

2006 ODI Source Book on Development-Related Trends

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
CO ₂	carbon dioxide
COW	correlates of war
CIA	Central Intelligence Agency
CIS	Commonwealth of Independent States
DAC	Development Assistance Committee
DRC	Democratic Republic of Congo
EDI	Education for all Development Index
EFA	Education for All
EEC	European Economic Community
ENSO	El Niño/Southern Oscillation
EOS	Executive Opinion Survey
EU	European Union
FAO	Food and Agriculture Organization (of the United Nations)
G8	The Group of Eight – an international forum for the governments of Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States.
GBA	Global Biodiversity Assessment
GER	general education requirements
GFCF	gross fixed capital formation
GFATM	Global Fund to Fight AIDS, TB and Malaria
GHG	greenhouse gases
GIR	gross intake rate
GLASOD	Global Assessment of Human Induced Soil Degradation
GNI	gross national income
GNP	gross national product
GPI	Gender Parity Index
GSP	General System of Preferences
HIV	Human Immunodeficiency Virus
ICT	Information and Communication Technology
IDMC	International Displacement Monitoring Centre
IDP	internally displaced person
IEA	International Energy Agency
IFPRI	International Food Policy Research Institute
IFRC	International Federation of the Red Cross
IMF	International Monetary Fund
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
ITU	International Telecommunication Union
IUCN	the World Conservation Union
IUSS	International Union of Soil Science
LDC	Least Developed Country
MDG	Millennium Development Goals
M&A	mergers and acquisitions
MEA	Millennium Ecosystem Assessment
NCD	non-communicable diseases
NGO	non-governmental organisation
NIC	National Intelligence Council
NICs	newly industrialised countries
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
PMCs	private military companies
PPM	parts per million
PPP	purchasing power parity
RTA	Regional Trade Agreement
SO ₂	sulphur dioxide

TB	Tuberculosis
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade and Industry
UNEP	United Nations Environment Programme
UNFCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UNICEF	the United Nations Children's Fund
UNWRA	United Nations Relief and Works Agency
US	United States
WFS	World Food Summit
WHO	World Health Organization
WTO	World Trade Organization
WWI	WorldWatch Institute

ABSTRACT

This study highlights current trends and brings together future projections of the main drivers of global change. Fifteen variables are identified and the projections by key organisations are presented in one report. This source book is an update of the ODI source book of 2001.

The main findings are as follows:

Key Drivers	Trends
Demography	<ul style="list-style-type: none"> • World population to expand from 6.5 billion now to 9.1 billion in 2050. • Upward revision by 0.2 billion from two years ago, owing to higher fertility expectations. • Almost all population growth (95%) is absorbed by the developing world. • High population growth in least developed regions, especially Africa, where population is set to more than double by 2050. • India will take over from China to become the most populous country in the world around 2030. • Total fertility was 2.65 children per woman in 2000–2005 at the world level, with developing countries (especially LDCs) offsetting low fertility in developed regions. • Increasingly ageing populations. Life expectancy is 65 in world, but 49 in Africa (down from 50 five years before); these are set to converge somewhat. • Higher dependency ratios in the developed world. • Lower dependency ratios in the developing world. • AIDS could severely affect demographic structure.
Urbanisation	<ul style="list-style-type: none"> • Percentage of population in urban areas projected to increase from 48% in 2003 to 61% in 2030. • Urbanisation highest in developing world. Urbanisation rate forecast to be highest in Africa and Latin America. • Much of the focus of growth is on medium–large urban areas and on the smaller cities, rather than mega-cities. • 16 of the largest 20 cities (and nine out of the largest ten) in the world are located in developing countries
Environment	<ul style="list-style-type: none"> • Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fibre, and fuel. • The degradation of ecosystem services could grow significantly worse during the first half of this century and is a barrier to achieving the MDGs. • If existing energy policies continue, the world’s energy needs will be almost 60% higher in 2030 than in 2004. • Energy efficiency continues to increase. • Waste generation rises slightly less than private consumption. • More than 2.8 billion people in 48 countries, mainly in Africa, the Middle East, West Asia, South Asia and parts of China and the US will face water stress or scarcity conditions by 2025 if present rates of consumption continue. By 2050, the number of countries facing water stress or scarcity could rise to 54, with their combined population being 4 billion people – about 40% of the projected global population of 9.4 billion. • While globally 1.2 billion people gained access to both improved drinking water sources and improved sanitation from 1990 to 2004, another 1.6 billion need to gain access from 2005 to 2015 to reach the MDG sanitation target and 1.1 billion need to gain access to meet the drinking water target. • Net global change in forest area in the period 2000–2005 is estimated at -7.3 million ha per year, down from -8.9 million ha per year in the period 1995–2000, and -11.3 million ha per year in 1990–1995. In 2005, the forest cover area is estimated at 30.2% of the total land area, down from 30.5% in 2000 and 31.2% in 1990. The pace of forest reduction is decreasing. • Species extinction since the year 1600 has occurred at 50 to 100 times the natural rate, and is expected to accelerate to between 1,000 and 10,000 times the natural rate by 2020. • About 2,000 million ha of soil, equivalent to 15% of the Earth’s land area, have been degraded through human activities. Land degradation continues to worsen. • 8% of the world’s reefs and 34% of all fish species may be at risk from human activity. Of the

	<p>major marine stocks fished worldwide, more than 28% are estimated to be overexploited.</p> <ul style="list-style-type: none"> • The North Atlantic and parts of the Pacific are already being over-fished. All or most of the increase in demand for fish to 2020 will need to be and is expected to be supplied through aquaculture, since marine capture fisheries show no sign of increasing yields. • Land use and land use changes are currently the strongest factor influencing the biosphere and will presumably remain so for the next few decades. • Emissions of almost all greenhouse gases (GHG) continue to rise under even the most environmentally friendly scenarios. Even if GHG emission could be stopped at current levels, significant changes in temperature, rising sea levels, disruptions in precipitating patterns, and increased hurricane intensity would continue for a long period. • The physical consequences of climate change are real, they are here and they can be quantified. • The global average surface temperature is projected to increase by between 1.4 and 5.8°C over the period 1990 to 2100 and sea levels are projected to rise by 0.09 to 0.88 m over the same period. • A doubling of CO₂ in the atmosphere is estimated to result in economic losses of 1.6 to 2.7% of GNP in developing countries, about twice the estimate for OECD countries. • The Stern report takes into account higher increases in average temperatures of at least 5°C by the end of the next century compared to 2-3°C in previous reports; The report estimates that the losses of climate change caused by 'business as usual' are between 5 and 20% of consumption.
Food	<ul style="list-style-type: none"> • Despite declining real food prices and expanding world production and trade, food security for the poor will only improve slowly in many regions. • Increasingly, world agriculture will depend on non-food uses of commodities. • About 800 million people – one-sixth of the developing world's population – do not have access to sufficient food to lead healthy, productive lives. • Although progress is being made in tackling food insecurity, it is slow. In sub-Saharan Africa the number of food-insecure people has doubled since 1969–71. • Slowly declining world food prices and buoyant international trade will coexist with continuing malnutrition throughout the world.
Economic Growth	<ul style="list-style-type: none"> • World economic growth was 3.3% in 2005, less than in 2004. • The importance of India and China has been increasing, and it is predicted that the combined GDP share of these two countries would exceed 10% by 2020. • The rise in oil prices, possibly caused by the imbalance between an increase in demand and the limited oil production capacity would potentially hinder growth for developing and emerging countries in the future. • Climate change affects economic activities in the poorest regions more than other regions, but factors of climate change, such as CO₂ emission, are largely produced in developed and fast growing regions. The costs are estimated to be large compared to the costs of <i>ex-ante</i> mitigation, with a central estimate for costs of 1% of gross domestic product per year by the middle of the century, with a range of plus or minus 3%, reflecting the uncertainties.
Poverty	<ul style="list-style-type: none"> • Poverty projections indicate a poverty rate of 10.2% in 2015 compared with 27.9% in 1990 and 21.2% in 2001, with the number of poor declining to 622 million from 1.1 billion in 2001. • Expectations on the number of poor people and on the incidence of poverty achievable by 2015 have improved in all regions compared to the previous sourcebook in 2004. • Much of this reduction is due to China and India; poverty will remain a problem in South Asia and sub-Saharan Africa. • Possible downside risks (e.g. increase in oil prices) may have negative impacts on poverty both in the near future and in the long term.
Education	<ul style="list-style-type: none"> • Latin America has made the fastest progress towards the target of EFA, while sub-Saharan Africa is unlikely to meet the EFA target. • The number of illiterate adults is expected to decrease to 799 million 2015 down from 862 million in 2000. • Literacy rates will have increased for all regions by 2015.
Health	<ul style="list-style-type: none"> • Global life expectancy has risen from 47 years in 1950–1955 to 65 years in 2000–2005, and is expected to keep on rising to reach 75 years in 2045–2050. • 33–46 million people live with HIV/AIDS, two-thirds of which are in Africa. • 4.1 million people became newly infected with HIV and an estimated 2.8 million lost their lives to AIDS in 2005. • HIV/AIDS will reduce life expectancy in Africa from 49.2 recently to 43 years over the next

	<p>decade.</p> <ul style="list-style-type: none"> • The HIV incidence rate peaked in the late 1990s and has stabilised subsequently. • There is an increase of antiretroviral therapy in low- and middle-income countries, but it still reaches only one in five who need it. • There were an estimated 8.9 million new cases of tuberculosis in 2004, up from 8.4 in 2000 and 8.0 million in 1997. • Deaths from communicable diseases to decline, but increase expected in the prevalence of deaths due to non-communicable diseases. • Global warming could increase annual number of malaria cases from 50 million a year to 80 million by 2100. • Shortfalls of health workers pose major constraint, especially in sub-Saharan Africa.
Trade and Finance	<ul style="list-style-type: none"> • World merchandise exports increased in value by 13% (to US\$ 10.1 trillion) in 2005; and commercial services increased 11% (to US\$ 2.4 trillion) in 2005. • However, the expansion of global trade decelerated during 2005. • China recorded a marked 24% increase in trade expansion, and other developing countries performed better than developed countries. • In particular, those countries and regions who export oil expanded rapidly, for example, export growth rates of the oil exporting countries in Africa was 45%. • There is a significant increase in South–South FDI, rapidly growing from US\$ 222 billion in 1995 to US\$ 562 billion in 2004. • Overall net capital inflows to developing countries increased to US\$ 472 billion in 2005, compared to US\$ 418 billion in 2004. • Net official capital flows have fallen steadily, but net private capital flow to developing countries has been increasing, especially in East Asia.
Official Development Assistance	<ul style="list-style-type: none"> • After declines in the levels of ODA over the 1990s, aid is now at its highest level in real and nominal terms. • ODA is expected to increase from around US\$ 60 billion in the 1990s to a projected \$US 130 billion by 2010. • An increasing proportion of ODA is going to the social sectors, with aid to infrastructure beginning to recover after big declines in the decade before. • The number of global funds has exploded and currently amounts to 1000.
Technology	<ul style="list-style-type: none"> • There are high hopes for the development and expansion of ICT. • The digital divide is decreasing. • Although growth in the fixed line telephone sector has been slow, the mobile sector has reduced the gap between developed and developing countries. • However, access to and use of mobile services are unevenly distributed throughout the world.
Governance	<ul style="list-style-type: none"> • Very little evidence of improvements in governance worldwide over the period 1996–2005 according to direct indicators. • Regulatory quality, rule of law, and control of corruption appear to have slightly deteriorated globally. • Africa is reforming business regulations faster than in the past, with Eastern Europe being the top reformer and South Asia the slowest. • Increasing levels of democracy to continue. • Growth in the number of international NGOs.
Migration	<ul style="list-style-type: none"> • International migration set to rise from 185–192 million today to 230 million in 2050, representing a decline from 3.0% to 2.6% of the total population. • Most rapid growth in migrations occurs as the result of a refugee crisis. • Developed countries need and continue to absorb immigrants. • Migrants are increasingly sending remittances to developing countries, surpassing ODA levels by more than half. • Increasing tensions for migration policy after 9/11.
Disasters	<ul style="list-style-type: none"> • It is difficult to predict the future occurrence and casualties of disasters, whether natural or human-made. • Global climate change, however, will increase the number of extreme events, creating more frequent and intensified natural hazards such as floods and windstorms. Disasters are becoming less deadly. • The number of disaster events seemingly continues to rise, as do the social and economic costs. Although the number of overall deaths caused by natural disasters is decreasing, the number of

	<p>those affected in terms of disruptions to daily life, loss of livelihoods, and deepening poverty continues to increase.</p>
<p>Conflict and Refugees</p>	<ul style="list-style-type: none"> • The highest number of armed conflicts was recorded in 1991 and 1992 with 51 conflicts active. In 2005, all 31 conflicts were intra-state, and six of these were internationalised. • World military expenditure in 2005 is estimated to have reached US \$1,118 billion in current dollars. This corresponds to 2.5% of world GDP or an average spending of US \$173 per capita. World military expenditure in 2005 represents a real terms increase of 3.4% since 2004, and of 34% over the 10-year period 1996–2005. • Since the mid 1990s, a rapid growth of the private military industry in the form of private military companies can be observed. • At the start of 2005, the number of ‘people of concern’ to UNHCR rose to 19.2 million from 17 million the previous year, an increase of 13%. • Of growing concerns are ‘environmental refugees’, people who have to escape the effects of environmental degradation, and who mostly remain within their own country. The predicted 50 million ‘environmental refugees’ (by 2010) are not yet recognised by any global convention, unlike victims of political upheaval or violence.

1 INTRODUCTION

This source book highlights current trends by bringing together future projections of the main drivers of global change. Fifteen variables are identified and projections by key organisations are presented in one report. This 2006 version is an update of the ODI source books of 2001 and 2004.

There have been several attempts to examine future trends in general. Table 1-1 shows a selection.

Table 1-1 Examples of forward-looking studies

Study	URL
Canadian Defence Department, <i>Military Assessment 2000</i>	www.vcds.dnd.ca/dgsp/dda/milasses/intro_e.asp
RIIA, <i>Open Horizons: Three Scenarios for 2020 – The 1998 Report and CD-ROM from the Chatham House Forum</i> , 1998.	–
Chatham House, <i>2020 Scenarios, The Drivers:</i>	http://www.chforum.org/scenario
CIA, <i>Global Trends 2015: A Dialogue About the Future With Non-government Experts</i> . December 2000.	http://www.cia.gov/cia/publications/globaltrends2015/
Bertand, Gilles <i>et al.</i> , <i>Scenarios Europe 2010 – Five Possible Futures For Europe – Working Paper</i> , European Commission Forward Studies Unit, July 1999.	–
Sleigh, Andrew (ed.), <i>PROJECT ‘Insight’ Phase 1 final report Volume 1 – Main Text – Discussion of drivers, ‘worlds’ and methodologies</i> , CDA/HLS/WP095/1.0, April 1997. [Unpublished report]	–
NHS Confederation/Institute of Health Service Management/International Hospital Federation, <i>Exploring the environment for healthcare: The Madingley Scenarios – Two Scenarios for the Future Context of Healthcare - a summary</i> .	http://www.cambridgeforesight.com/pdf/madingley.doc
MOD, <i>Future Strategic Context for Defence</i> . 22/02/2001] future_strategic_context_defence.pdf from	http://www.mod.uk/index.php3?page=2449 .
Open University Business School, <i>Millennium Project</i> URL:	http://pcbs042.open.ac.uk/future/Millennium/000.html
PIU Strategic Futures, <i>The Future and How To Think About It</i> . URL:	http://www.cabinet-office.gov.uk/innovation/2000/strategic/future.html
Shell, <i>Global Scenarios 1998–2020</i> .	http://www.shell.com/downloads/publications/51234.pdf
United Nations University, <i>Millennium Project</i>	http://www.geocities.com/~acunu/millennium/Millennium_Project.html
Engelbrecht, Col Joseph A. <i>et al.</i> , <i>Alternative Futures for 2025: Security Planning to Avoid Surprise – A Research Paper Presented to Air Force 2025</i> , April 1996.	http://www.maxwell.af.mil/au/2025/
<i>Which World? Scenarios for the 21st century</i> .	http://mars3.gps.caltech.edu/whichworld/index.html
CIA update of its 2015 project	http://www.cia.gov/nic/NIC_2020_project.html
UN Millennium Project	http://www.unmillenniumproject.org/html/about.shtm
Copenhagen consensus	http://www.imv.dk/Default.asp?ID=158
Stern review	http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

There has been controversy surrounding recent forward looking exercises relating to the costs of climate change. For instance, the Copenhagen Consensus initiative examined ten major challenges in development: subsidies and trade barriers; malnutrition and hunger; climate change; conflicts; financial instability; sanitation and water; population: migration; communicable diseases; education; government and

corruption. The aim was to prioritise the numerous problems facing the world at a meeting where some of the biggest challenges in the world would be assessed (see <http://www.imv.dk/Default.asp?ID=158>). It argues that the provision of some international public goods make good economic sense, in addition to being expected to contribute to the MDG directly. For instance, health scores high (control of HIV/AIDS, and malaria). The provision of economic governance (trade liberalisation, improving investment climate) also gets a good scoring. However, environment-related actions score poorly.

The recent Stern report (2006) provides different conclusions. While the authors for the Copenhagen consensus argued that the costs of climate change are 3% of GDP, Stern reports that costs can be much higher. There are several reasons for the difference: the Stern report takes into account higher increases in average temperatures of at least 5°C by the end of the next century (compared to 2–3°C in previous reports); it takes into account a wide range of possible outcomes and builds in aversion to risk; it uses a discount rate that favours the importance of future generations; and finally, the report adds rough and ready estimates of the monetary equivalent of health and environmental impacts. The report estimates that the losses of climate change caused by ‘business as usual’ are between 5 and 20% of consumption. This is large compared to the costs of *ex-ante* mitigation, with a central estimate for costs of 1% of gross domestic product per year by the middle of the century, with a range of plus or minus 3%, reflecting the uncertainties.

The IPCC is providing a new report in 2007, and others will provide projections for individual variables, such as population growth (UNDP), food (FAO), MDGs (World Bank and UNDP), HIV/AIDS (UNAIDS) and others, sometimes as far as 2050 or 2100.

This report is more limited in scope. It aims to provide information and report on trends and *existing* future projections for a selected number of topics. It does not attempt to build new scenarios. Projections are available in certain areas, such as demography and social indicators. However, in other areas, such as conflict and disasters, analysts are reluctant to make long-term predictions, while in economic spheres forecasts are normally only for the short term and revert to ‘trend’ in the long run.

It is increasingly important to note the inter-linkage among many of the key drivers. Projections in one area are subject to the variability of progress in others. For example, the rate of population increases will clearly influence the level of environmental stress and the projections for food demand. Hence major inaccuracies in one area will clearly affect the validity of other projections. Projections have been wrong in the past; the failure of the international institutions to predict the Asian economic crisis constitutes one example, too pessimistic water withdrawal projections another.

Future projections are always open to error and bias and therefore care must be taken to include forecasts from reliable sources. Even so, the projections must be treated with caution. The main aim of this report is simply to present the projections. There is little attempt to analyse their likelihood.

This study is an update of the previous ODI source books of 2001 and 2004. Since then, several forward-looking studies have been published, for some variables but not for all. Key new publications that were not available last time include:

- new monitoring reports on achieving MDGs like education, health and poverty
- the Millennium Ecosystem Assessment reports qualitative scenarios
- new growth projections
- Stern report on the economics of climate change.

In addition, more recent annual updates on trends and projections have been used, such as:

- OECD DAC and IMF reports
- World Bank annual reports, such as Global Economic Prospects and Global Development Finance
- annual UNCTAD and UNDP reports
- population projections that the UN updates regularly
- UNESCO's Education For All annual reports
- International Red Cross and UNHCR annual reports
- annual publications by ITU and WTO
- IOM World Migration Reports.

Most reports are available on the Internet. In several instance we have taken tables and charts from these publications and make appropriate reference to the source.

The previous source book of 2004 indicated some noticeable changes in trends and projections since the previous source book in 2001, including:

- rebound in forecasts for development assistance
- recovery of world economy and rise in oil prices
- sharp fall in FDI in past few years, although a recovery is expected for the near future
- lower population forecasts
- renewed insights into the tragedy of HIV/AIDS
- strengthened focus on Millennium Development Goals
- increased focus on migration policies and security following 9/11
- continued strong growth and poverty reduction in China and India
- rapid increase in the amount of democratic governments
- strong growth in ICT: Mobile subscriptions have overtaken fixed line subscriptions.

This 2006 source book notes the following changes from the previous 2004 source book:

- The importance of the effects of climate change is being emphasised in areas such as economic growth, the amount of environmental refugees, the number of disasters and health. This mainstreaming is occurring at a faster rate than before and in 2004.
- Aid is on the increase and is expected to rise even faster than thought in 2004.
- China and India's growth is increasingly visible, and has wide ranging effects for development policy.

2 DEMOGRAPHY

Demographic projections are fundamental in describing future trends in areas such as growth, poverty, health issues and environmental stress.

Growth rates by region and dependency ratios in an increasingly ageing world are important factors to consider in demographic projections. An increased population places a greater burden on resources. In the developed world the ageing populations are likely to place a greater economic burden on the economically active. However, in the developing world there is a window of opportunity, as large numbers of children will become economically active (UN 2001).

