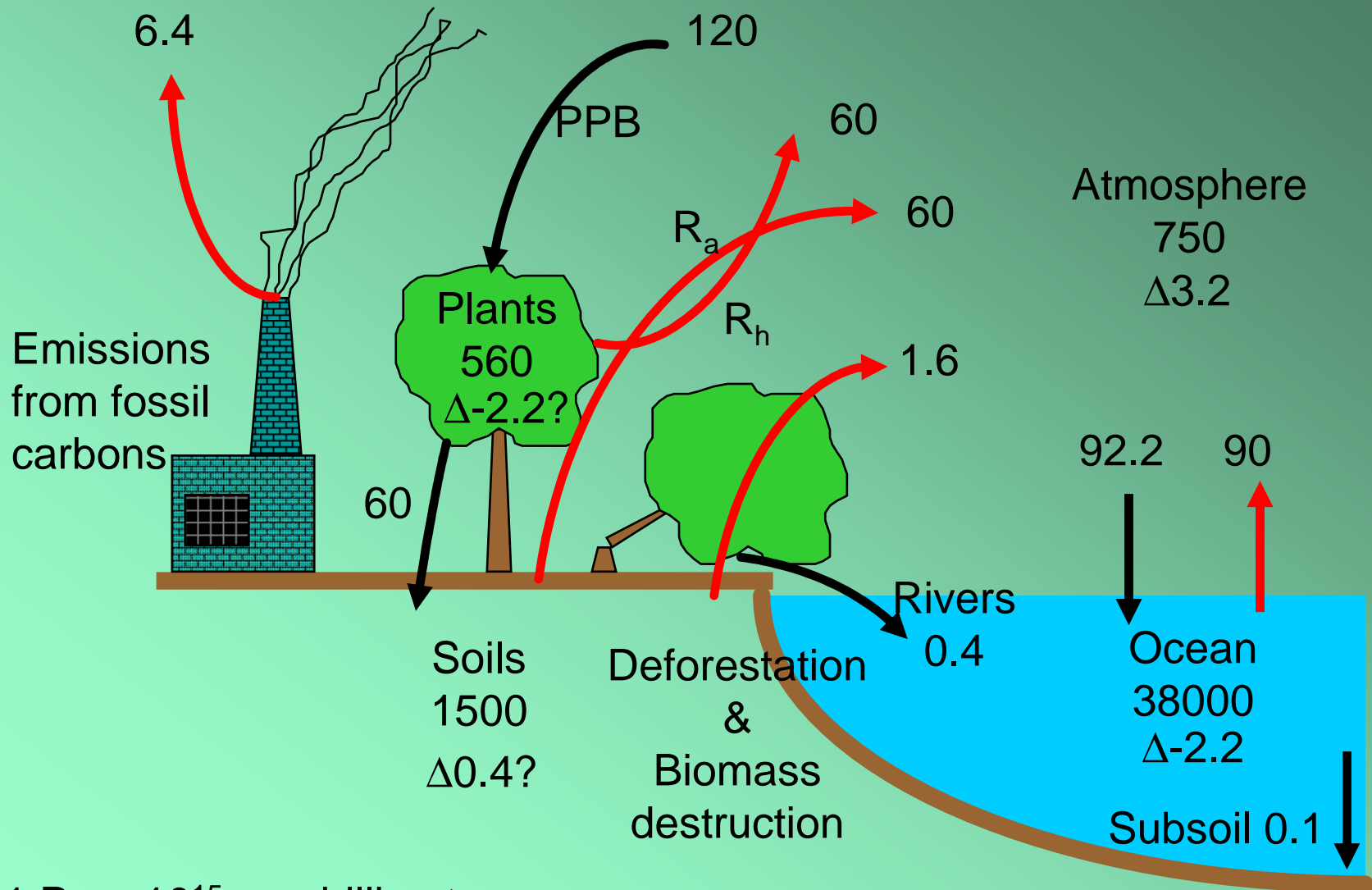


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uoswald@gmail.com
**[http://www.afes-press.de/html/
download_oswald.html](http://www.afes-press.de/html/download_oswald.html)**