While the population at the global level continues to increase, that of the more developed regions as a whole is hardly changing and virtually all population growth is occurring in the less developed regions (UN 2005).

In 2005, the world population reached 6.46 billion, 380 million more than in 2000 or a gain of 76 million annually (at a rate of 1.2% p.a.). Despite declining fertility levels projected over 2005–2050 the world population is expected to reach 9.1 billion according to the medium variant and will still be adding 34 million persons annually by mid-century. However, given different fertility scenarios, world population could range between 7.7 billion and 11.7 billion in 2050 (Table 2-1). According to the FAO, strategic framework population is forecast to reach 7.2 billion in 2015 (FAO 2001).

Almost all population growth (95%) is absorbed by the developing world. By 2050, the population of the more developed countries as a whole would be declining slowly by about 1 million persons a year and that of the developing world would be increasing by 35 million annually, 22 million of whom would be absorbed by the least developed countries (LDCs) (UN, 2005).

Table 2-1 Estimated and projected world population by fertility projection variant, 1950–2050

Major areas	Estimated population (millions)			Projected population (millions) 2050			
	1950	2000	2005	Low	Medium	High	Constant
World	2519	6071	6465	7680	9076	10646	11658
Africa	221	796	906	1666	1937	2228	3100
Asia	1398	3680	3905	4388	5217	6161	6487
Latin America and Caribbean	167	520	561	653	783	930	957
Europe	547	728	728	557	653	764	606
Northern America	172	316	331	375	438	509	454
Least Developed Countries	200	668	759	1497	1735	1994	2744
% LDCs	7.9%	11.0%	11.7%	19.5%	19.1%	18.7%	23.5%

Source: United Nations (2005), World Population Prospects – the 2004 revision.

Particularly rapid growth is expected among the LDCs, whose population is expected to rise from 759 million to 1.7 billion by 2050 (medium variant), despite the fact that fertility rates are expected to decline markedly. The share of LDCs in total population has already been increasing between 1950 and 2005 and is expected to rise even faster until 2050, when it is estimated that almost one person in five will live in an LDC (medium variant). A no-change projection would put the number at 2.7 billion (almost one fourth of world's population). The population of the developed regions is expected to change very little in the next 50 years, with a marked contraction in Europe if fertility rates remain constant throughout the period. Asia

will remain by far the most populous region by 2050 regardless of different fertility projections. The greatest rate of increase will be seen in Africa, whose population will more than double by 2050 under medium-variant prediction (Table 2-1) (UN 2005).

Numerous organisations publish population predictions. Table 2-2 gives predictions for developing countries from the World Bank, which provides estimates until 2090. These figures are comparable with the UN projections for developing countries. According to these estimates, sub-Saharan Africa is the region which is likely to grow the most until 2090, although at decreasing rates between 2050 and 2090. Low income countries as a whole are expected to increase significantly their share in world's population, reaching almost 50% in 2050 and passing that threshold by 2090 (with a population of over 5 billion). Despite these trends, sub-Saharan Africa would still enjoy a much higher land-labour ratio than most other developing regions, especially regions in Asia.

Table 2-2 Population estimates and projections for developing countries 2000–2090

	2000	2005	2050	2090
World	6,055	6,418	8,800	9,656
East Asia & Pacific	1,806	1,888	2,317	2,395
East Asia & Pacific (exc. China)	543	580	825	898
Eastern Europe & central Asia	475	477	476	468
Latin America & the Caribbean	512	549	805	873
Middle East & North Africa	295	323	547	614
South Asia	1,354	1,470	2,251	2,532
sub-Saharan Africa	658	732	1,409	1,820
Low Income countries	2,407	2,624	4,285	5,035
Lower Middle income	2,369	2,471	3,035	3,146
LMC excl. China	1,107	1,163	1,543	1,648
Low income %	39.7%	40.9%	48.7%	52.1%

Source: World Bank – HPN Statistics (2006).

Regional trends mirror national ones and an analysis of individual countries' population helps highlight which countries are expected to drive world population growth. Table 2-3 presents the ranking of the most populous nations in the world between 1950 and 2050. As expected, the ranking shows little persistence over time (except for the first three countries), with developing countries replacing developed countries by 2050. The only exception is the US, which consistently remains the third most populous nation in the world. India should overtake China and become the most populous state in the world by around 2030. The figures show an estimated decrease in the concentration of population between now and 2050, contrary to what has happened between 1950 and now (which has seen a relative stable concentration). The first three countries' share is expected to fall to 37% in 2050 (from 42% in 2005) and the first ten to 56% (from 59% in 2005). Several sub-Saharan African countries grow at the highest rates in the world. This is reflected in the fact that three out of the first ten countries in the world are expected to be African by 2050 (as opposed to none in 1950 and one in 2005). By 2050 three LDCs (Bangladesh, DRC and Ethiopia) will be among the ten most populous countries (there was one in 2005).

Table 2-3 Most populous countries in the world, 1950–2050

Rank	Country	Pop in 1950 (in million)	Cum. %	Rank	Country	Pop in 2005 (in million)	Cum. %	Rank	Country	Pop in 2050 (in million)	Cum. %
1	China	555	22	1	China	1316	20.4	1	India	1593	17.5
2	India	358	36.2	2	India	1103	37.4	2	China	1392	32.9
3	USA	158	42.5	3	USA	298	42	3	USA	395	37.2
4	Russia	103	46.6	4	Indonesia	223	45.5	4	Pakistan	305	40.6
5	Japan	84	49.9	5	Brazil	186	48.4	5	Indonesia	285	43.7
6	Indonesia	80	53	6	Pakistan	158	50.8	6	Nigeria	258	46.6
7	Germany	68	55.7	7	Russia	143	53	7	Brazil	253	49.4
8	Brazil	54	57.9	8	Bangladesh	142	55.2	8	Bangladesh	243	52
9	UK	50	59.9	9	Nigeria	132	57.3	9	DRC	177	54
10	Italy	47	61.7	10	Japan	128	59.2	10	Ethiopia	170	55.9

Source: United Nations (2005), World Population Prospects – the 2004 revision

The main driver of population growth is fertility rate. Total fertility was 2.65 children per woman in 2000–2005 at the world level. However, this average masks the heterogeneity of fertility levels among countries. In 2000–2005, 65 countries or areas (43 of them located in the more developed regions) had fertility levels below the replacement level of 2.1 children per woman, whereas 127 countries or areas (126 of which are located in the less developed regions) had total fertility levels at or above 2.1 children per woman (UN, 2005). Among the latter, 35 had total fertility levels at or above five children per woman, 30 of which are LDCs.

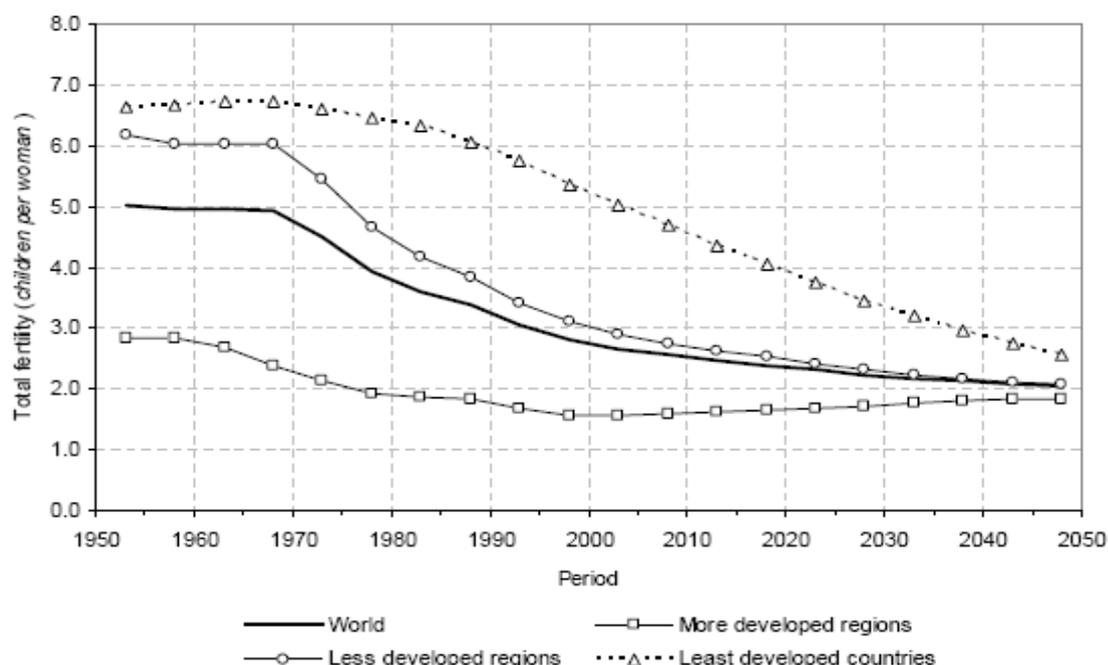
Although most developing countries are already advanced in the transition from high to low fertility, 17 still had fertility levels of six children per woman or higher in 2000–2005 and for 15 of them there is either no recent evidence about fertility trends or the available evidence does not indicate the onset of a fertility reduction. The world is eventually expected to converge at a rate slightly below the replacement one by 2050, with Africa and the LDCs being at a somewhat higher level (Table 2-4).

Table 2-4 Total fertility rates 1995–2000 and 2045–2050 in the medium variant for the world and major development groups

Major area	1970–1975	2000–2005	2045–2050
World	4.49	2.65	2.05
More developed regions	2.12	1.56	1.84
Less developed regions	5.44	2.9	2.07
LDCs	6.61	5.02	2.57
Africa	6.72	4.97	2.52
Asia	5.08	2.47	1.91
Europe	2.16	1.4	1.83
Latin America & Caribbean	5.05	2.55	1.86
Northern America	2.01	1.99	1.85
Oceania	3.23	2.32	1.92

Source: United Nations (2005), World Population Prospects – the 2004 revision

Figure 2-1 Total fertility trajectories of the world and major development groups, 1950-2050 (medium variant)



Source: United Nations (2005), World Population Prospects – the 2004 revision

The other driver of population growth is mortality rate, which is usually proxied by life expectancy at birth. This is currently 65 years in the world but only 49 in Africa, which, unlike other regions, has been experiencing declining life expectancy since the late 1980s. While this trend is due in large part to the HIV/AIDS epidemic, other factors have also played a role, including armed conflict, economic stagnation, and resurgent infectious diseases such as tuberculosis and malaria (see Section 9 on Health). The recent negative trends in Africa have set back progress in reducing mortality by at least 25 years. Life expectancy levels in Africa are expected to return by 2010–2015 to those last seen in 1985–1990. By 2045–2050, life expectancy in Africa is expected to be 65 years, a full 12 years below the life expectancy of the next lowest major area, Asia (Table 2-5). Anticipated rises would increase life expectancy to 75 in the world and 74 in the developing world by 2050 (UN 2005). The 50 least developed countries, which include 31 of the countries that are highly affected by HIV/AIDS, have been experiencing higher mortality than other development groups. Their life expectancy at birth was 51 years in 2000–2005 (compared to 62 years in the previous five years period) and is expected to remain relatively low, reaching 67 years in 2045–2050.

Table 2-5 Life expectancy at birth for the world and major development groups

Region	Total fertility (average number of children per woman)		
	1995–2000	2000–2005	2045–2050
World	64.6	65.4	75.1
Africa	50.0	49.1	65.4
Asia	65.7	67.3	77.2
Latin Am. & Caribbean	69.4	71.5	79.5
Europe	73.2	73.7	80.6
Northern Am	76.4	77.6	81.8
Least Developed Countries	62.5	51.0	66.5

Source: UN (2005), World Population Prospects 2004, revised version.

Although the gap between developed and developing regions is expected to narrow between 2005 and mid-century, in 2045–2050 the former are still expected to have considerably higher life expectancy at birth than the less developed regions (82 years versus 74 years). This demonstrates a convergence of life expectancy and implies an increasingly ageing population, especially in the developed world.

Fertility decline combined with increases in life expectancy leads to population ageing. This will lead to an increase in the number of people aged 60 years or over, from 673 million in 2005 to almost 2 billion in 2050 (22% of the total population). This number will quadruple in less developed regions (UN 2003). In contrast, the number of children (persons aged 0–14 years) worldwide will change little over the next 45 years, passing from 1.82 billion to 1.83 billion and their share of the total population will drop from 28% to 20%.

At present, 11 countries, all of them belonging to the more developed regions, have a median age of over 40 years. By 2050 population ageing is expected to also become common in the developing world. In 2050, the youngest populations will be found in 11 LDCs whose median ages are projected to be at or below 23 years. These countries include Angola, Burundi, Chad, the Democratic Republic of Congo, Equatorial Guinea, Guinea-Bissau, Liberia, Niger and Uganda. At present, the median age in Mali, Niger and Uganda is 16 years or less, making their populations the youngest on the planet (UN, 2005).

In more developed regions, the proportion of the population of working age (between 15 and 59 years) has slightly increased between 1950 and 2005 (from 61% in 1950 to 63% in 2005), but it is expected to decline in the future, reaching 52% by 2050. In the less developed regions as a whole, the proportion of the population of working age is expected to decline slightly, passing from 61% in 2005 to 59% in 2050. However, among the LDCs, that proportion will rise from 53% in 2005 to 61% in 2050, an increase that represents both an opportunity and a challenge: the opportunity for economic growth provided that the challenge of creating gainful employment for the growing share of persons of working age is met (UN 2005). We note here that these statistics are based upon a static definition of working age population. As life expectancy increases and health conditions improve, we may expect the definition of working age to be expanded.

When a greater proportion of people enter the economically active groups as fertility rates decline, this will reduce the dependency ratio and provide opportunities for economic growth. However, these gains could be wiped out in the countries badly affected by HIV/AIDS (see Section 9 on Health).

Table 2-6 Dependency ratios and population aged 15–64, 2000–2050

	2000			2050		
	Total dependency ratio	Child dependency ratio	Elderly dependency ratio	Total dependency ratio	Child dependency ratio	Elderly dependency ratio
World	59	48	11	56	31	25
Africa	85	79	6	53	43	10
Asia	57	48	9	55	29	26
Europe	48	26	22	75	26	49
Latin America and the Caribbean	60	51	9	57	28	29

Notes: Child dependency ratio is the ratio of the population aged 0–14 to that aged 15–64. The elderly dependency ratio is the ratio of the population aged 65 years or over to the population aged 15–64. The total dependency ratio is the ratio of the sum of the population aged 0–14 and that aged 65+ to the population aged 15–64. All ratios are presented as number of dependents per 100 persons of working age (15–64).

Source: United Nations Population division database (2002) revision.

Changing age structures affect the dependency ratios with consequent financial and development repercussions. Table 2-6 shows the percentage ratio of the population in each dependent age range to the

population aged 15–64, the economically active group. The dependency ratio is decreasing significantly only in Africa. The declining dependency ratios for the younger age ranges can be witnessed across all regions except Europe and this can lead to further growth for developing countries.

The median age has changed only slightly in the period (1950–95) reaching 26.4 years in 2000. It is predicted to rise by ten years to 37 years in 2050 (UN 2003). Table 2-7 shows that the world median age will reach 36.8 years by 2050 and will have risen in all regions. However the projected disparity between Europe (47.7 years) and the LDCs (27.1 years) has increased slightly.

Table 2-7 Median age by major area (medium variant)

Region	Median age (years)		
	1950	2000	2050
World Total	23.6	26.4	36.8
Africa	19.0	18.3	27.5
Asia	22.0	26.1	38.7
Europe	29.2	37.7	47.7
Northern America	29.8	35.4	40.2
Latin America & Caribbean	20.1	24.2	39.8
Oceania	27.9	30.7	39.9
Least Developed Countries	19.5	18.1	27.1

Source: UN (2003), World Population Prospects 2002, revised version.

Population predictions are subject to numerous qualifications, such as the impact of HIV/Aids in Africa and increasingly Asia, rates of migration and the contribution of shocks (see Section 9 on Health).

MAJOR SOURCES

FAO (2001), 'FAO Strategic Framework', see <http://www.fao.org/strategicframework/>

UN (2001), *World Population Prospects: The 2000 Revision*, UNPD.

UN (2003), *World Population Prospects 2002: Revised version*, UNDP, see <http://www.un.org/esa/population/publications/wpp2002/WPP2002-HIGHLIGHTSrev1.PDF>

UN (2005), *World Population Prospects 2004: Revised version*.

World Bank (2006), Health, Nutrition and Population data platform, available at <http://devdata.worldbank.org/hnpstats/default.htm>

3 URBANISATION

'In the next quarter century, the population explosion that characterised much of the 20th century will be replaced by another dramatic demographic transition: urban population growth of an unprecedented scale' (IFPRI – Brockerhoff 2000).

The world's urban population has been estimated at 3 billion in 2003 and is expected to rise to 5 billion by 2030. The urban population accounts for the majority of the world population increase in this period (UN 2004).

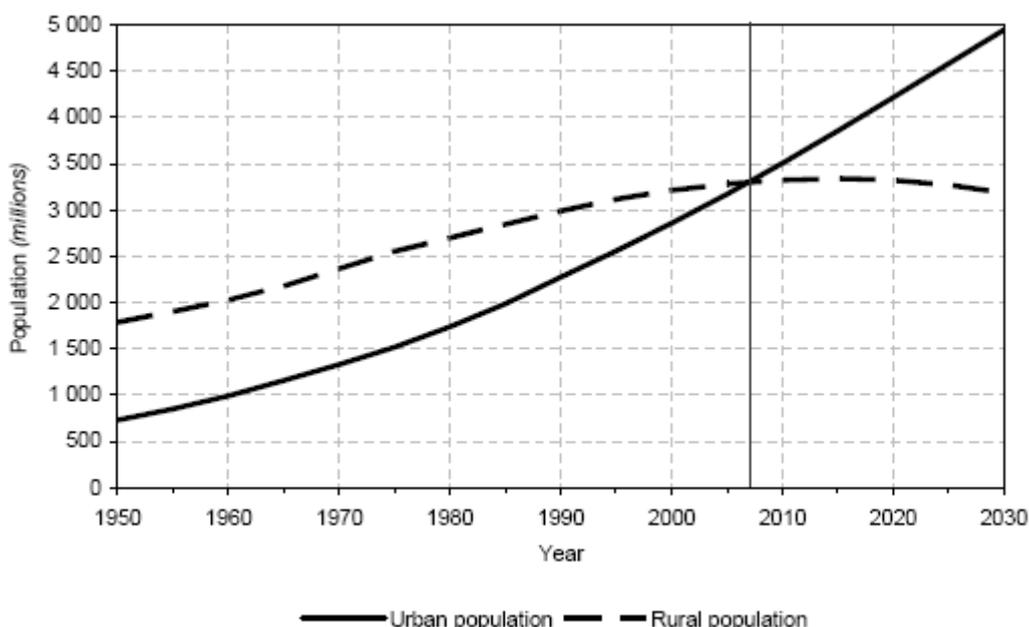
Of the world's population 48% lived in urban areas in 2003, but this is expected to increase to 61% by 2030 (see Figure 3-1). For the first time in history, the world in 2007 will be more urban than rural.

This rise in urban population will be concentrated in the less developed regions with population on average rising by 2.3% annually. Major drivers include rural to urban migration and transformation of rural settlements into urban places. The urban population in more developed regions is expected to only rise slowly from 0.9 to 1.0 billion, or by 0.1% annually over the period 2000–30 (UN 2004).

There are strong regional differences in the levels of urbanisation. Latin America is already highly urbanised at 77%, whereas Africa and Asia both have urbanisation rates of 39% respectively. Africa and Asia can expect to see high rates of urban growth with forecasts of 3.1% and 2.2% respectively by 2030 (see Table 3-1).

Care must be taken to view the statistics in absolute terms as well. Asia is currently the least urbanised major area of the world. However, it has 1.5 billion urban dwellers, which is more than the combined total of Europe, North America, Latin America and the Caribbean (1.2 billion), see UN (2004)

Figure 3-1 Rural and urban population of the world



Source: UN (2004), World Urbanisation Prospects: the 2003 Revision

Table 3-1 Total urban and rural populations by major area, selected periods, 1950–2030

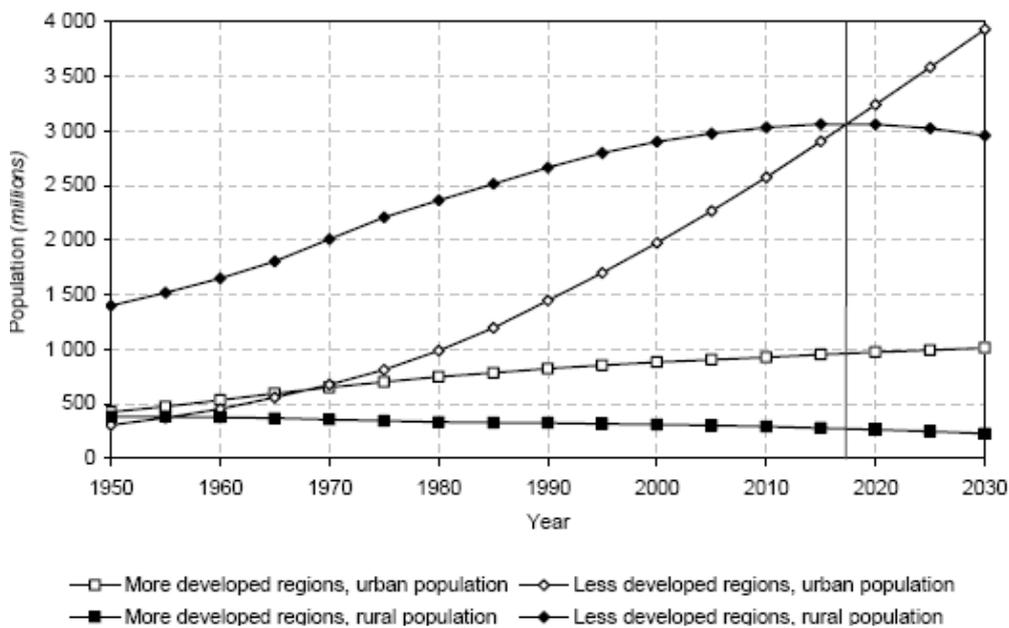
	Population (millions)					annual change (%)	
	1950	1975	2000	2003	2030	1950–2000	2000–30
<i>Total population</i>							
Africa	221	408	796	851	1398	2.56	1.88
Asia	1398	2398	3680	3823	4887	1.93	0.95
Europe	547	676	728	726	685	0.57	-0.2
Latin America & Caribbean	167	322	520	543	711	2.27	1.04
Northern America	172	243	316	326	408	1.22	0.85
Oceania	13	22	31	32	41	1.77	0.97
<i>Urban population</i>							
Africa	33	103	295	329	748	4.39	3.1
Asia	232	575	1367	1483	2664	3.55	2.22
Europe	280	446	529	530	545	1.27	0.1
Latin America & Caribbean	70	197	393	417	602	3.45	1.42
Northern America	110	180	250	261	354	1.65	1.16
Oceania	8	15	23	24	31	2.13	1.07
<i>Rural population</i>							
Africa	188	305	500	521	650	1.95	0.87
Asia	1166	1823	2313	2341	2222	1.37	-0.13
Europe	267	230	199	196	140	-0.59	-1.17
Latin America & Caribbean	97	125	127	126	109	0.54	-0.51
Northern America	62	64	66	65	53	0.12	-0.7
Oceania	5	6	8	9	10	1.04	0.68
<i>Percentage urban</i>						<i>(rate of urbanisation)</i>	
Africa	14.9	25.3	37.1	38.7	53.5	1.82	1.22
Asia	16.6	24	37.1	38.8	54.5	1.61	1.28
Europe	51.2	66	72.7	73	79.6	0.7	0.3
Latin America & Caribbean	41.9	61.2	75.5	76.8	84.6	1.18	0.38
Northern America	63.9	73.8	79.1	80.2	86.9	0.43	0.31
Oceania	60.6	71.7	72.7	73.1	74.9	0.36	0.1

Source: UN (2004), World Urbanisation Prospects: the 2003 Revision, Table 4.

Rural population is forecast to have positive growth rates in Africa and Oceania in the period 2000–30. However, world rural population will remain stable in the same period, with anticipated declines in the other regions (see Table 3-1).

Most of the world population's growth will occur in the urban areas of developing regions, which is expected to become more urban than rural by 2017 (Figure 3-2).

Figure 3-2 Rural and urban population in developed and less developed regions



Source: UN (2004), World Urbanisation Prospects: the 2003 Revision, Fig. I.3.

The proportion of world's population living in urban agglomerations of over 10 million persons (mega-cities), whilst constantly increasing, is still small: it reached 4.5% in 2003, and is set to rise to just 5% by 2015. Large urban areas are expected to host a rising percentage of the world's population: while urban areas larger than 1 million hosted 18.3% of total population in 2003, this figure is expected to reach 21.4% by 2015. The proportion of the world's population living in small cities (below 0.5 million) is larger at 25% and expected to rise to 27.2% by 2015. Hence, much of the focus of growth is both on medium-large urban areas and on the smaller cities and urbanised rural settlements. These are the cities where poverty rates are higher and where existing coverage of basic public services is far from comprehensive (National Research Council, see Cohen 2006).

Today, there are almost 400 cities in the world with more than a million inhabitants and about 70% of these are in less developed countries. This may be good news to the extent that it may be favourable to economic growth in the South (via economies of agglomeration and the like). Nevertheless, it may pose formidable challenges to avoid the deteriorating living conditions of the urban poor (Cohen, 2006).

Table 3-2 illustrates the nature of the projected growth in world urban population between 2003 and 2015: a 0.5 percentage point increase in mega-cities but 2.2 percentage point increase in cities below 0.5 million. For less developed regions this is 0.5 and 2.9 respectively.

Several sources provide data on the population of cities and urban agglomerations. Data are not always strictly comparable as the definitions of boundaries vary significantly from city to city, hence the difficulty of compiling an accurate, comparative list of the world's most populous urban areas. We report in Table 3-3 a ranking provided by the World-Gazetteer referred to both cities and urban agglomerations in 2006.¹

¹ We report data from this source as it is one of the most recent rankings and as it distinguishes between cities and metropolitan areas (a concept similar to urban agglomeration).

Table 3-2 Distribution of population among global urban settlements of different sizes 1975 to 2015

Size class of urban and rural settlements	Population (millions)				Percentage distribution			
	1975	2000	2003	2015	1975	2000	2003	2015
Total	4068	6071	6301	7197	100	100	100	100
Urban	1516	2857	3044	3856	37.3	47.1	48.3	53.6
Cities > 10 million	65	251	283	358	1.6	4.1	4.5	5.0
Cities 5-10 million	131	167	175	269	3.2	2.7	2.8	3.7
Cities 1-5 million	333	659	695	914	8.2	10.9	11.0	12.7
Cities 500,000 <1 million	179	291	316	358	4.4	4.8	5.0	5.0
Cities fewer than 500,000	808	1489	1575	1957	19.9	24.5	25.0	27.2
Rural	2552	3214	3258	3341	62.7	52.9	51.7	46.4

Source: UN (2004), World Urbanisation Prospects 2003, Table 6.

Urban agglomerations are sometimes considerably larger than cities, indicating a clear tendency of the original city to expand well over its boundaries, forming the so-called city-regions (Scott, 2001). Tokyo is the most populous urban agglomeration (36.8 million) followed by New York (22.5) and Mexico City (18.7). Fifteen of the largest 20 urban agglomerations and 16 of the largest 20 cities (and nine out of the largest ten) are located in developing countries. The growth of the urban population in the developing world tendency is expected to further accentuate the tendencies of megalopolises to be concentrated in less developed countries. According to UN (2004) estimates, eight of the largest ten urban agglomerations are set to be in developing countries (up from seven out of ten in 2000 and five out of ten in 1975).

Table 3-3 Largest cities and urban agglomerations in the world

Rank	City	Population	Country	Urban aggl.	Population	Country
1	Shanghai	15,018	China	Tōkyō	36,769	Japan
2	Bombay	12,884	India	New York	22,531	USA
3	Karachi	11,969	Pakistan	México	22,414	Mexico
4	Buenos Aires	11,595	Argentina	Seoul	22,174	South Korea
5	Delhi	11,215	India	Mumbai	19,944	India
6	Manila	10,547	Philippines	São Paulo	19,357	Brazil
7	Moscow	10,473	Russia	Jakarta	17,929	Indonesia
8	Seoul	10,409	South Korea	Manila	17,844	Philippines
9	São Paulo	10,060	Brazil	Los Angeles	17,767	USA
10	Istanbul	10,035	Turkey	Delhi	17,753	India
11	Lagos	9,020	Nigeria	Osaka-Kobe-Kyōto	17,525	Japan
12	Mexico City	8,659	Mexico	Cairo	15,708	Egypt
13	Jakarta	8,557	Indonesia	Shanghai	14,871	China
14	Tōkyō	8,372	Japan	Calcutta	14,682	India
15	New York	8,124	USA	Moscow	14,521	Russia
16	Kinshasa	8,096	DRC	Buenos Aires	13,470	Argentina
17	Lima	7,857	Peru	London	12,524	UK
18	Cairo	7,836	Egypt	Tehran	12,184	Iran
19	Peking	7,602	China	Karachi	11,969	Pakistan
20	London	7,489	UK	Dhaka	11,918	Bangladesh

Source: World-Gazetteer 2006

In general, urbanisation also brings about improved access to basic services even in poorer regions. For example, 92% of the urban population and 70% of the rural population in developing countries use improved drinking water sources. The disparities are greatest in sub-Saharan Africa, with a difference of 37

percentage points between rural and urban dwellers. Only 31% of rural inhabitants in developing regions have access to any type of improved sanitation, as opposed to 73% of urban dwellers. However, the statistics tend to mask the lack of access of those living in urban slums. Calculating separate estimates for slum and other urban dwellers poses formidable technical challenges (WHO/UNICEF, 2004). UN HABITAT (2003) estimates the total number of people currently living in slums to be 928 million. This figure is set to double until 2030 without policy changes.

Recent work by Kaufman, *et al.* (2006) shows that good governance and globalisation (at both the country as well as at the city level) matter for city-level performance in terms of access and quality of delivery of infrastructure services. There appear to be dynamic pressures from globalisation and accountability that result in better performance at the city level.

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4 ENVIRONMENT

Global population in 2020 is projected to be 7.6 billion and will further increase to 9.4 billion in 2050. Economic growth rates will remain high especially in parts of Asia. Increased demand is likely to lead to greater intensification of agriculture, increasing consumption of natural resources and the production of waste (Pinstrup-Anderson, *et al.* 1999, US Census Bureau, 2006).

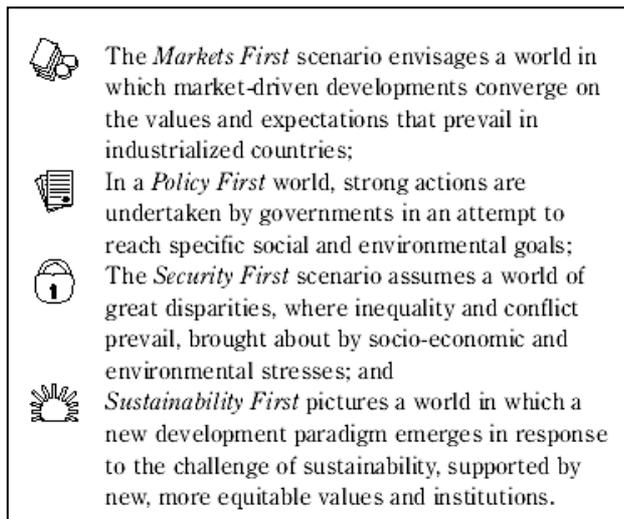
Environmental impacts of human development are large and increasing. Launched by the UN General Secretary Kofi Annan, the Millennium Ecosystem Assessment (MEA) was initiated to meet the needs of decision makers for scientific information on the links between ecosystem change and human well-being. The MEA focuses on how changes in ecosystem services have affected human well-being, how ecosystem changes may affect people in future decades, and what responses can be adopted at local, national, or global scales to improve ecosystem management and thereby contribute to human well-being and poverty alleviation.

The main findings of the MEA are:

1. Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fibre, and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on Earth.
2. The changes made to ecosystems have contributed to substantial net gains in human well-being and economic development, but these gains have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risks of nonlinear changes, and the exacerbation of poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.
3. The degradation of ecosystem services could grow significantly worse during the first half of this century and is a barrier to achieving the Millennium Development Goals.
4. The challenge of reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met under some scenarios that the MEA has considered, but these involve significant changes in policies, institutions, and practices that are not currently under way. Many options exist to conserve or enhance specific ecosystem services in ways that reduce negative trade-offs or that provide positive synergies with other ecosystem services (MEA, 2005).

Future environmental projections are subject to fierce debate. There are very different projections and scenarios presented. For example, UNEP's Global Environmental Outlook 3 (GEO-3) and the MEA each include four different qualitative scenarios, and we will report on these for some individual variables in the section.

Figure 4-1 Scenarios in Global Environmental Outlook



Source: GEO-3, UNEP (2002a).

The scenarios used in the Millennium Ecosystem Assessment (MEA, 2005) are:

1. *Global orchestration*: depicts a globally connected society that focuses on global trade and economic liberalisation and takes a reactive approach to ecosystem problems but that also takes strong steps to reduce poverty and inequality and to invest in public goods such as infrastructure and education. Economic growth is the highest of the four scenarios, while this scenario is assumed to have the lowest population in 2050.
2. *Order from Strength*: This scenario represents a regionalised and fragmented world that is concerned with security and protection, emphasises primarily regional markets, pays little attention to public goods, and takes a reactive approach to ecosystem problems. Economic growth rates are the lowest of the scenarios (particularly low in developing countries) and decrease with time, while population growth is the highest.
3. *Adapting Mosaic*: In this scenario, regional watershed-scale ecosystems are the focus of political and economic activity. Local institutions are strengthened and local ecosystem management strategies are common; societies develop a strongly proactive approach to the management of ecosystems. Economic growth rates are somewhat low initially but increase with time, and the population in 2050 is nearly as high as in Order from Strength.
4. *TechnoGarden*: This scenario depicts a globally connected world relying strongly on environmentally sound technology, using highly managed, often engineered, ecosystems to deliver ecosystem services, and taking a proactive approach to the management of ecosystems in an effort to avoid problems. Economic growth is relatively high and accelerates, while population in 2050 is in the mid-range of the scenarios.

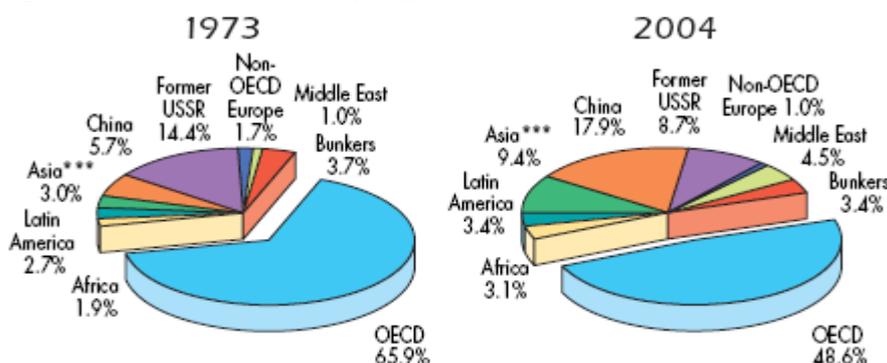
Consumption and production patterns

Consumption of natural resources in modern industrial economies is very high. It currently requires 300 kilograms of natural resources to generate US\$100 of income. Some argue that transferring this resource-intensive model to the developing world is not a viable model of development (WRI 2001).

Energy use, development, air pollution, human and ecosystem health are all interrelated. Access to energy is essential for development, but energy generated by the combustion of fossil fuels and biomass often results in air pollution, with negative impacts on human and ecosystem health. The good news is that clean technology is becoming more readily available (UNEP, 2006).

Global energy consumption has increased by 66% since 1973, while world carbon dioxide (CO₂) emissions from fuel increased from 15,661Mt to 26,583Mt or by 70% over the same period. During these 30 years, the regional distribution of CO₂ emissions changed considerably, with OECD countries reducing their emissions from 65.9 to 48.6%, while China and the rest of Asia tripled their shares from 5.7 to 17.9% and 3.0 to 9.4%, respectively, with further prospects of growth as economies in China and Asia are expected to continue to grow.

Figure 4-2 CO₂ emissions by region, 1973–2004



Source: IEA (2005)

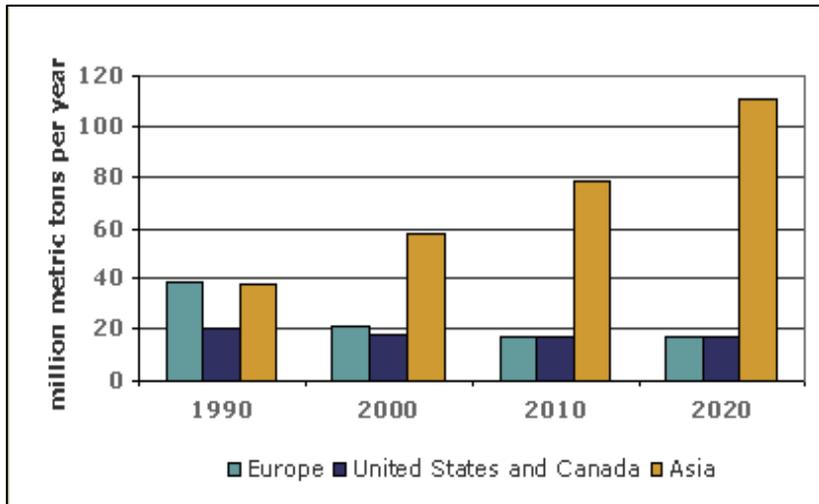
If existing energy policies continue, the world’s energy needs will be almost 60% higher in 2030 than in 2004. This increase in demand could be met from present known fossil fuel reserves. From a supply point of view, oil, gas and especially coal could therefore continue to dominate the global energy mix for the foreseeable future, unless the environmental implications of this fossil fuel dependency are reconsidered. Alternatively, major changes in global energy patterns driven by concerns about energy security, access, and the negative externalities of current patterns of energy use – particularly climate change and the health impacts associated with air pollution e.g. 800,000 premature deaths are attributed to urban air pollution, of which 65% occur in developing countries of Asia – could be initiated. The IEA estimates that energy investments from 2003 to 2030 will total around US\$16 trillion, or US\$568 billion per year, with a growing share for investments in alternative energy supply, especially based on renewable energy sources, which in 2002 already accounted for 13% of the total primary world energy supply (UNEP, 2006).

Energy consumption in developed countries, currently accounting for 70% of the world energy demand, is expected to slow down. Two-thirds of future growth is expected to take place in developing countries. Much of this growth will be to satisfy basic energy needs. Roughly 54% of the population in developing countries still lack access to modern, high quality energy sources and fuels, relying on traditional fuels such as wood, dung and agricultural residues for cooking and heating. At least 1,600 million people lack access to electricity in their homes (UNEP, 2006).

Table 4-1 indicates significant increases in primary energy consumption still to be seen in Asia and Africa whilst the high consumption levels of the developed world are projected to plateau (UNEP, 2001). World primary energy consumption increased by 2.9% in 2003. The demand for primary energy is expected to double every 28 years on average, while in Asia energy demand is predicted to double every 12 years. The demand for energy has increased the pressure on land, air, water and biodiversity (Shrestha and Iyngararasan, 2004). In the OECD, energy intensity per unit of GDP has generally decreased during the 1990s, but at a slower rate than during the 1980s. While in the first half of the 1990s, energy intensity did not improve in most countries, owing to decreasing prices for energy resources (oil, gas, etc.), it improved slightly in the second half of the 1990s as a consequence of structural changes in the economy, energy conservation measures, and in some countries decreases in economic activity (OECD 2004).

Industrial production is shifting towards the developing economies, especially in East Asia. Combined with economic expansion and continued reliance on coal as a primary fuel this is likely to increase acid rain in Asia in the next two decades (see Figure 4-3). By 2000, SO₂ emissions in Asia will be greater than those of North America and Europe combined, and will further increase by 2020, whereas SO₂ emissions in Europe and North America will slightly decline (WRI, 2001).

Figure 4-3 SO₂ emissions, by regions



Source: WRI (2001).

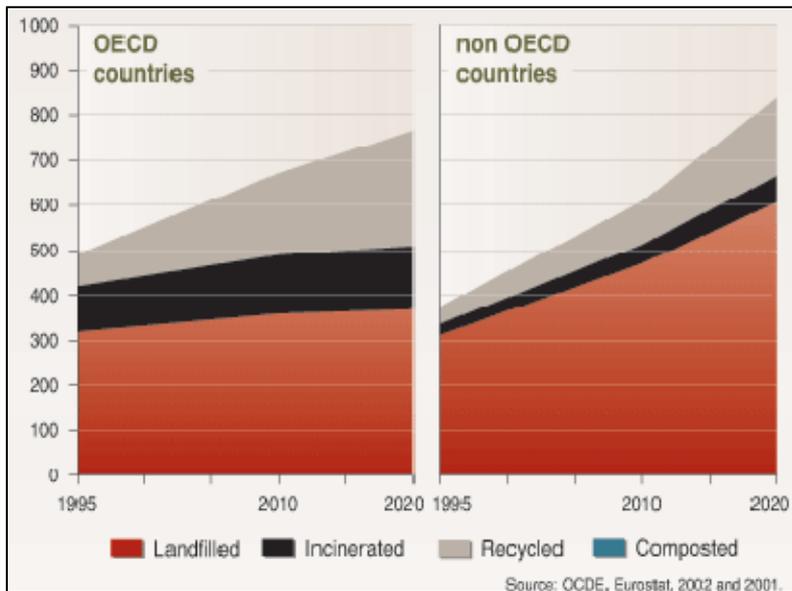
Table 4-1 Primary energy consumption projections

Region	Primary energy consumption total (petajoules)				Average annual change (%)		
	1950	1990	2015	2050	1950–90	1990–2015	2015–50
World	76,459	320,563	571,309	836,592	3.5	2.3	1.1
Africa	1,231	7,396	16,528	58,859	4.6	3.3	3.7
Asia & Pacific	4,814	68,663	185,143	336,144	6.9	4.1	1.7
Europe	30,691	129,933	185,490	205,483	3.7	1.4	0.3
Latin Am	1,938	14,322	35,067	55,405	5.1	2.3	2.3
North Am	37,398	88,824	132,650	121,604	2.2	1.6	-0.2
West Asia	389	1,1424	26,431	59,097	8.8	3.4	2.8

Source: UNEP (2001), Global Environmental Outlook 2001.