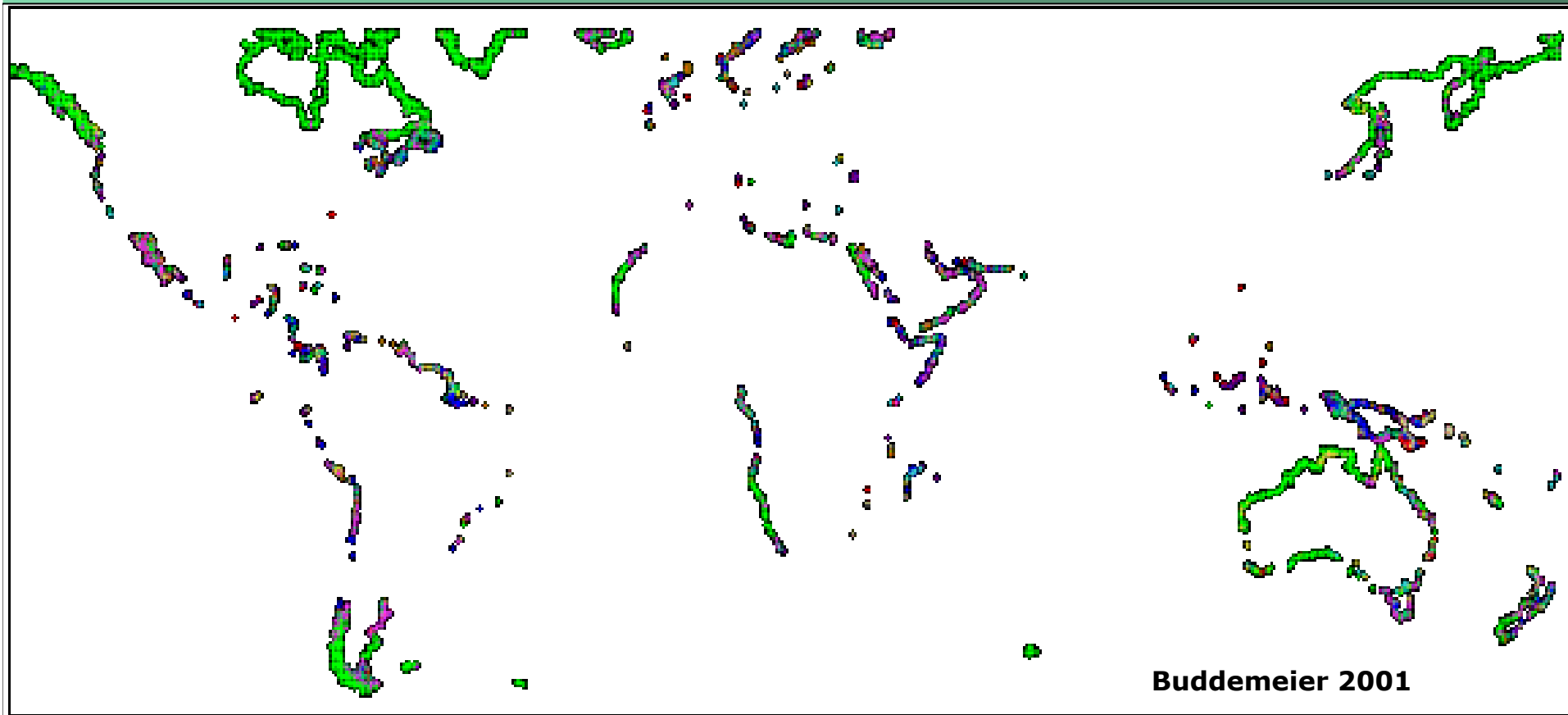
GEC and threats to health

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



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

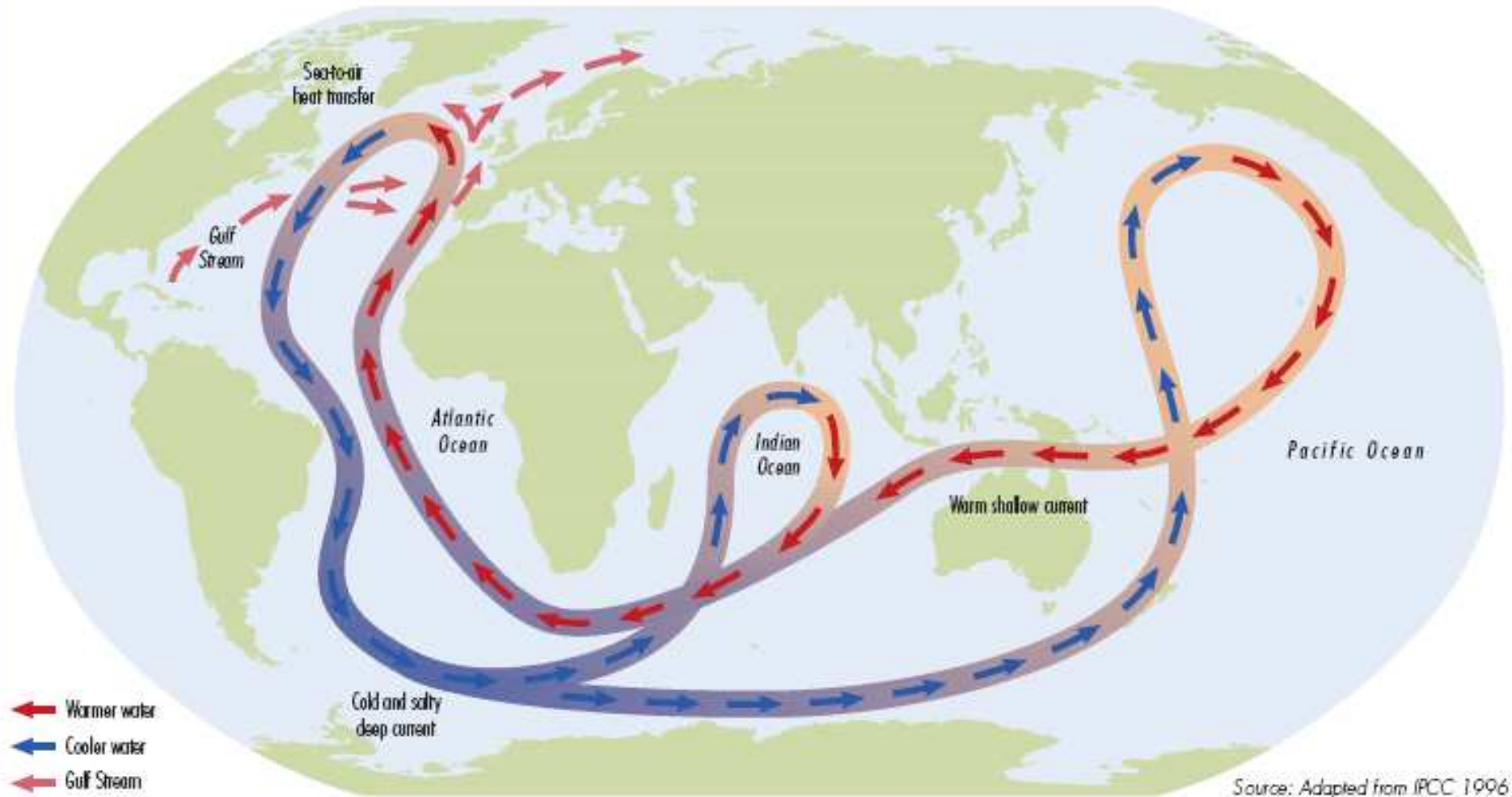
Sea level rise and disappearance of coastal zones



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

Global Ocean Conveyor: heat wave and cold spill

Figure 4.2 The Global Ocean Conveyor



Source: GEO-4, 2007:119

Integral development

RESPONSES (R) — Formal and informal adaptation to and mitigation of environmental change (including restoration) by altering human behaviour within and between the Drivers (D), Pressures (P) and Impacts (I) boxes, i.e., through science and technology, policy, law and institutions and coping capacity.