The generation of municipal waste in OECD countries increased by around 40% between 1980 and 1997. Whilst this growth rate is predicted to decline, municipal waste generation is expected to keep growing over the next two decades, reaching an estimated 770 million tonnes annually by 2020. The growth rate of municipal waste in non-OECD countries is expected to be considerably bigger than in OECD countries during the period 1995–2020 (OECD, 2004), see Figure 4-4.

Figure 4-4 Waste generated in OECD and non-OECD countries and its treatment



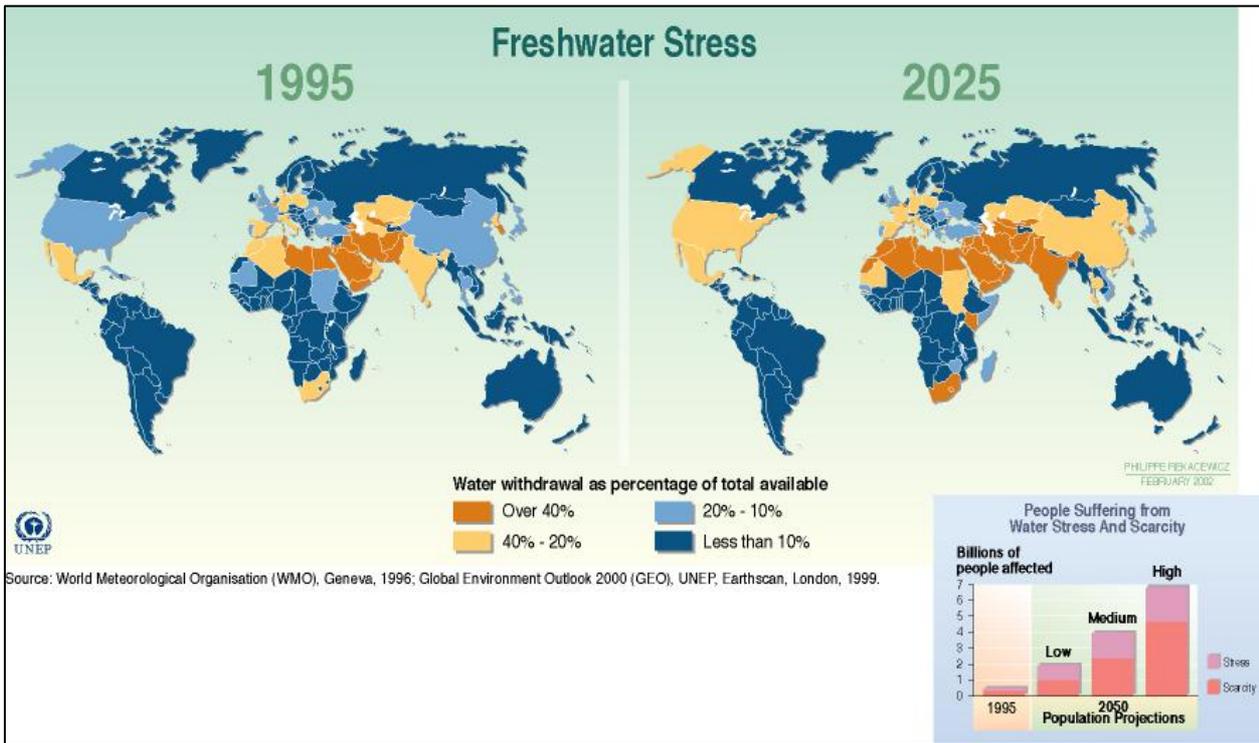
Source: UNEP (2004)

The quantity of municipal waste generated in the OECD area has reached approximately 600 million tonnes in 2005. Approximately 350 million tonnes is deposited in landfills. Amounts recycled have increased steadily. In non-OECD countries, though recycling will also increase, current predictions assume that the majority of municipal wastes are deposited in landfills (UNEP, 2004), with all its associated negative environmental (e.g. water pollution) and aesthetic implications.

Water resources

More than 2.8 billion people in 48 countries will face water stress or scarcity conditions by 2025 if present rates of consumption continue (see Figure 4-5). Of these countries, 40 are in West Asia, North Africa or sub-Saharan Africa. Over the next two decades, population increases and growing demands are projected to push all the West Asian countries into water scarcity conditions. By 2050, the number of countries facing water stress or scarcity could rise to 54, with their combined population being 4 billion people – about 40% of the projected global population of 9.4 billion (UNEP, 2002b). Also, most of Europe, the US and China will face water stress by 2025 with up to 40% of their total available water withdrawn for human use in agriculture, industry or domestic use

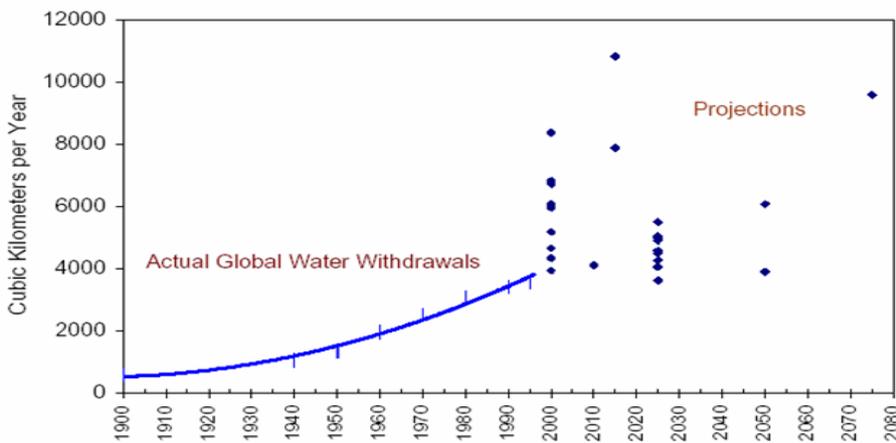
Figure 4-5 Freshwater stress 1995 and projections for 2025



Source: UNEP (2002b)

Gleick (1999) surveys projections on annual water withdrawal prepared in the past 25 years. He finds that the earlier projections greatly overestimated the magnitude of future demands because of the basic approach of extrapolating existing trends. Figure 4-6 shows actual water withdrawals until 1995 and projections thereafter.

Figure 4-6 Water scenarios: projected and actual global water withdrawals



Source: Gleick (1999).

In the future, annual global water withdrawal is expected to grow by about 10-12% every ten years, reaching approximately 5,240km³ (or an increase of 1.38 times since 1995) by 2025 (Table 4-2). Water consumption is expected to grow at a slower rate of 1.33 times. In the coming decades, the most intensive

growth of water withdrawal is expected to occur in Africa and South America (increasing by 1.5–1.6 times), while the smallest growth will take place in Europe and North America (1.2 times). The agricultural sector is by far the biggest user of water globally. In Africa and Asia, an estimated 85–90% of all the freshwater used is for agriculture (UNEP, 2002b). It is argued that this is not sustainable and that by 2015 a number of countries will be unable to maintain their levels of irrigation (CIA 2000).

Table 4-2 Total water withdrawal projections

Region	Total water withdrawal (km ³ p.a.)		% Change
	1995	2025	1995–2025
World	3401	4327	27
sub-Saharan Africa	73	141	93
West Asia / North Africa	246	302	23
Asia	1919	2464	28
China	584	764	31
India	573	735	28
Southeast Asia	194	286	47
South Asia (excluding India)	318	390	23
Latin America	251	358	43
Developed countries	976	1131	16
Developing Countries	2425	3197	32

Source: Rosegrant, *et al.* (2002)

Table 4-3 shows the make up of this increasing water use, with agriculture the major user. All users show projected increases, with agricultural users remaining the dominant influence.

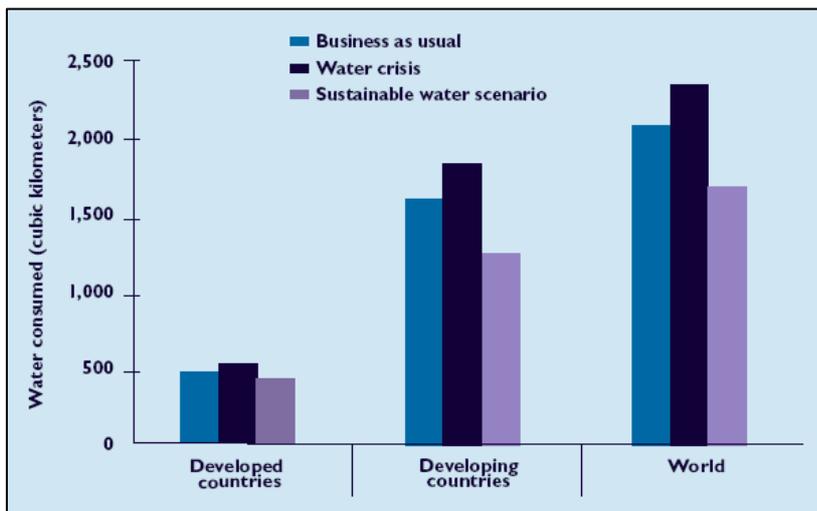
Table 4-3 Dynamics of water withdrawal and consumption by type of use (1990–2025)

Sector		Assessment			Forecast		
		1900	1980	1995	2000	2010	2025
Irrigated land area	(million ha)	47.3	198	253	264	288	329
Agricultural use	Withdrawal	525	2,179	2,488	2,560	2,737	3,097
	Consumptive use	406	1,688	1,939	1,970	2,093	2,331
Industrial Use	Withdrawal	37.8	699	732	768	884	1,121
	Consumptive use	3.36	59.0	79.4	84.6	103	133
Municipal Use	Withdrawal	16	207	357	389	468	649
	Consumptive use	4.17	41.8	58.9	64.4	70.5	84.0
Reservoirs	km ³ /year	0.3	129	188	210	235	270
Total (rounded)	Withdrawal	579	3,214	3,765	3,927	4,324	5,137
	Consumptive use	415	1,918	2,265	2,329	2,501	2,818

Source: Shiklomanov (1998) in Gleick (2000).

Although the domestic and industrial sectors use far less water than agriculture, water consumption in these sectors is also growing rapidly. Under a ‘business as usual’ scenario, IFPRI projects demand for all non-irrigation uses to rise by 62% between 1995 and 2025, with industrial water growing much faster in developing countries than in developed countries related to the overall increase in the world’s industrial production. Increasing urbanisation and income in developing countries will also lead to increases in domestic water demand. Agriculture water consumption is projected to grow only by 4% as a result of lacking water availability. Under a ‘sustainable water scenario’ global water consumption would be 20% less than under the ‘business as usual scenario’ and would reap greater benefits, especially in developing countries (Rosegrant, *et al.*, 2002)

Figure 4-7 Total water consumption in 2025 under three global scenarios



Source: Rosegrant, *et al.* (2002)

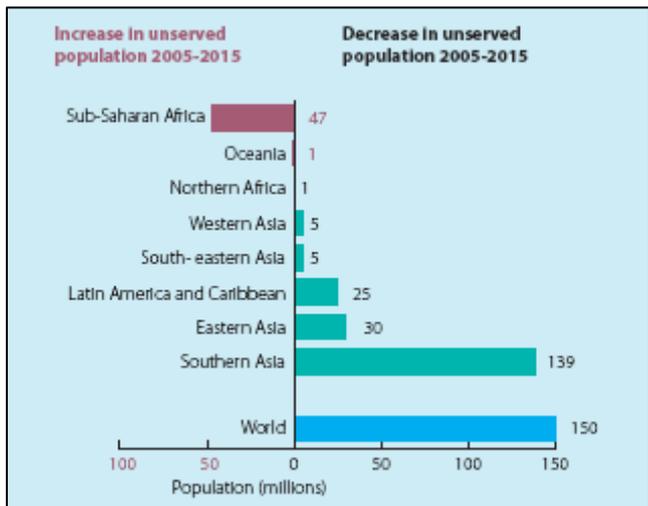
Many countries are entering a period of severe water shortage. None of the global food projection models such as those of the World Bank, FAO, and IFPRI have explicitly incorporated water as a constraint. There will be an increasing number of water-deficit countries and regions including not only West Asia and North Africa but also some of the major breadbaskets of the world such as the Indian Punjab and the central plain of China. There are likely to be some major shifts in world cereal grain trade as a result. One of the most important conclusions from an analysis by the International Water Management Institute of world water demand and supply 1990 to 2025 is that around 50% of the increase in demand for water by the year 2025 can be met by increasing the effectiveness of irrigation. While some of the remaining water development needs can be met by small dams and conjunctive use of aquifers, medium and large dams will almost certainly also be needed (Seckler, *et al.* 1998).

Over-pumping of ground water is a major problem: for example, the water table under the grain producing areas of Northern China is falling at a rate of five feet per year. Measures taken to improve the efficiency of water use are not predicted to alter the problems of water shortage significantly by 2015. It is anticipated that water-pricing policies will not be widely applied by 2015 (CIA 2000).

The CIA predicts the possibility of conflicts arising from water shortage disputes by 2015. More than 30 nations receive over a third of their water from outside their boundaries. The potential for conflict in the Middle East is thought to be of considerable concern (CIA 2000). Although there are 263 international river basins, several of which are shared by ten countries and more (e.g. Nile: ten countries, Niger and Congo: 11 countries, Danube: 12 countries), incidence of acute conflict over international water resources is overwhelmed by the rate of cooperation. The last 50 years have seen only 37 acute disputes (those involving violence), and 30 of those occurred between Israel and one of its neighbours. What has been observed more frequently – and is expected to increase as water resources are declining – are intrastate disputes over water. Thus, water problems can contribute to local instability, which in turn can destabilise a nation or an entire region. In this indirect way, water contributes to international and national disputes, even though the parties are not fighting explicitly about water (WWI, 2005).

Besides absolute water quantity per person, water quality is a second issue of concern for many countries. In 1990, 1.2 billion people were without access to safe drinking water. In 2004, this number declined to 1.07 billion. While globally, 1.2 billion people gained access to both improved drinking water sources and improved sanitation from 1990 to 2004, another 1.6 billion need to gain access from 2005 to 2015 to reach the MDG sanitation target and 1.1 billion need to gain access to meet the drinking water target (WHO/UNICEF, 2006).

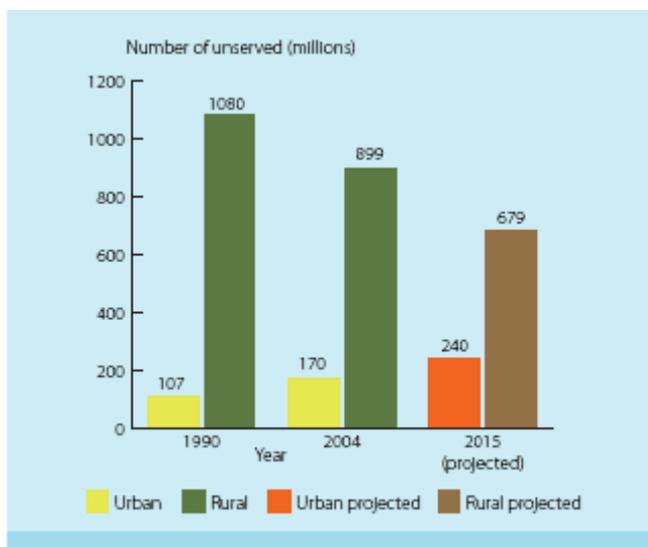
Figure 4-8 Projected change in the absolute numbers of people without access to an improved drinking water source 2005–2015, by developing region



Source: WHO/UNICEF (2006)

If current trends continue to 2015, the absolute number of people without an improved drinking water source will decline by 150 million; sub-Saharan Africa will end up with 47 million more unserved than in 2004 (see Figure 4-8).

Figure 4-9 Global population (in millions) without access to improved sources of drinking water in urban and rural areas



Source: WHO/UNICEF (2006)

Although rural–urban differences with regard to access to improved sources of drinking water decreased between 1990 and 2004, the number of urban dwellers without access to improved drinking water is projected to increase from 170 million in 2004 to 240 million in 2015. This increase is mainly related to increasing urbanisation in several countries with already high urbanisation trends such as China, Indonesia, Kenya and Nigeria (see Figure 4-9).

Forest resources

The FAO estimate of total global forest was 3.86 billion ha in 2000 compared with 3.45 billion ha in 1995 (FAO, 2001). Latest findings from the Global Forest Resources Assessment 2005 (FAO, 2005) estimated forest area in 2005 to be 3,952 million ha or 30% of total land area. This corresponds to an average of 0.62 ha of forest per capita. The figures though are not directly comparable owing to changes in forest definition and the information base. However, the growing awareness of forest issues and management has helped to halt the rate of deforestation globally, although the problem still exists and is worsening in tropical zones (FAO 2001). Deforestation, mainly due to conversion of forests to agricultural land, continues at an alarmingly high rate – some 13 million ha per year. At the same time, forest planting, landscape restoration and natural expansion of forests have significantly reduced the net loss of forest area. Net global change in forest area in the period 2000–2005 is estimated at -7.3 million ha per year, down from -8.9 million ha per year in the period 1995–2000 (FAO, 2005) and -11.3 million ha per year in 1990–1995 (FAO, 2001). South America suffered the largest net loss of forests from 2000 to 2005 – about 4.3 million ha per year – followed by Africa, which lost 4.0 million ha annually. Although net forest loss has decreased, still 200 km² of forest per day are lost.

The GEO Year Book 2006 (UNEP 2006) finds that in 2005 the forest cover area is estimated at 30.2% of the total land area, down from 30.5% in 2000 and 31.2% in 1990. The pace of forest loss seems to have decreased slightly, and some regions show a stabilisation or net gain. Although the Latin America and Caribbean region still has the largest proportion of forest area, the decrease here is significant: from 49.2% cover in 1990 to 45.8% in 2005. Africa also shows a continued net loss of forest area with 21.4% in 2005, compared to 23.6% in 1990. Forest areas in Europe and North America continued to expand modestly during this period, while the Asia and Pacific and West Asia regions showed relatively little change.

Table 4-4 Regional forest cover and forest cover change

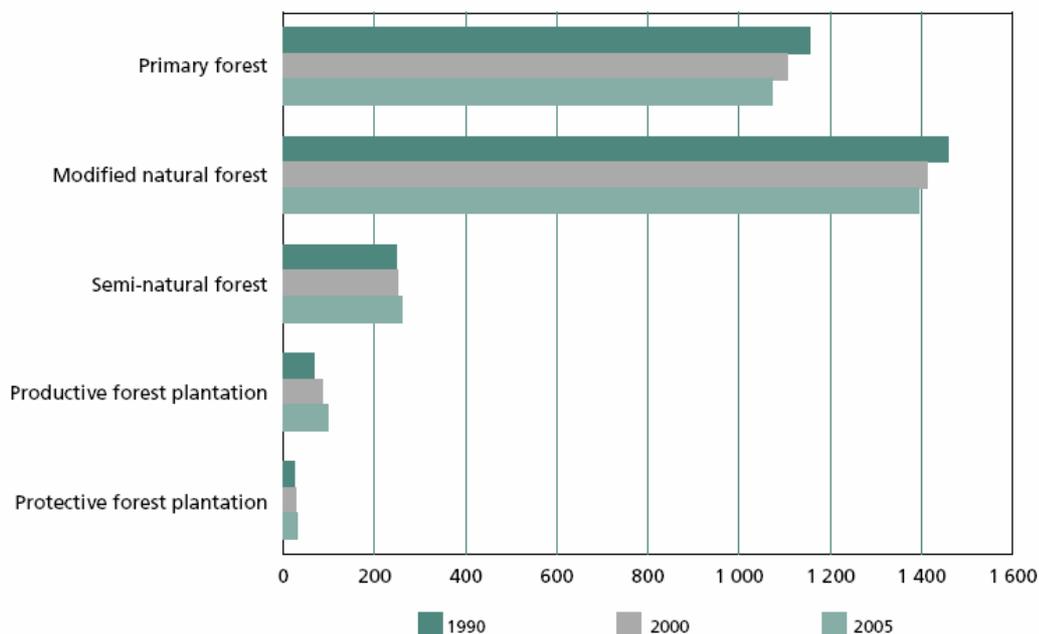
Region	Total forest area 2000		Total forest are 2005		Annual changes 2000–2005
	Million ha	%	Million ha	%	% per year
World	3,856	100	3,952	100	-0.18
Africa	650	17	635	16.1	-0.62
Asia	542	14	572	14.5	+0.18
Oceania	201	5	206	5.2	-0.17
North & Central America	539	14	706	17.9	-0.05
South America	874	23	832	21.0	-0.50
Europe	1,040	27	1,001	25.3	+0.07

Source: The Global Forest Resources Assessment 2005 (FAO 2005).

Reasons for deforestation include conversion of forest to permanent agriculture, intensification of agriculture in shifting cultivation areas, and expansion of shifting cultivation into undisturbed forests.

At least as important as the total forest cover is the type of the forest under consideration and the type of services this forest provides. In 2005, of the total forest area, 36.4% were primary forests, 52.7% modified natural forests, 7.1% semi-natural forests, 3% productive forest plantations, and 0.8% protective forest plantations. About 6 million ha of primary forest have been lost or modified each year since 1990, and there is no indication that the rate of change is slowing down. This rapid decrease stems not only from deforestation, but also from modification of forests due to selective logging and other human interventions – whereby primary forests move into the class of modified natural forests. The rate of loss of primary forests is stable or slightly decreasing in most sub-regions, but is increasing in South America and, to a lesser extent, in North America. Brazil and Indonesia alone account for an annual loss of primary forest of 4.9 million ha (FAO, 2005).

Figure 4-10 Global trends in forest characteristics, 1990–2005 (in million ha)



Source: FAO (2005)

On average, 104 million ha of forest were affected each year by forest fire, pests (insects and disease) or climatic events such as drought, wind, snow, ice and floods. However, the area of forest affected by disturbances was severely underreported, with information missing from many countries, especially on forest fires in Africa (FAO, 2005).

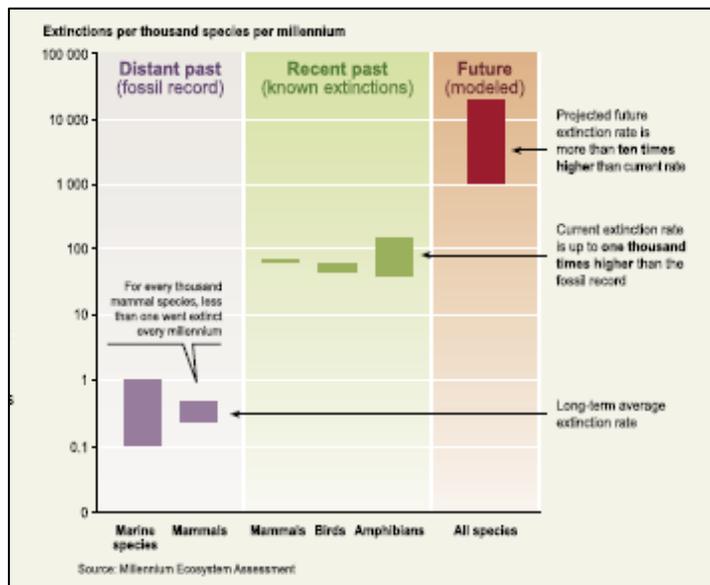
Fire has been a major factor in the development and management of many of the world's forests. Every year, millions of ha of the world's forests are consumed by fire, with loss of human and animal life and very substantial economic damage in destroyed wood and non-wood forest resources, loss of biodiversity, release of carbon to the atmosphere, burned housing, degraded real estate, high costs of fire suppression, and damage to other environmental, recreational and amenity values. Most fires in forests and woodlands today are caused by humans. They are the result of a misuse of fire for conversion of forests to agricultural lands, maintenance of grazing lands, extraction of non-wood forest products, hunting, and clearing of land for mining, industrial development and resettlement. Forest fires may also be the result of personal or ownership conflicts. As only some countries reported incidences of forest fires, establishing trends is difficult. With the exception of Africa, all other regions reported slight increases in areas damaged by forest fires since 1990 (FAO 2005).

Biodiversity

The Millennium Ecosystem Assessment (MEA, 2005) concluded that in the last 50 years, human actions have changed the diversity of life on the planet more than at any other time in history. Our activities have lifted many people out of poverty, but at the price of a loss of biodiversity. If continuing down this road, humans will reduce biological diversity, with life-threatening consequences. Over the past few hundred years, humans have increased species extinction rates by as much as 1,000 times background rates that were typical over Earth's history. Ecosystems are being transformed with unprecedented magnitude, the distribution of species on Earth is becoming more similar and genetic diversity has declined globally.

Biodiversity affects human well-being. Not only does it provide the materials we need for food, clothing and shelter, but also gives us security, health and freedom of choice. Human activities are leading to the loss of the variety of life. Population increase and economic activity, fuelled by technological change and our patterns of political and cultural life are placing unprecedented pressure on ecosystems. Current actions are changing habitats, the climate, overexploiting resources, creating pollution and promoting the spread of invasive alien species. If current patterns continue, the loss of biodiversity will accelerate, not diminish.

Figure 4-11 Species extinction rate



Source: MEA (2005)

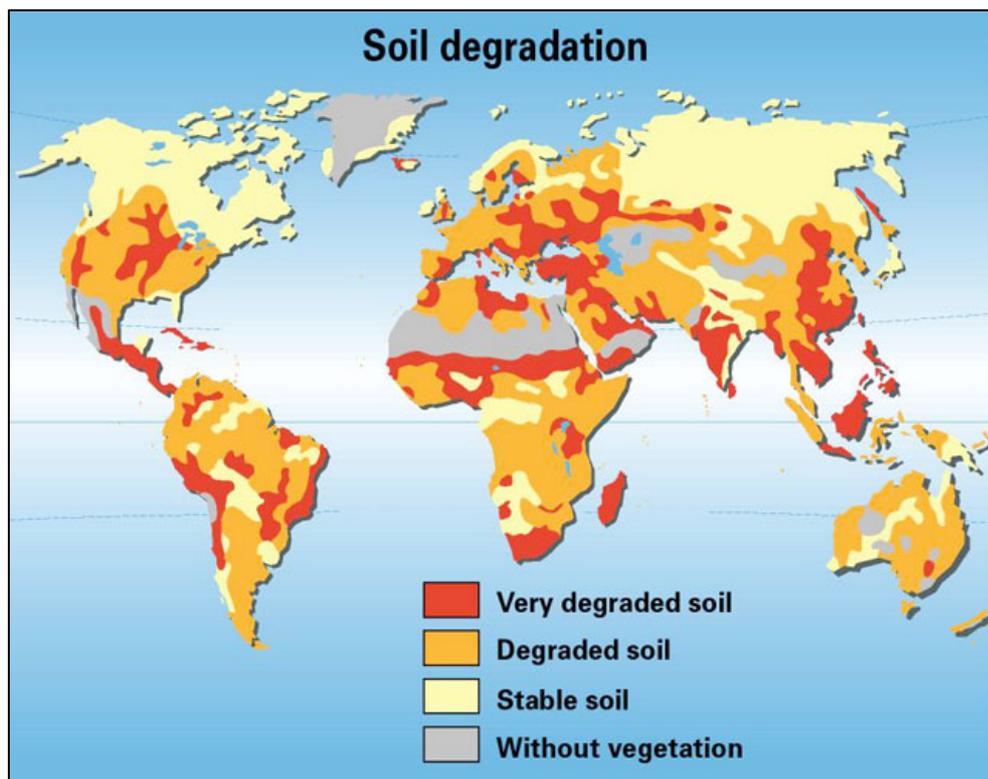
According to UNEP 1995 Global Biodiversity Assessment (GBA), species extinction since the year 1600 has occurred at 50 to 100 times the natural rate, and is expected to accelerate to between 1,000 and 10,000 times the natural rate by 2020 (GBA, 1995). The GBA states that 38 bird and mammal species became extinct between 1600 and 1810, compared to 112 species between 1810 and 1995. Of the 129 recorded bird extinctions, 103 have become extinct since 1800. This indicates an extinction rate that is 50 times that of the background rate (IUCN, 2004)

The leading threats to biodiversity are: converting land to agriculture, clearing forests, climate change, pollution, unsustainable harvesting of natural resources and the introduction of alien species to areas where they are not native. One study of animal extinctions since 1600 found that 39% arose mainly from the introduction of alien species, 36% from habitat destruction, and 23% from hunting or deliberate extermination. Secondary causes of biodiversity loss include human population growth, unsustainable patterns of consumption, increasing production of waste, urban development and international conflict (WCMC, 1992; UNEP, 2002a). The 2004 Red List of Threatened Species published by IUCN (*op. cit.*) states the number of species threatened with extinction at 15,589, while the Global Biodiversity Outlook in 2000 estimated the number of threatened species at 11,046. Part of this large increase (+41%) is because of modified criteria for listing, but it also reflects an ever increasing human pressure on a number of ecosystems. With increasing pressure towards intensified agriculture, increasing water production and pollution in fast growing economies, increasing urbanisation and development of coastal regions, the threat to biodiversity is not expected to diminish in the near future.

Land and soil degradation

There is no measure of the extent, impact or trend of land degradation. The only harmonised global assessment, GLASOD, was an expert-judgement compiled in the 1980s – a map of perceptions that cannot be updated (see Figure 4-12). For policy development, investment and action on the ground, however, there is a continual demand for an up-to-date, quantitative assessment – including land improvements as well as land degradation – reproducible by defined procedures, backed up by field measurements of the nature of degradation, and an early warning system (IUSS, 2006)

Figure 4-12 Assessment of severity of soil degradation



Source: UNEP/GRID-Arendal (1997).

The MEA does not focus on soil or land *per se*, but its concept looks at the status and trends of ecosystem services. Soils are therefore addressed in relation to the services they provide for human well-being and poverty reduction. The MEA concludes that 60% of all ecosystem services have been degraded or are used in an unsustainable manner. Of particular importance seems that many of the provisioning services (e.g. food livestock, feed, and fibre production) have increased tremendously over the last 50 years, which has helped to improve the lives of billions of people. However, many regulating and supporting functions have been degraded, and this is endangering the achievements of the MDGs. The MEA focuses specifically on issues related to the assessment of nutrient cycles, soil formation, erosion regulation, water regulation, and natural hazard regulation (Giger, 2006).

The MEA takes a somewhat pessimistic stance with regard to land degradation and poverty, especially in drylands. It states that:

‘poverty and degradation of nature can combine into a downward spiral – poor communities are often left with fewer options to conserve their natural resources, leading to further deterioration of the land and even greater poverty. The problem of degradation of drylands, a process known as desertification, is

acknowledged as a cause as well as a consequence of poverty. Poor farming practices can lead to serious soil erosion and lack of moisture, making survival from the land even more difficult.’
(MEA, 2005, p. 17)

Soil erosion is a major factor in land degradation and has severe effects on soil functions - such as the soil's ability to act as a buffer and filter for pollutants, its role in the hydrological and nitrogen cycle, and its ability to provide habitat and support biodiversity. About 2,000 million ha of soil, equivalent to 15% of the Earth's land area, have been degraded through human activities. The main types of soil degradation are water erosion (56%), wind erosion (28%), chemical degradation (12%) and physical degradation (4%). Causes of soil degradation include overgrazing (35%), deforestation (30%), agricultural activities (27%), overexploitation of vegetation (7%) and industrial activities (1%) (GACGC 1994).

Improper land use and poor land management technologies are the most important factors leading to soil degradation. However, the main contributing factors are the economic conditions of poor farmers often exacerbated by agricultural policies that discourage farmers from adopting improved procedures of management, and access to markets for their produce. Examples of policies that contribute to land degradation include commodity-based subsidies, controlled prices on agricultural products, or taxation policies that encourage the use of marginal land.

Excessive use of fertilisers and other chemicals through increased agriculture intensity contributes to soil degradation and water pollution. The cumulative productivity loss from crop-land over the past 50 years has been estimated at 13%. Productivity has declined on 16% of agricultural land in developing countries due to soil degradation. Almost 75% of Central America's agricultural land has been seriously degraded. Various sources suggest that 5 to 10 million ha are being lost annually to severe degradation. If this trend continues, 1.4 to 2.8% of total cropland, pasture, and forestland will have been lost by 2020. Declining yields (or increasing input requirements to maintain yields) could be expected over a much larger area. These data are, however, likely to overestimate the problem, as they do not account for the effects of land improvements, which also appear to be widespread (Scherr, 1999).

A global agricultural model suggests that a slight increase in degradation relative to the baseline trends could result in a 17% to 30% higher world price for key food commodities in 2020 (Pinstrup-Anderson, *et al.* 2001).

Ecosystem goods and services are often the only significant assets to which the poor have access. These natural endowments, if managed efficiently, can provide a capital base – a foundation for greater economic viability, and a stepping-stone beyond mere subsistence. Yet the potential of these assets is often overlooked. Typical commercial evaluation of natural resources tends to undervalue the total amount of ecosystem goods and services provided to the poor, which includes not just the crops, timber and fuelwood, fish, and forage that are the usual focus of exploitation, but also a wide variety of other goods that are collected, agroforestry products, small-scale aquaculture products, as well as services such as maintenance of soil fertility, flood control, and recreation. One of the consequences of the difficulty of assigning a monetary value to ecosystem benefits is that it has led to the systematic undervaluation of the assets of the poor and the underestimation of the potential benefits of improved environmental management (WRI, 2005)

The MEA findings also confirm that the substantial degradation of ecosystems that is now occurring is a barrier to achieving the MDGs. For example, the MEA warns that meeting the goals of eradicating hunger and reducing child mortality by 2015 will be unattainable if ecosystems continue to be used unsustainably. Soil degradation and water scarcity are two important sources of risk to the production of agro-ecosystems, and thus to the food supply, particularly as it affects the poor. The MEA makes it clear that failure to tackle the current decline of ecosystem health will seriously erode efforts to reduce rural poverty (MEA, 2005)

An assessment of the wealth of nations, assessing capital assets – produced, natural and intangible – upon which development depends, concludes that cropland and pastureland make up 70% of natural wealth in low-income countries, and 18% of total wealth (World Bank, 2006).

Table 4-5 Estimated natural capital (in US\$ per capita)

Income group	Subsoil assets	Timber resources	NTR	Protected Areas	Cropland	Pasture - land	Total natural capital
Low-income countries	325	109	48	111	1,143	189	1,925
Middle-income countries	1,089	169	120	129	1,583	407	3,496
High-income countries (OECD)	3,825	747	183	1,215	2,008	1,552	9,531
World	1,302	252	104	322	1,496	536	4,011

Source: World Bank (2006)

Fisheries

Fish stocks are increasingly under threat, as are livelihoods from fishing with declining catches and the imposition of quotas and bans.

Currently, 8% of the world's reefs and 34% of all fish species may be at risk from human activity (WRI 2001). Of the major marine stocks fished worldwide, more than 28% are estimated to be overexploited (18%) and depleted or recovering (10%), while about 47% are fully exploited. Trend analysis shows large differences among OECD countries and among fishing areas, with high increases in some areas (e.g. the Pacific and Indian Oceans) and relatively stable trends in others (e.g. the North Atlantic). Only a few of the fish stocks in areas closest to OECD countries have significant potential for additional exploitation; the North Atlantic and parts of the Pacific areas are already being over-fished. All or most of the increase in demand for fish to 2020 will need to be, and is expected to be, supplied through aquaculture, since marine capture fisheries show no sign of increasing yields (OECD 2004; and Table 4-6).

Table 4-6 Total production of food fish, 1997 and 2020

	Actual 1997		Projected 2020		Projected annual growth rates 1997–2020 (percent)		
	Million metric tons	Share from aquaculture (percent)	Million metric tons	Share from aquaculture (percent)	Capture	Aqua-culture	Total
China	33.3	58	53.1	66	1.1	2.6	2.0
Southeast Asia	12.6	18	17.5	29	0.8	3.6	1.4
India	4.8	40	8.0	55	1.0	3.7	2.3
Other South Asia	2.1	23	3.0	39	0.6	4.0	1.7
Latin America	6.4	10	8.8	16	1.1	3.5	1.4
West Asia and North Africa	2.2	9	2.8	16	0.6	3.6	0.9
Sub-Saharan Africa	3.7	1	6.0	2	2.0	5.8	2.1
United States	4.4	10	4.9	16	0.1	2.7	0.5
Japan	5.2	15	5.2	20	-0.3	1.2	0.0
European Union 15	5.9	21	6.7	29	0.0	2.1	0.5
Eastern Europe and former Soviet Union	4.9	4	5.0	4	0.1	0.4	0.1
Other developed countries	4.8	12	5.8	20	0.5	2.9	0.8
Developing world	68.0	37	102.5	47	1.0	2.8	1.8
Developing world excluding China	34.6	17	49.4	27	1.0	3.6	1.6
Developed world	25.2	13	27.6	19	0.1	2.1	0.4
World	93.2	31	130.1	41	0.7	2.8	1.5

Sources: Actual data were calculated by authors from FAO 2002a; projections for 2020 are from the baseline scenario of IFPRI's IMPACT model (July 2002).

Notes: Actual data are three-year averages centered on 1997. Projected growth rates are exponential, compounded annually using three-year averages as endpoints.

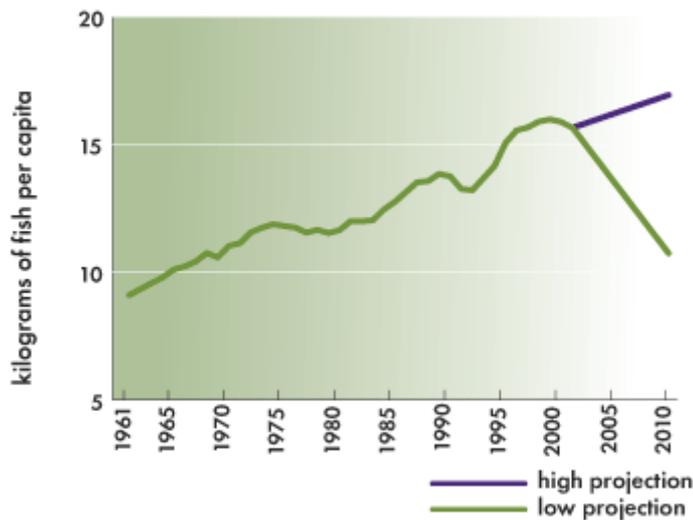
Source: Delgado, *et al.* (2003).

While capture fisheries production has stagnated owing to overexploitation, there are hopes that aquaculture may ease pressure on threatened wild stocks. However, aquaculture itself is also associated with certain environmental problems. Aquaculture may have led to disturbance of the capture fisheries habitat through pollution and coastal habitat conversion and the increasing use of fishmeal and fish oil in the feeds of farm-raised fish has also raised concerns that aquaculture may be harming wild fish populations rather than easing pressure on them. These concerns are expected to become increasingly prominent as demand for fish grows over the coming years (Delgado, *et al.*, 2003).

Global fish production rose slightly in 2002, the most recent year for which UN figures are available, based largely on increasing aquacultural production in China. Some fisheries biologists challenge these figures and contend that fisheries production has actually been in decline since 1988.

While the number of individual fishers continues to increase, the amount of fish each one catches has generally fallen. The poor have long depended on fish for complete protein, but population growth is helping to push this important food source out of their reach. A generally optimistic projection of future fish supply and demand by the IFPRI and World Fish Centre suggests that by 2020 the price of seafood will rise by a global average of 15% above 1997 – above and beyond general inflation – compared to a 3% decrease for beef.

Figure 4-13 Past and projected trends in global per capita fish production, 1961–2010



Source: Population Action International (2006)

In the short-to-medium term, demand for fish will expand as populations and incomes grow. However, this increase will be relatively slow in developed countries, probably less than 1% per year (in terms of quantity of fish), because populations stagnate or increase only very slowly, per capita consumption is already relatively high and consumption does not increase significantly as disposable income increases. In developing countries, the growth will be faster because populations increase more quickly and in some countries per capita consumption figures are very low. Growth – again in terms of quantity – could easily be double or triple that projected for the developed countries (FAO, 2004)

Table 4-7 FAO statistics and forecasts for production and consumption trends for fish

	2000	2010	2020	2030
	<i>FAO statistics</i>	<i>SOFIA 2002</i>	<i>SOFIA 2002</i>	<i>SOFIA 2002</i>
	In million tonnes			
Marine capture	86	87	87	87
Inland capture	9	6	6	6
Total capture	95	93	93	93
Aquaculture	36	53	70	83
Total production	131	146	163	176
Food fish production ¹	96	120	138	150
Percentage used for food	73%	82%	85%	85%

Source: FAO (2004)

While FAO predicts no large changes in marine and inland capture until 2030, aquaculture is projected to increase considerably from 36 million tons in 2000 to 83 million tons in 2030. Fish catch for non-food use is expected to decrease from about 25% to 15% (see Table 4-7).

Land cover and land use changes

Changes in population and dietary intake will lead to the greater intensification of agriculture in the developing regions. Cropping intensity is set to increase by 15–20% by 2050 (UNEP, 2001).

The most significant historical change in land cover has been the expansion of agricultural lands. At present, close to a third of the earth's land surface is devoted to pastures or cropland, which amounts to approximately half of all lands suitable for agriculture. The past century witnessed over half of the worldwide increase in agricultural lands, and in the developing world half the land cover conversion occurred in just the past 50 years (Sherbinin, 2002).