HUMAN SOCIETY

DRIVERS (D)

- Demographics
- Economic processes (consumption, production, markets and trade)
- Scientific and technological innovation
- Distribution pattern processes (inter- and intra-generational)
- Cultural, social, political and institutional (including production and service sectors) processes

IMPACTS (I)

Human well-being broadly defined as human freedoms of choice and actions to achieve, for example: security, basic material needs, good health and good social relations, which may result in human development or poverty, inequity and human vulnerability

Social and economic sectors include demographic, social (institutional) and material factors determining human well-being

- **Service:** health, justice, finance, trade, education, science and technology, communication, culture, services, tourism and environment
- **Infrastructure:** for example, transport, housing, security and defence
- **Production:** for example agriculture, forestry, fisheries, tourism, mining, energy and industry

Environmental factors determining human well-being

- Ecological services, such as provisioning services (consumptive use), cultural services (non-consumptive use), regulating services and supporting services (indirect use)
- Non-ecosystem natural resources such as hydrocarbons, minerals and renewable energy
- Stress such as diseases, pests, radiation and hazards

PRESSURES (P)

Human Interventions:

- Land use
 - Resource extraction
 - External inputs (fertilizers, chemicals, irrigation)
 - Emissions (pollutants and waste)
 - Modification and movement of organisms
- Natural Processes:**
- Solar radiation
 - Volcanoes
 - Earthquakes

STATE-AND-TRENDS (S)

Environmental impacts and change: Climate change and depletion of the stratospheric ozone layer, biodiversity change, pollution, degradation and/or depletion of air, water, minerals and land (including desertification)