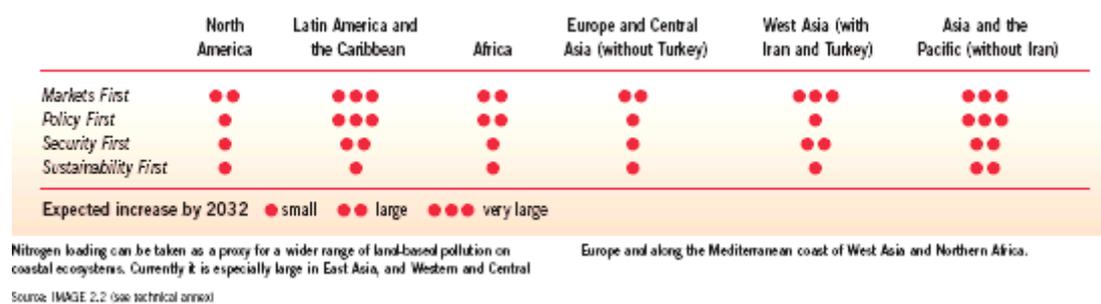
Land use and land use changes are currently the strongest factor influencing the biosphere and will presumably remain so for the next few decades. Estimated population growth of 1,000 million people per decade will make an annual increase in food production of approx 2% necessary. This will lead in Africa, Latin America and Asia to yet more conversion of natural ecosystems into agricultural land and to an intensification of production on developed crop land (WBGU, 2001)

Between 1945 and 1990 it has been estimated that 23% of our world's agricultural land, permanent pastures, forests and woodland had been degraded. By 2001 about 30% had been degraded. Overgrazing; deforestation; inappropriate agricultural and energy policies which promote intensive farming practices, subsidise electricity and encourage over-pumping of water; and excessive deposition of acids, heavy metals, organic compounds, salts, nutrients (mainly nitrogen) and pesticides, are the main causes of degradation (WEC, 2001).

The impact of agriculture is not limited to the developing world. Total water use by agriculture in OECD countries is expected to increase by 15% by 2020. Nitrogen and biochemical oxygen demand loading are forecast to increase by more than 25% and methane emissions could increase by almost 9% above current levels (OECD 2001).

Table 4-8 shows for different scenarios the changes expected by UNEP over 2002–32 in nitrogen loading, which can be taken as a proxy for a wider range of land-based pollution on coastal ecosystems. It is currently large in East Asia, Western and Central Europe, and along the Mediterranean coast of West Asia and Northern Africa (UNEP 2002a).

Table 4-8 Potential increase in nitrogen loading on coastal ecosystems



Source: UNEP (2002a).

Table 4-9 Non-domesticated land as percentage of total regional land areas

Region	1990	2015	2050
World	70	65	60
Africa	70	55	45
Asia & Pacific	60	50	55
Europe & Former USSR	75	75	70
Latin Am. & Caribbean	70	65	60
North America	80	80	80
West Asia	90	75	70

Source: UNEP (2001), Global Environmental Outlook.

Table 4-9 shows that in all areas of the world the amount of land not used for human activity is set to decline, with the largest land use changes being seen in Africa and West Asia. These land use changes will have significant environmental impacts for humans and will also cut habitat availability for numerous endangered species (WRI 2001).

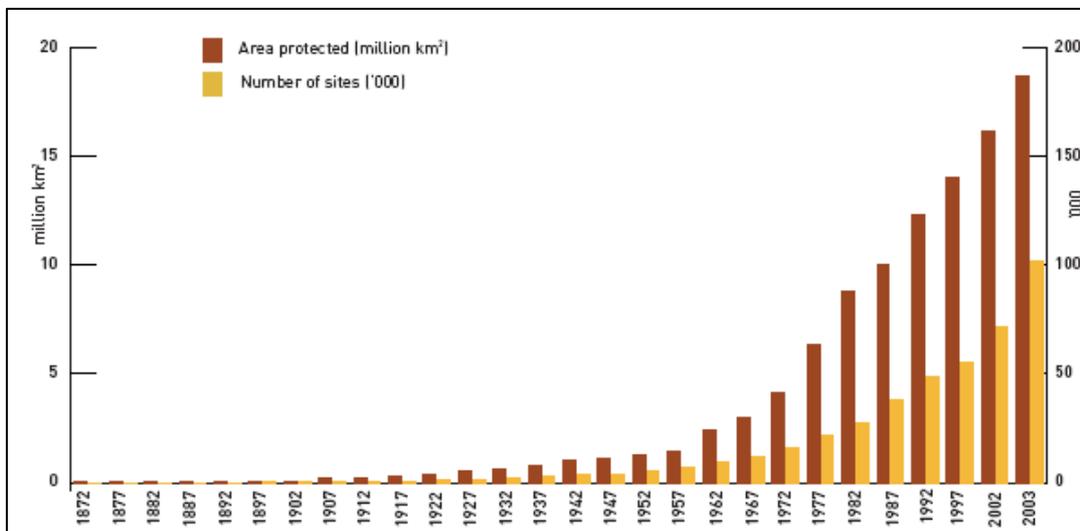
Major constraints inhibiting crop cultivation are temperature limitations (13%), limited water availability (27%), steep slopes (12%) and poor soils (40%). Cultivable land in developing countries totals about 1.8 billion ha, of which some 20% is only moderately suitable for crop cultivation. At present, over 900 million ha of this land is under cultivation. The corresponding figures for the developed countries are 765 million ha of cultivable land, 35% of which is only moderately suitable, and 595 million ha under cultivation at present.

Over 80% of potentially cultivable land reserves are located in just two regions, South America and sub-Saharan Africa. In contrast, most of the cultivable land in Asia is already in use, and the population increase expected by 2050 will reduce per capita availability of cultivable land to below the critical level of 0.1 ha per person.

In both the developed and developing worlds, some 1.4 billion ha constitute forest ecosystems, of which 12% and 30%, respectively, have good potential for crop cultivation. However, cultivation in these forest areas would result in severe environmental consequences.

An ever growing area of the earth's surface, including both land and sea, is covered by protected areas (see Figure 4-14). These areas do not necessarily imply that they are not used by humans, but intensity and manner of use are often regulated. The fifth World Parks Congress in 2003 intended to maintain and enhance the core conservation goals and equitably integrate them with the interests of all affected people.

Figure 4-14 Protected areas, 1872–2003



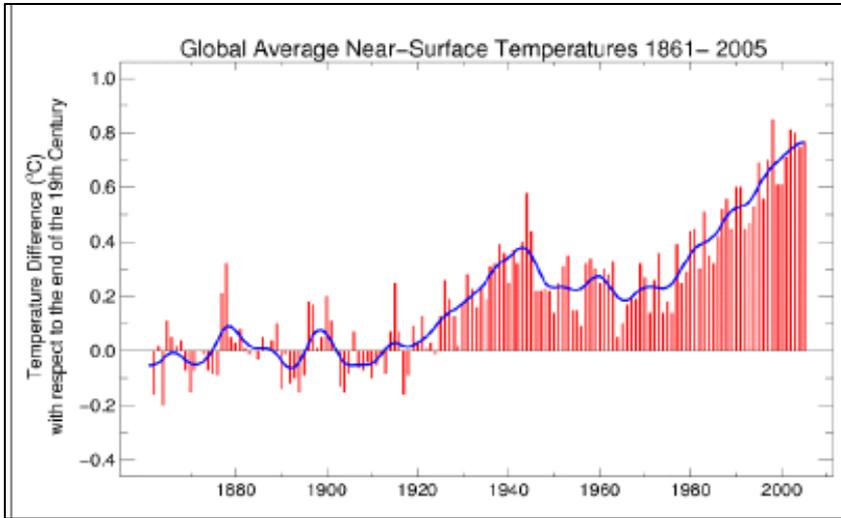
Source: Mulongoy and Chape (2004)

Climate change

‘The physical consequences of climate change are no longer theoretical; they are real, they are here, and they can be quantified.’ is the finding of an analysis of papers on climate change published in peer-reviewed journals in 2005 (Levin and Pershing, 2006). The climate is changing, and significant impacts can be identified. Measurements compiled from thousands of weather stations all over the world support the idea of a warming planet. The Earth has warmed on average by 0.7°C globally since 1900 (see Figure 4-

15). All ten warmest years on record have occurred since 1994. The rate and scale of 20th century warming has been unprecedented for at least the past 1,000 years (Stern, 2006).

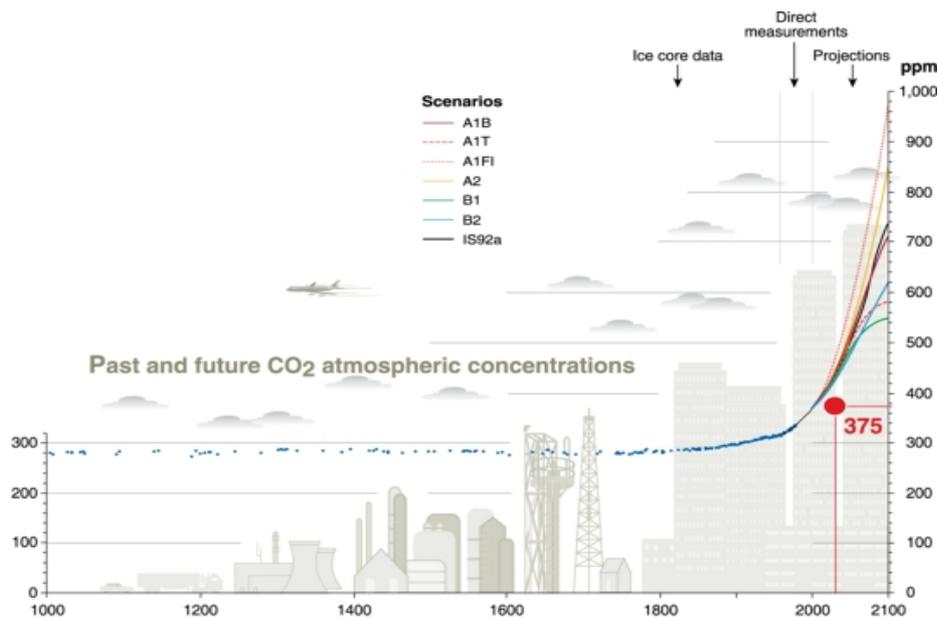
Figure 4-15 Global average near-surface temperature 1861–2005



Source: Hadley Centre (2005)

Carbon dioxide accounts for the largest share of emissions of greenhouse gases associated with global warming. CO₂ emissions have continued to rise since 1990 except in Europe, partly thanks to stricter regulations and downturns in Eastern Europe (UNEP Year Book 2003). The atmospheric concentration of carbon dioxide has increased by 31% since 1750. The present level of carbon dioxide concentration (around 375 ppm) is the highest for 420,000 years, probably the highest for the past 20 million years (UNEP, 2005b).

Figure 4-16 Past, present and future CO₂ concentrations



Source: UNEP (2005)

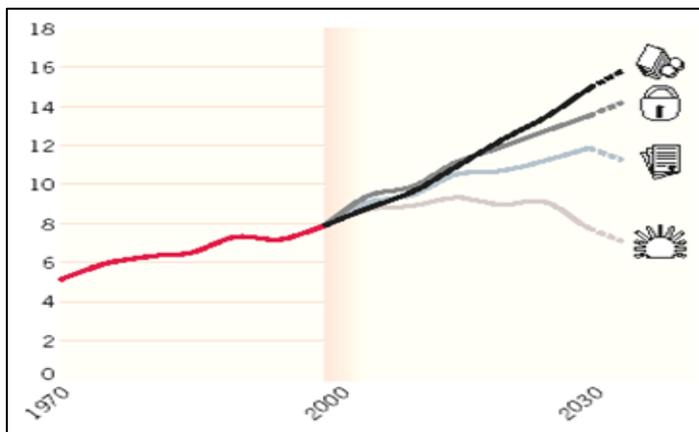
Global CO₂ emissions currently show an average annual increase of 1.4% (IPCC 2001a and b) and are expected to increase by 1.9 % annually between 2001 and 2025 (EIA 2005). The energy sector (including energy production and transport) is responsible for the largest share of GHG emissions (see Table 4-10).

Table 4-10 Sectoral share in GHG totals, 2003

	Energy	Waste	Agriculture	Industrial processes	Other	Solvent and other product use
% of total GHG emissions	84.8	2.7	7.0	5.5	0.02	0.08

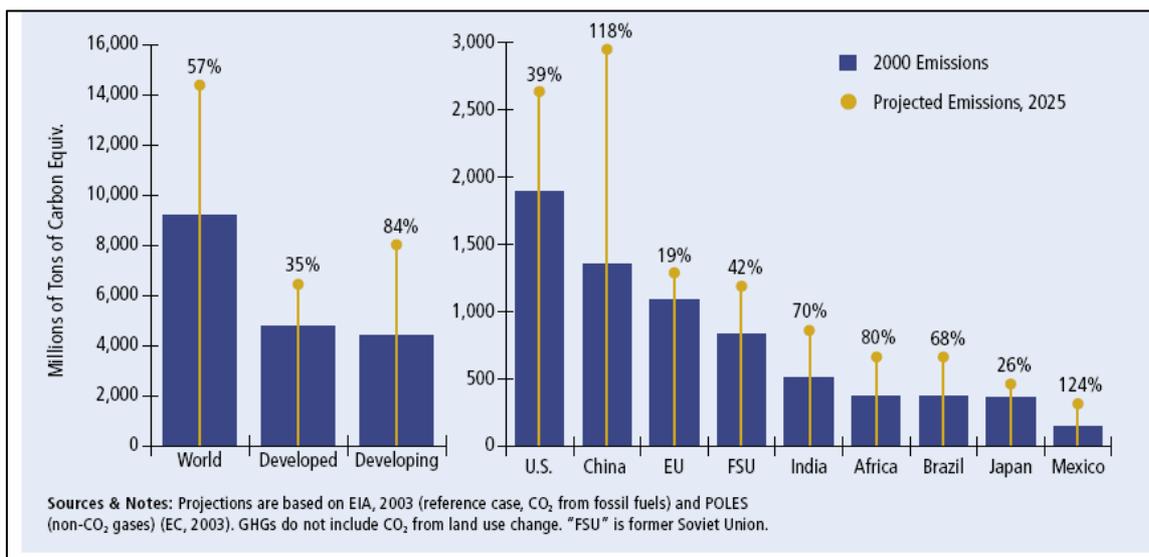
Source: UNFCCC (2005a)

Figure 4-17 Carbon dioxide emissions from all sources (billion tonnes carbon/year)



Note: for key to symbols, refer to fig 4-1.
Source: UNEP (2002a).

Figure 4-18 Projected emissions of GHGs in 2025



Source: Baumert, et al. (2005)

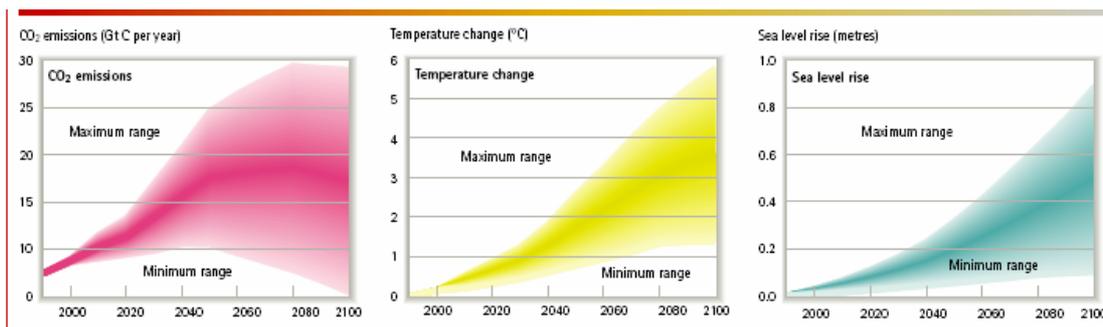
Under a reference scenario – no policy changes relative to today’s situation, a constant oil price and a stable GDP growth – the IEA projected an increase of over 50% in global energy-related CO₂ emissions by 2025. Developing countries will account for almost three-quarters of the increase. Emissions from land use and agriculture are also predicted to increase due to increasing livestock numbers, fertiliser application and continuing tropical deforestation. Total GHG emissions, might increase, depending on the underlying assumptions, between 63% and 235% by 2050 (Baumert, *et al.* 2005). China’s and India’s rapid economic growth, if continuing at similar rates as observed today, would lead to GHG emission increases of 118% and 70%, respectively.

The IPCC developed six emissions scenarios, resulting in projected concentration of CO₂ in the year 2100 from 540 to 970 ppm, compared to about 280 ppm in the pre-industrial era and about 368 ppm in the year 2000. The different socio-economic assumptions (demographic, social, economic, and technological) result in the different levels of future greenhouse gases and aerosols. Further uncertainties, especially regarding the persistence of the present removal processes (carbon sinks) and the magnitude of the climate feedback on the terrestrial biosphere, cause a variation of about -10 to +30% in the year 2100 concentration, around each scenario. Therefore, the total range is 490 to 1,250 ppm (75 to 350% above the year 1750 [preindustrial] concentration). Concentrations of the primary non-CO₂ greenhouse gases by year 2100 are projected to vary considerably across the six scenarios (IPCC, 2005)

Projections using these CO₂ emissions scenarios to predict temperature developments conclude that global average surface temperature would increase by 1.4 to 5.8°C over the period 1990–2100. This is about two to ten times larger than the central value of observed warming over the 20th century (IPCC, 2001b), see Figure 4-19. The recent Stern Report (2006) takes into account increases in average temperatures of at least 5°C by the end of the next century (compared to 2-3°C in previous reports).

Global mean sea level is projected to rise by 0.09 to 0.88 m between the years 1990 and 2100, but with significant regional variations. This rise is due primarily to thermal expansion of the oceans and melting of glaciers and ice caps. For the periods 1990 to 2025 and 1990 to 2050, the projected rises are 0.03 to 0.14m and 0.05 to 0.32m, respectively (IPCC, 2001b).

Figure 4-19 Projected effects of CO₂ emissions on temperature and sea levels



Source: UNFCCC (2004)

Globally averaged annual precipitation is projected to increase during the 21st century, though at regional scales both increases and decreases are projected at typically 5–20%. It is likely that precipitation will increase over high-latitude regions in both summer and winter. Increases are also projected over northern mid-latitudes, tropical Africa, and Antarctica in winter, and in southern and eastern Asia in summer. Australia, Central America, and southern Africa show consistent decreases in winter rainfall. Larger year-to-year variations in precipitation are very likely over most areas where an increase in mean precipitation is projected (IPCC, 2001b).

Glaciers are projected to continue their widespread retreat during the 21st century. Northern Hemisphere snow cover, permafrost, and sea-ice extent are projected to decrease further. The Antarctic ice sheet is likely to gain mass, while the Greenland ice sheet is likely to lose mass (IPCC, 2001b). The Kilimanjaro ice field has melted by 80% of its maximum size in 1912. Projection of the melting rate into the future suggests that the ice cap will most likely disappear by 2015–2020 (Thompson, *et al.* 2002).

People and ecosystems will need to adapt to future climatic regimes. Past and current emissions have already led to some degree of climate change in the 21st century. Adapting to these effects will require a good understanding of socio-economic and natural systems, their sensitivity to climate change, and their inherent ability to adapt. Fortunately, many strategies are available for adapting to the expected effects of climate change (UNEP/UNFCCC, 2002).

Efforts to stabilise atmospheric concentration of greenhouse gases are called for. Without emissions-control policies motivated by concerns about climate change, atmospheric concentrations of CO₂ are expected to increase by the year 2100 by 75–350% since the year 1750. Stabilizing concentrations at, for example, 450 ppm would require world-wide emissions to fall below 1990 levels within the next few decades. Given an expanding global economy and growing populations, this would require dramatic improvements in energy efficiency and fundamental changes in other economic sectors (UNEP/UNFCCC, 2002).

This goal of reducing greenhouse gas concentrations is addressed by the international community through the Climate Change Convention, adapted in 1992 and now including over 185 members. The Convention seeks to stabilise atmospheric concentrations of greenhouse gases at safe levels. It commits all countries to limit their emissions, gather relevant information, develop strategies for adapting to climate change, and cooperate on research and technology. It also requires developed countries to take measures aimed at returning their emissions to 1990 levels.

In 1997, the parties to the Convention agreed by consensus that developed countries should accept a legally binding commitment to reduce their collective emissions of six greenhouse gases by at least 5% compared to 1990 levels by the period 2008–2012. The Convention also establishes an emissions-trading regime and a clean development mechanism. Annex I countries – currently 35 countries plus the EEC – commit to limit or reduce their greenhouse gas emissions. For many countries, such as the EU member states, this corresponds to some 15% below their expected GHG emissions in 2008 (UNEP/UNFCCC, 2002).

Table 4-11 Countries included in Annex B to the Kyoto protocol and their emission targets

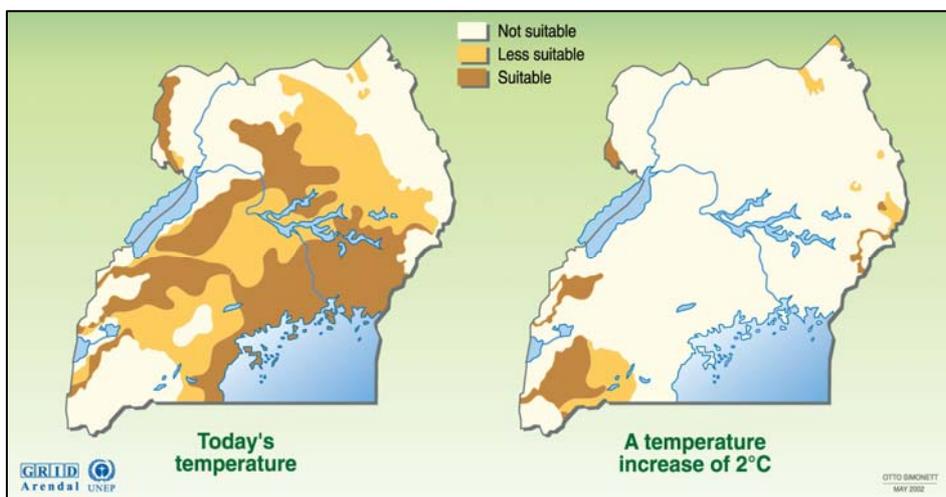
Country	Target (1990–2008/2012)
EU-15*, Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, Switzerland	-8%
US**	-7%
Canada, Hungary, Japan, Poland	-6%
Croatia	-5%
New Zealand, Russian Federation, Ukraine	0
Norway	+1%
Australia	+8%
Iceland	+10%
* The EU's 15 member states will redistribute their targets among themselves, taking advantage of a scheme under the Protocol known as "bubble". The EU has already reached agreement on how its target will be redistributed.	
** The US has not ratified the Kyoto protocol.	

Source: UNFCCC (2006)

Impacts of climate change are predicted to be far reaching, even if greenhouse gas emissions were to decline, as GHG concentrations in the atmosphere will persist.

Negative consequences of climate change are expected in agriculture and on food security, especially if temperatures increased by more than 2.5°C, which would reduce global food supplies and contribute to higher food prices. Regional differences are to be expected: added heat stress, shifting monsoons, and drier soils may reduce yields by as much as a third in the tropics and sub-tropics, where crops are already near their maximum heat tolerance. Mid-continental areas such as the US grain belt, vast sections of mid-latitude Asia, sub-Saharan Africa and parts of Australia are all expected to experience drier and hotter conditions. Meanwhile, longer growing seasons and increased rains may boost yields in many temperate regions. Plant growth and health may benefit from fewer freezes and chills, but some crops may be damaged by higher temperatures, particularly if combined with water shortages (UNEP/UNFCCC, 2002). A modelling of coffee plantations in Uganda at current temperatures and with a modest increase of 2°C is shown in Figure 4-20.

Figure 4-20 Impact of temperature rise on robusta coffee in Uganda



Source: UNEP/GRID-Arendal.

Climate models project that both evaporation and precipitation will increase, as will the frequency of intense rainfalls. While some regions may become wetter, in others the net effect of an intensified hydrological cycle will be a loss of soil moisture and increased erosion. Some regions that are already drought-prone may suffer longer and more severe dry spells. In Africa's large catchment basins of Niger, Lake Chad, and Senegal, total available water has decreased by 40 to 60%, and desertification has been worsened by lower average annual rainfall, runoff, and soil moisture, especially in southern, northern, and western Africa. The Rhine floods of 1996 and 1997, the Chinese floods of 1998, the East European floods of 1998 and 2002, the Mozambique and European floods of 2000, and the monsoon-based flooding of 2004 in Bangladesh (which left 60% of the country under water), are an indication that storms are growing more powerful. Regional effects would vary widely, and some countries may experience reduced output even if they take measures to adapt. This conclusion takes into account the beneficial effects of CO₂ fertilisation but not other possible effects of climate change, including changes in agricultural pests and soils (UNEP/UNFCCC, 2002).

Increasing sea levels will especially affect coastal zones and small islands. Additional economic costs are expected as much of the economic activity and human settlement is concentrated in areas close to coasts. In addition to higher sea levels, climate change will reduce sea-ice cover; decreases of up to 14% have been measured in the Arctic during the past two decades, and a decline of 25% has been recorded in the

Antarctic from the mid-1950s to early 1970s. Climate change will also alter ocean circulation patterns, the vertical mixing of waters, and wave patterns (UNEP/UNFCCC, 2002).

Biological diversity, the source of environmental, economic, and cultural value, will be threatened by rapid climate change. The composition and geographic distribution of ecosystems will change as individual species respond to new conditions created by climate change. At the same time, habitats may degrade and fragment in response to other human pressures. Species that cannot adapt quickly enough may become extinct (UNEP/UNFCCC, 2002).

With few exceptions, deserts are projected to become hotter but not significantly wetter. Changing precipitation patterns are already affecting water supplies. Increasingly heavy rain and snow are falling on the mid- and high latitudes of the Northern Hemisphere, while rains have decreased in the tropics and subtropics in both hemispheres (UNEP/UNFCCC, 2002).

Many climate models suggest that downpours will in general become more intense. This would increase runoff and floods while reducing the ability of water to infiltrate the soil. Changes in seasonal patterns may affect the regional distribution of both ground and surface water supplies. Reduced water supplies would place additional stress on people, agriculture, and the environment. Already, some 1.7 billion people – a third of the world population – live in water-stressed countries, a figure expected to rise to 5 billion by 2025. Climate change will exacerbate the stresses caused by pollution and by growing populations and economies. The most vulnerable regions are arid and semi-arid areas, some low-lying coasts, deltas, and small islands (UNEP/UNFCCC, 2002).

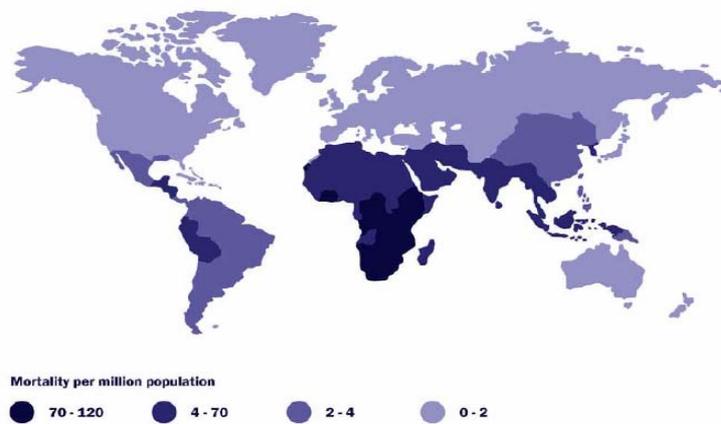
Climate change is expected to have wide-ranging consequences for human health. Public health depends on sufficient food, safe drinking water, secure shelter, good social conditions, and a suitable environmental and social setting for controlling infectious diseases. All of these factors can be affected by climate (UNEP/UNFCCC, 2002).

Growing human vulnerability is transforming more and more extreme events into climatic disasters. A climate extreme is called a climatic disaster when it has a major adverse impact on human welfare. In some parts of the world, climatic disasters occur so frequently that they may be considered part of the norm. Vulnerability to disasters is increasing as growing numbers of people are forced to live in exposed and marginal areas. Elsewhere, greater vulnerability is being caused by the development of more high-value property in high-risk zones (UNEP/UNFCCC, 2002).

Climate change is expected to increase the frequency and severity of heat waves. More intense rainfall events may lead to greater flooding in some regions. The intensity of tropical cyclones is likely to worsen over some areas. Major climate patterns could shift. Although centred in the Southern Pacific, the El Niño/Southern Oscillation (ENSO) phenomenon affects the weather and climate in much of the tropics. Climate change could intensify the droughts and floods that are associated with El Niño events in these regions. Similarly, new patterns could emerge for the Asian summer monsoon, which affects large areas of temperate and tropical Asia. Likely impacts would include a greater annual variability in the monsoon's precipitation levels, leading to more intense floods and droughts. Most climate models also show a weakening of the ocean thermocline circulation which allows heat transport to the northern hemisphere; after 2100 this system could completely and irreversibly shut down (UNEP/UNFCCC, 2002).

All these effects combined are predicted to lead to higher mortality attributed to climate change. Areas already poor today – sub-Saharan Africa, North Africa, West Asia, and South Asia, will bear the biggest burden (Figure 4-21).

Figure 4-21 Estimated mortality attributable to climate change



Source: Abbott, *et al.* (2006)

Energy use and transportation are the main contributors to greenhouse gases (75%), with the remainder associated with land use changes (IPCC 2001). If current policy patterns continue, the impact on climate change is expected to increase.

Motor vehicle kilometres travelled in OECD countries are expected to increase by 40% from 1997 to 2020, passenger air kilometres to triple by 2020, and energy use to increase by 35% to 2020 (OECD 2001).

Currently, the CO₂ emissions are predominantly from OECD countries; these are predicted to rise by a further 33% to 2020. This is well outside the Kyoto protocol target for Annex 1 countries of a 55% reduction from 1990 to 2008–12 (OECD 2001).

Emissions from non-OECD countries are set to rise at even greater rates. Table 4-12 shows projections of global greenhouse gases to 2050.

Table 4-12 Projected emissions of greenhouse gases, 1990=100

Gases	1990 base year	2000	2025	2050
Carbon dioxide	100	110	163	204
Methane	100	105	125	150
Nitrous oxide	100	104	122	152

Source: Adapted from FAO (2001).

The IPCC predicts that anthropogenic climate changes will persist for many centuries, even with stabilisation of the emissions. The last IPCC conference agreed on the reality of human-induced climate change and that the impact of climatic change was likely to be more devastating in less developed countries, as these lacked the infrastructure to deal with and adapt to the new climates (IPCC 2001a and b).

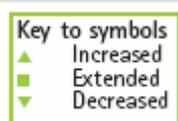
The effects of the above impacts of climate change present a particular threat to poor countries and communities. A doubling of CO₂ in the atmosphere is estimated to result in economic losses in the order of 1.6 to 2.7% of GNP for developing countries overall, about twice the estimate for OECD countries (Pearce, 2000)

David Henderson suggested that the IPCC is too pessimistic because it uses market-based GDP levels to forecast emissions, and not GDP corrected for purchasing power parity.

Table 4-13 Confidence in changes in extreme weather and climate events

Changes in phenomenon	Confidence in projected changes (during 21 st century)	Projected Impact
Higher maximum temperatures, more hot days and heat waves over nearly all land areas	Very likely	<ul style="list-style-type: none"> ▲ Incidence of death and serious illness in older people and urban poor ▲ Heat stress in livestock and wildlife ▲ Risk of damage to a number of crops ▲ Electric cooling demand ▼ Energy supply reliability
Higher minimum temperatures, fewer cold days and frost days and cold waves over nearly all land areas	Very likely	<ul style="list-style-type: none"> ▼ Cold-related human morbidity and mortality ▼ Risk of damage to a number of crops ■ Range and activity of some pests and disease vectors ▼ Heating energy demand
More intense precipitation events	Very likely, over many areas	<ul style="list-style-type: none"> ▲ Flood, landslide and avalanche damage ▲ Soil erosion ▲ Flood runoff could increase recharge of some flood plain aquifers ▲ Pressure on government and private flood insurance systems and disaster relief
Increased summer drying over most mid-latitude continental interiors and associated risk of drought	Likely	<ul style="list-style-type: none"> ▼ Crop yields ▲ Damage to building foundations caused by ground shrinkage ▲ Risks of forest fires ▼ Water resource quantity and quality
Increase in tropical cyclone peak wind intensities, and mean and peak precipitation intensities	Likely, over some areas	<ul style="list-style-type: none"> ▲ Risk to human life, risk of infectious disease epidemics ▲ Coastal erosion and damage to coastal buildings and infrastructure ▲ Damage to coastal ecosystems such as coral reefs and mangroves
Intensified droughts and floods associated with El Niño events in many regions	Likely	<ul style="list-style-type: none"> ▼ Agricultural and rangeland productivity in regions prone to drought and flood ▼ Hydro-power potential in drought-prone areas
Increased variability of Asian monsoon precipitation	Likely	<ul style="list-style-type: none"> ▲ Flood and drought magnitude and damage in temperate and tropical Asia
Increased intensity of mid-latitude storms	Little agreement between current models.	<ul style="list-style-type: none"> ▲ Risks to human life and health ▲ Property and infrastructure losses ▲ Damage to coastal ecosystems

Source: UNFCCC, 2005b.



Nitrogen cycle

The level of biologically available nitrogen may double in the next 25 years. Human activities now contribute more to the global supply of fixed nitrogen than do natural ones (UNEP 2000). The large increase in the use of fertilisers (predominantly nitrogen) is the main cause. Between 1972 and 1988, global fertiliser use grew at an annual average of 3.5% or by more than 4 million tonnes per year. Up to the 1980s, maintenance and improvement of fertility was thought of chiefly in terms of addition of mineral fertilisers, and agricultural subsidies increased the use of fertilisers further. Government policies supported farmers by subsidising agricultural inputs such as irrigation, fertiliser and pesticides. A study by FAO of 38 developing countries showed that 26 of them subsidised fertiliser use (cited in UNEP 2002b). Levels and projections of fertiliser use can be seen in Table 4-14, with continued and significant annual growth rates of 3.3% and 2.8% for Africa and Asia up to 2020.

The increase in food demand brings new land under cultivation and increases the intensity of production. The Green Revolution in Asia witnessed large increases in the use of fertilisers. Generally, future growth will be slow owing to the high current usage rates. However, certain regions of the developing world, especially Africa and West Asia, have very low usage rates, so the capacity to expand levels is high (Bumb and Baanante 1996).

Table 4-14 Trends and projections in fertiliser use

Region	Fertiliser use (million nutrient tons)			Annual growth %	
	1960	1990	2020	1960–90	1990–2020
World total	27.4	143.6	208.0	5.5	1.2
Developed countries	24.7	81.3	86.4	4.0	0.2
Developing countries	2.7	62.3	121.6	10.5	2.2
East Asia	1.2	31.4	55.7	10.9	1.9
South Asia	0.4	14.8	33.8	12.0	2.8
West Asia/North Africa	0.3	6.7	11.7	10.4	1.9
Latin America	0.7	8.2	16.2	8.2	2.3
sub-Saharan Africa	0.1	1.2	4.2	8.3	3.3

Source: Bumb and Baanante (1996).

Positive trends

In general, environmental degradation has increased at a slightly lower rate than economic growth. The use of energy and other resources appears to be increasing at a slower rate than GDP in many OECD countries, and the pollution intensity of output is growing even more slowly. Since the 1990s, CO₂ emissions in the OECD region has remained more or less stable, with, however, very wide variations in emission trends among countries (OECD 2004).

Progress has been made in reducing the consumption of ozone-depleting substances, down by about 70% since 1987. However, pockets of use of these and the growth in black-market trade are worrying (WRI 2001).

These trends give an indication of the possible decoupling of economic growth and environmental degradation. OECD economies are expected to reduce the energy intensity of their economies by 20% to 2020, while increasing total energy use by 35% (OECD 2001).

UNEP (2002a) GEO 3 mentions several environmental achievements over the past three decades including:

- Reductions in many countries of emissions of common air pollutants.
- Ambient air quality and point-source water pollution addressed satisfactorily in many areas; recycling has become more common; wastewater treatment has improved; pulp and paper industry effluents have declined and hazardous waste threats have been reduced. Protected areas have been increasingly set aside for conservation and recreation.
- Technological change has helped to relieve some environmental pressures: lower material intensity in production; a shift from materials and energy supply to the provision of services; a modest boost in renewable technology; and a significant clean-up in some regions in previously 'dirty' industries.

Others include:

- There is increasing technology cooperation and technology partnerships addressing issues of climate change, including specific technologies for promoting renewable energy sources and carbon sequestration (Stern, 2006)
- Recently, institutions and organisations have been established which provide a strong basis for developing an effective collective response to climate change.
- Increasing recognition of environmental–poverty links and endorsement of the argument that improved ecosystem management can provide a path out of poverty when coupled with governance reforms that provide the poor with access to natural resource assets and to decision-making processes that affect them (WRI, 2005).

Negative trends

Table 4-15 gives an overview of the environmental concerns that are likely to worsen into the 21st century. The areas of key concern appear to be related to water and coastal issues. The concentration of these factors in small island states is especially noted.

UNEP (2002a) mentions several environmental challenges:

- Emissions of almost all greenhouse gases continue to rise.
- Ground-level ozone, smog and fine particulates have emerged as significant health risks.
- Overexploitation of many of the surface water resources and great aquifers upon which irrigated agriculture and domestic supplies depend has resulted in more and more countries facing water stress or scarcity. About 1,200 million people still lack access to clean drinking water and some 2,400 million to sanitation services.
- The extinction rate of species is believed to be accelerating. Habitat destruction and/or modification are the main cause of biodiversity loss.
- There has been a trend towards increasingly intense exploitation and depletion of wild fish stocks.
- Land degradation continues to worsen.
- Many remaining forest ecosystems have been degraded and fragmented.
- Crop and livestock production has contributed to the large increase in reactive nitrogen in the global biosphere, contributing to the acidification and eutrophication of ecosystems.
- Urban air pollution and deteriorating water quality are having major health, economic and social impacts.
- An increase in the frequency and intensity of natural disasters over the past 30 years has put more people at greater risk.

Table 4-15 Summary of global and regional environmental trends likely to worsen in the 21st century

Trends	Reasons	Consequences
Nitrogen overload	Large fertiliser usage increases	Still under consideration
Environmental-related disasters	Natural and human exacerbated increases	Increase in number of deaths and people affected. Severe economic loss
Degradation of coastal areas and resources	Poor management of urbanisation, tourism and industrialisation	Resource exploitation, habitat loss, ecosystem disruption
Species invasion	Deliberate or accidental introduction of non- indigenous species	Many indigenous organisms severely threatened by exotic species
Climate extremes	1997/98 El Niño was the most powerful on record. Industrialisation/atmospheric pollution	Drought, flooding, storm events
Land degradation	Increased use of marginal land, increasing vulnerability to water and wind induced erosion	Loss of productive capacity, food security concerns
Looming global water crisis	Increasing population, industrialisation, and food demand creates large demand increases	Food security, irrigation land losses, conflict
Urbanisation	Industrialisation and intensification of agriculture	Problems of waste disposal and chronic health impacts
Environmental importance of refugees	Increasing conflict and environmental disasters	Refugees forced to make unrestricted use of the natural resources
Vulnerability of small island developing states	Isolation, high import dependency, high coast to inland ratio, small physical and economic size	Increasing land loss, poverty, shortage of fresh water
Chemicals	Increasing use of compounds that persist in the environment	Impact on health and reproduction of organisms.

Source: UNEP (2002a).

The most recent and extensive environment-related assessment, the MEA (MEA, 2005), including some 1,360 experts worldwide, assessing the condition and trends of ecosystems, developing scenarios for the future, and developing possible responses, concluded that:

- Everyone in the world depends on nature and ecosystem services to provide the conditions for a decent, healthy, and secure life.
- Humans have made unprecedented changes to ecosystems in recent decades to meet growing demands for food, fresh water, fibre, and energy.
- These changes have helped to improve the lives of billions, but have at the same time weakened nature's ability to deliver other key services such as purification of air and water, protection from disasters, and the provision of medicines.
- Among the outstanding problems identified by this assessment are the dire state of many of the world's fish stocks; the intense vulnerability of the 2 billion people living in dry regions to the loss of ecosystem services, including water supply; and the growing threat to ecosystems from climate change and nutrient pollution.
- Human activities have taken the planet to the edge of a massive wave of species extinctions, further threatening our own well-being.
- The loss of services derived from ecosystems is a significant barrier to the achievement of the MDGs to reduce poverty, hunger, and disease.
- The pressures on ecosystems will increase globally in coming decades unless human attitudes and actions change.
- Measures to conserve natural resources are more likely to succeed if local communities are given ownership of them, share the benefits, and are involved in decisions.

- Even today's technology and knowledge can reduce considerably the human impact on ecosystems. They are unlikely to be deployed fully, however, until ecosystem services cease to be perceived as free and limitless, and their full value is taken into account.
- Better protection of natural assets will require coordinated efforts across all sections of governments, businesses, and international institutions. The productivity of ecosystems depends on policy choices on investment, trade, subsidy, taxation, and regulation, among others.

Synthesising all the findings of observed and postulated trends, the MEA produced an overview of the global status of ecosystem services. The MEA documented that 15 of 24 types of ecosystem services used by people are in global decline. They further concluded that the link between poverty and the environment is straightforward – it is poor people whose livelihoods, health, and safety are most dependent on the maintenance of ecosystem services (see Table 4-16).

Table 4-16 Global status of ecosystem services as evaluated by the MEA

An upwards arrow indicates that the condition of the service globally has been enhanced and a downwards arrow that it has been degraded. Definitions of "enhanced" and "degraded" for the three categories of ecosystem services shown in the table are provided in the note below. Supporting services, such as soil formation and photosynthesis, are not included here as they are not used directly by people.