Natural capital: Atmosphere, land, water and biodiversity

ENVIRONMENT

Retrospective

Outlook

TIME

1987

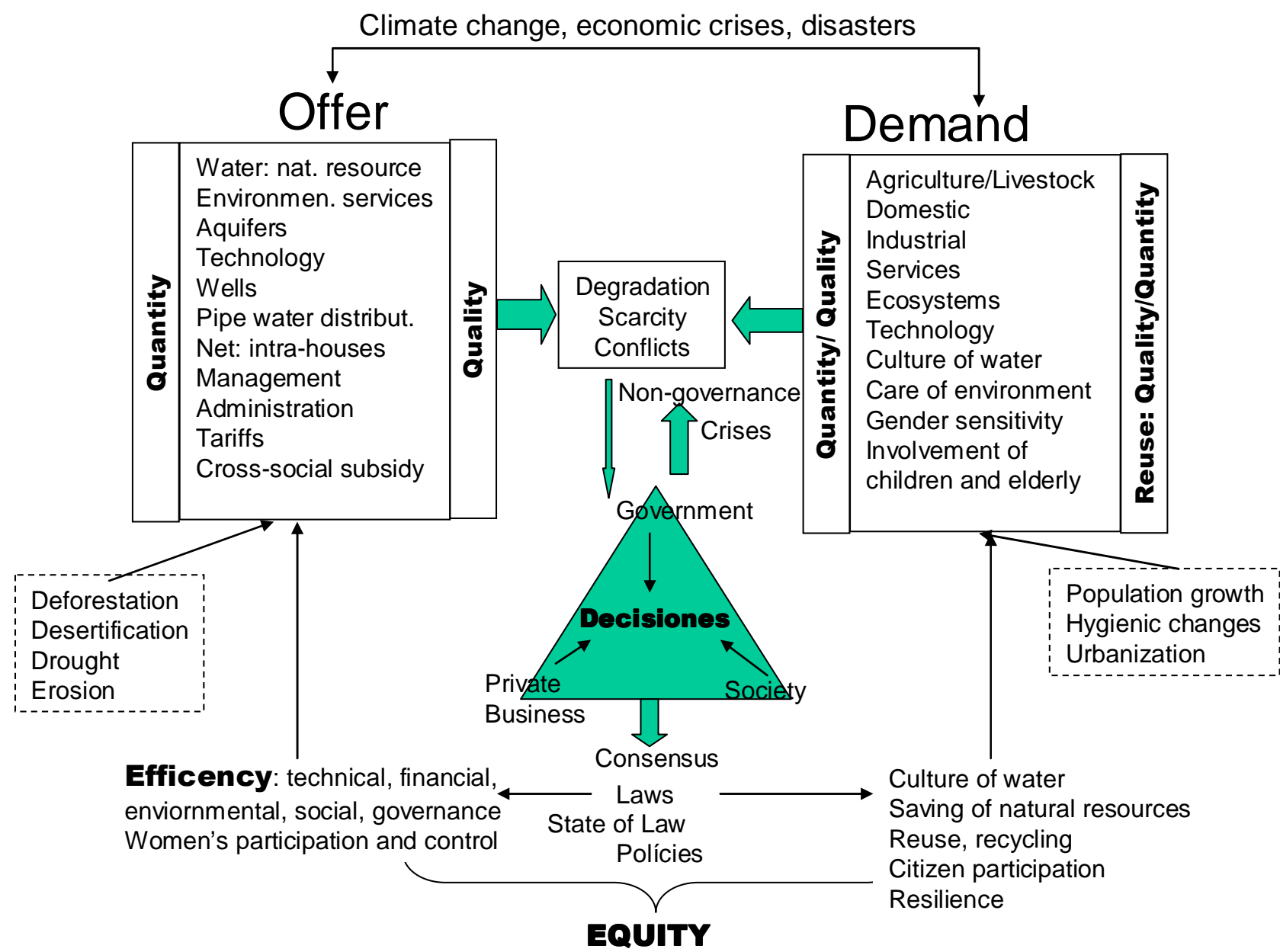
2007

2015 (short-term)

2050 (medium-term)

Long-term

Efficiency and Equity with Natural Resources

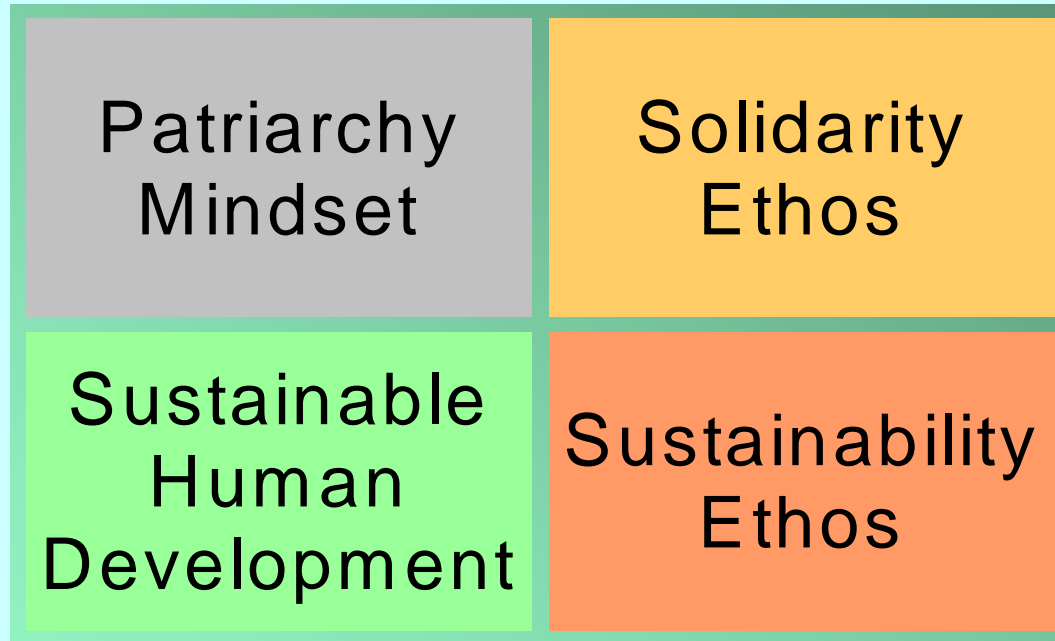


Human, Gender, Environmental Security

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

**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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(+)
**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