Service	Sub-category	Status	Notes
Provisioning Services			
Food	crops	▲	substantial production increase
	livestock	▲	substantial production increase
	capture fisheries	▼	declining production due to overharvest
	aquaculture	▲	substantial production increase
	wild foods	▼	declining production
Fiber	timber	+/-	forest loss in some regions, growth in others
	cotton, hemp, silk	+/-	declining production of some fibers, growth in others
	wood fuel	▼	declining production
Genetic resources		▼	lost through extinction and crop genetic resource loss
Biochemicals, natural medicines, pharmaceuticals		▼	lost through extinction, overharvest
Fresh water		▼	unsustainable use for drinking, industry, and irrigation; amount of hydro energy unchanged, but dams increase ability to use that energy
Regulating Services			
Air quality regulation		▼	decline in ability of atmosphere to cleanse itself
Climate regulation	global	▲	net source of carbon sequestration since mid-century
	regional and local	▼	preponderance of negative impacts
Water regulation		+/-	varies depending on ecosystem change and location
Erosion regulation		▼	increased soil degradation
Water purification and waste treatment		▼	declining water quality
Disease regulation		+/-	varies depending on ecosystem change
Pest regulation		▼	natural control degraded through pesticide use
Pollination		▼ ^a	apparent global decline in abundance of pollinators
Natural hazard regulation		▼	loss of natural buffers (wetlands, mangroves)
Cultural Services			
Spiritual and religious values		▼	rapid decline in sacred groves and species
Aesthetic values		▼	decline in quantity and quality of natural lands
Recreation and ecotourism		+/-	more areas accessible but many degraded
<p>Note: For provisioning services, we define enhancement to mean increased production of the service through changes in area over which the service is provided (e.g., spread of agriculture) or increased production per unit area. We judge the production to be degraded if the current use exceeds sustainable levels. For regulating services, enhancement refers to a change in the service that leads to greater benefits for people (e.g., the service of disease regulation could be improved by eradication of a vector known to transmit a disease to people). Degradation of regulating services means a reduction in the benefits obtained from the service, either through a change in the service (e.g., mangrove loss reducing the storm protection benefits of an ecosystem) or through human pressures on the service exceeding its limits (e.g., excessive pollution exceeding the capability of ecosystems to maintain water quality). For cultural services, degradation refers to a change in the ecosystem features that decreases the cultural (recreational, aesthetic, spiritual, etc.) benefits provided by the ecosystem.</p> <p>^a Indicates low to medium certainty. All other trends are medium to high certainty.</p>			

Source: MEA (2005).

Of the 24 analysed services – provisioning, regulating and cultural services – only four show an improving trend, five are at a global level about constant, but show considerable regional differences, and a massive 15 services have been qualified as degraded due to human interference.

The provision of food, fresh water, energy, and materials to a growing population has come at considerable cost to the complex systems of plants, animals, and biological processes that make the planet habitable. As human demands increase in coming decades, these systems will face even greater pressures – and the risk of further weakening the natural infrastructure on which all societies depend. Protecting and improving our future well-being requires wiser and less destructive use of natural assets. This in turn involves major changes in the way we make and implement decisions. We must learn to recognise the true value of nature – both in an economic sense and in the richness it provides to our lives in ways much more difficult to put numbers on. Above all, protection of these assets can no longer be seen as an optional extra, to be considered once more pressing concerns such as wealth creation or national security have been dealt with (MEA, 2005).

MAJOR SOURCES

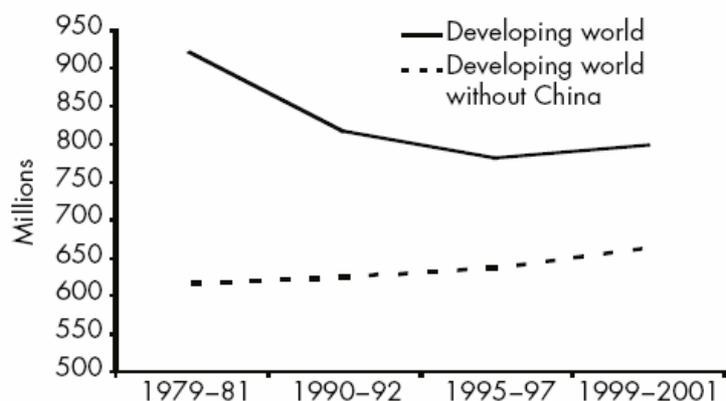
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5 FOOD

Over the past two decades, the world has made remarkable progress in increasing food production and reducing food insecurity. The number of food-insecure people in developing countries fell from 920 million in 1980 to 798 million in 2001, while the proportion of people living in food insecurity dropped substantially, from 28% to 17% (Braun, *et al.*, 2005). However, progress has slowed considerably since the 1990s and, if China is excluded from consideration, the number of undernourished people in the rest of the developing world increased by 28 million during the course of the decade (see Figure 5-1). In sub-Saharan Africa, the population living in hunger jumped nearly 20%, with 30 million more food-insecure people by the end of the decade.

Figure 5-1 Undernourished people in developing countries, 1980–2001



Source: FAO 2003.

Source: von Braun, *et al.* 2005

Food consumption, in terms of kcal/person/day, is the key variable used for measuring and evaluating the evolution of the world food situation. The world has made significant progress in raising food consumption per person. It increased from an average of 2360 kcal/person/day in the mid-1960s to 2800 kcal/person/day at present. This growth was accompanied by significant structural change. Diets shifted towards more livestock products and vegetable oils, and away from staples such as roots and tubers. Projections estimate that on average, food consumption will increase to 2940 kcal/person/day in 2015, 3050 kcal/person/day in 2030 and 3070 kcal/person/day in 2050 (Bruinsma, 2003, FAO, 2006).

Significant changes in the number of people living in countries with a given per capita food availability took place before the turn of the century, and are expected to continue to happen (Table 5-1). The number of people living on less than 2200 kcal/day is expected to further decline dramatically. While in the mid-1960s, 57% of the world population was living of less than 2200 kcal/day, this proportion declined to 9.7% at the end of the 20th century and is expected to further decline to 2.4% in 2030 (Bruinsma, 2003).

Table 5-1 Population living in countries with a given per capita food consumption

	1964/66	1974/76	1984/86	1997/99	2015	2030
Kcal/person/day	Population (million)					
Under 2200	1893 ^a	2281 ^a	558	571	462	196
2200–2500	288	307	1290 ^b	1487 ^b	541	837
2500–2700	154	141	1337 ^c	222	351	352
2700–3000	302	256	306	1134	2397 ^b	2451 ^b
Over 3000	688	1069	1318	2464 ^c	3425 ^c	4392 ^c
World total	3325	4053	4810	5878	7176	8229

Note: ^a Includes India and China. ^b Includes India. ^c Includes China.

Source: Bruinsma, 2003.

However, not all countries may achieve food consumption levels in accordance with requirements for good nutrition. This may be the case for some of the countries which start with very low consumption (under 2200 kcal/person/day in 1999/01), high rates of undernourishment, high population growth rates, poor prospects for rapid economic growth and often meagre agricultural resources. There are 32 countries in this category, with rates of undernourishment between 29% and 72%, an average of 42% (FAO, 2006).

World agriculture (aggregate value of production, all food and non-food crop and livestock commodities) has been growing at rates of 2.1–2.3% p.a. in the last four decades, with much of the growth originating in developing countries (3.4–3.8% p.a.). The future may see a drastic decline in the growth of aggregate world production, to 1.5% p.a. in the next three decades and on to 0.9% p.a. in the subsequent 20 years to 2050. The slowdown reflects the lower population growth and the gradual attainment of medium-high levels of per capita consumption in a growing number of countries (FAO, 2006).

Increasingly, world agriculture will have to depend on non-food uses of commodities. The biofuel sector may provide some scope, perhaps a significant one, for relaxing the demand constraints represented by declining growth rates in human consumption (FAO, 2006).

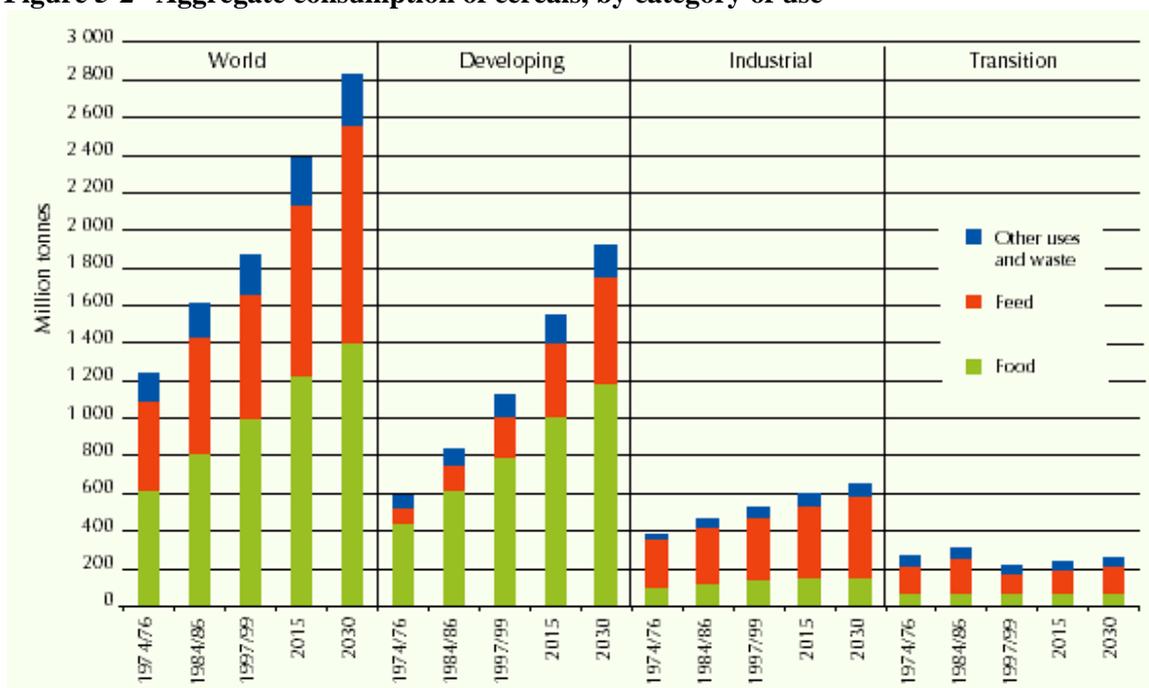
Cereals

The growth rate of world demand for cereals could be higher than in the recent past. This shows up in the projections where the growth rate of world demand for 1997/99–2015 is 1.4% p.a., compared with 1.0% p.a. in the preceding ten years. In the longer term, however, the more fundamental sources of slowdown – slower population growth everywhere, gradually declining income elasticities of food demand for cereals in many countries and the achievement of mid-high levels of per capita consumption in some countries – will predominate and the growth rate of world demand will be lower for the second part of the projection period 2015–30, to 1.2% p.a. (Bruinsma, 2003). Global cereal production is estimated to be 2 billion mt in 2005, and is projected to increase to 3 billion mt by 2050. Achieving this increase by 1 billion mt should not be taken for granted, as land and water resources are more stretched than in the past and the continued growth of yields is more limited (FAO, 2006), see Figure 5-2.

Developing Asia will account for the biggest part of the global increase in cereal demand (344 million tonnes), with China alone accounting for 26% (173 million tonnes). India will account for an additional 12% (78 million tonnes) of worldwide cereal growth and other developing Asian countries will account for 14% (92 million tonnes). Regional production increases will not satisfy rising Asian cereal demand and East Asian demand in particular will exceed production. The only developing region projected to have surplus cereal growth to 2020 is Latin America. Asia's share of world cereal production is predicted to increase 2% to reach 41% by 2020. Meanwhile, sub-Saharan Africa's share will increase from 4 to 5% and Latin America's from 7 to 8%. The share of the developed countries in total cereal production will decline through 2020 (Rosegrant, *et al.*, 2002).

At the world level, aggregate consumption of all cereals should increase by 2030 by nearly 1 billion tonnes from the 1.86 billion tonnes of 1997/99. Of this increment, about a half will be for feed, and 42% for food, with the balance going to other uses (seed, industrial non-food and waste). Feed use will be the most dynamic element driving the world cereal economy, in the sense that it will account for an ever-growing share in aggregate demand for cereals. While developing countries will increase the share of cereals used for feed from less than 20% in 1997/99 to 29% in 2030, the majority of cereals consumed is still for food, whereas in industrial countries cereals were already in the 1970s used primarily as feed.

Figure 5-2 Aggregate consumption of cereals, by category of use



Source: Bruinsma, 2003

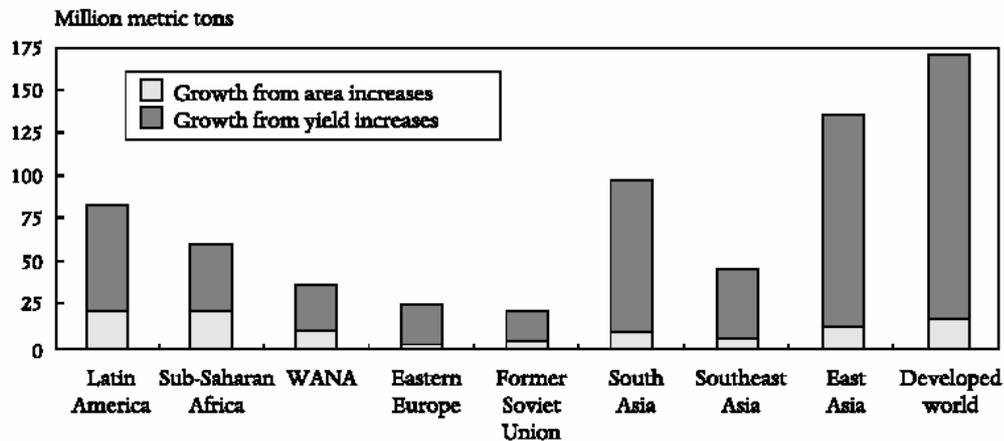
There are three sources of growth in crop production: arable land expansion which, together with increases in cropping intensities (i.e. increasing multiple cropping and shorter fallow periods), leads to an expansion in harvested area; and yield growth. About 80% of the projected growth in crop production in developing countries will come from intensification in the form of yield increases and higher cropping intensities. Arable land expansion will remain an important factor in crop production growth in many countries of sub-Saharan Africa, Latin America and some countries in East Asia, although much less so than in the past (Bruinsma, 2003) and Figure 5-3.

Looking beyond 2030, the growth rate of world consumption and production is expected to fall further in the subsequent 20 years to 0.6% p.a. and the aggregate consumption would rise to just over 3 billion tonnes by 2050. Thus, annual world production must rise by some 800 million tons in the 30 years to 2030 and by another 330 million tonnes in the subsequent two decades. The slowdown in the growth of world consumption is, however, a very mixed blessing. On the positive side we must count the influence of the lower population growth and the gradual approaching of saturation levels in per capita food consumption in a growing number of countries. On the negative side is the prospect that there will still be countries with persistent low overall food consumption levels whose population would consume more if they had access to more food (FAO, 2006).

Despite the importance of yields to overall growth in cereal production, yield growth rates will slow across all cereals and all regions, with the notable exception of sub-Saharan Africa (see Figure 5-4). Increasing intensity of land use – and the high levels of input use already achieved in much of Asia – has led to higher

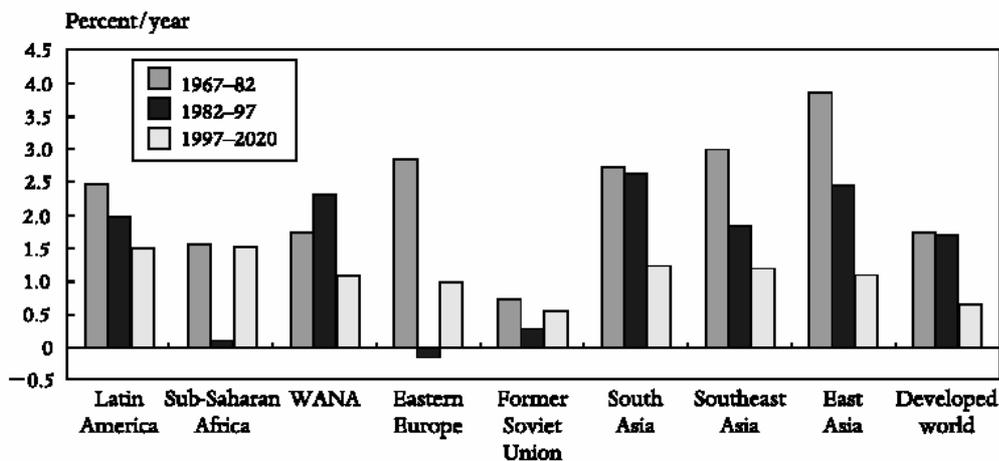
and higher input requirements in order to sustain yields. Public investment in crop research and irrigation infrastructure has also slowed considerably, with consequent effects on yield growth (Rosegrant, *et al.*, 2002).

Figure 5-3 Share of area and yield increase in regional cereal production to 2020



Source: IFPRI IMPACT Projections (2002)

Figure 5-4 Yield growth rates by region, all cereals



Source: IFPRI IMPACT Projections (2002)

Meat, eggs and milk

Livestock production is the world's largest user of land, either directly through grazing or indirectly through consumption of fodder and feedgrains. Globally, livestock production currently accounts for 40% of the gross value of agricultural production. In industrial countries this share is more than 50%. In developing countries, where it accounts for one-third, its share is rising quickly; livestock production is increasing rapidly as a result of growth in population and incomes and changes in lifestyles and dietary habits (Bruinsma, 2003).

The world food economy is being increasingly driven by the shift of diets and food consumption patterns towards livestock products. This shift of aggregate agricultural output towards the higher-value livestock products makes the growth rate of agriculture to be higher than would result from a mere aggregation of

tonnes or calorie equivalents. On the negative side, there are environmental implications associated with the expansion of livestock production. For example, through the expansion of land for livestock development, livestock sector growth has been a prime force in deforestation in some countries such as Brazil, and in overgrazing in other countries. Intensive livestock operations on industrial scale, mostly in the industrial countries but increasingly in developing countries too, are a major source of environmental problems through the production of point-source pollution (FAO, 2006).

The rising share of animal products in the diet is evident in developing countries. Even though calories derived from cereals have increased in absolute terms, as a share of total calories they continue to fall, from 60% in 1961/63 to an expected 50% in 2030. Similarly, the contribution of other traditional staples (plantains, potatoes, sweet potatoes, cassava and other roots) fell from second largest contributor to dietary calories (10%) in 1961/63 to lowest (6.2%) by 1997/99. By then, animal products had become the second major source of calories (10.6%) in developing countries (Bruinsma, 2003).

In industrial countries, the consumption of animal proteins increased in the 1960s and 1970s from 44 to 55 g/capita/day. After this, animal protein consumption remained fairly stable. In developing countries, however, although the level of consumption of animal proteins increased steadily from 9g/capita/day in 1961/63 to 20g/capita/day in 1997/99, there is still significant potential for increases. Between 1997/99 and 2030, annual meat consumption in developing countries is projected to increase from 25.5 to 37 kg per person, compared with an increase from 88 to 100 kg in industrial countries. Projections to 2050 indicate that the aggregate meat consumption in developing countries may grow between 2020 and 2050 half as rapidly as in the preceding three decades. The overall projected slowdown in the world meat economy is based on the following assumptions: a) relatively modest further increases in per capita consumption in the industrial countries, b) growth rates in per capita consumption in China and Brazil well below those of the past, c) persistence of relatively low levels of per capita consumption in India, and d) persistence of low incomes and poverty in many developing countries (FAO, 2006).

Consumption of milk and dairy products will rise from 45 to 66kg/person/p.a. in developing countries, and from 212–221kg in industrial countries. For eggs, consumption will grow from 6.5 to 8.9kg in developing countries and from 13.5 to 13.8kg in industrial countries between 1999 and 2030 (Bruinsma, 2003).

Wide regional and country differences are also evident in the quantity and type of animal products consumed, reflecting traditional preferences based on availability, relative prices and religious and taste preferences. Some of the more important aspects include the following: In sub-Saharan Africa, low consumption levels of animal products have changed little over the last 30 years; milk contribution to total calories and protein per capita has remained constant in recent years, indicating an increase in total milk availability equivalent to population increases. Only minor increases in consumption are projected. In South Asia (excluding India), there has been a slow but steady growth in animal product consumption. This increase is mostly the result of an increase in the contribution of milk and poultry meat. The contribution of eggs is well below the developing country average. In India, the relative contribution of animal products to diets is predicted to increase up to 2030 largely as a result of increases in the consumption of milk and milk products. In East Asia (excluding China) there is also a steady increase in the contribution of animal products to the diet. However, unlike South Asia, this increase is a result of the contribution of meat, predominantly pork. In China, the projected rapid rise in the contribution of animal products to dietary energy from 15 to 20% between 1997/99 and 2030 will be mainly on account of a substantial increase in the contribution of pork and poultry. (Bruinsma, 2003).

Roots and Tubers

In 1995–97, the major roots and tubers – cassava, potato, sweetpotato, and yam – occupied about 50 million ha worldwide. Farmers produced 639mt of these crops annually, 70% of which were harvested in developing countries. Global total use of roots and tubers is projected to increase to 864mt or by 35% between 1993 and 2020. The largest increase in terms of volume is projected for cassava: 103 million mt, or by 44%. Potato ranks second, with 68 million mt, or 29% of the increase. Sweetpotato and yam will account for an additional 62 million mt, about 27%. In developing countries, the increase is projected to be

56%, and in sub-Saharan Africa root and tuber use is projected to almost double from 126mt to 248mt over the period 1993 to 2020 (Scott, *et al.* 2000).

Soybeans

Latin America will retain its dominant position as the top regional consumer of soybeans in the developing world, with demand increasing 78% by 2020. Production will more than meet demand increasing 81% by 2020 (Rosegrant, *et al.* 2002).

Edible Oils

Southeast Asia, the largest producer of edible oils, will increase its sizeable production surplus with production growth exceeding demand by 7 million tonnes by 2020. Much of this excess will be exported to East Asia (Rosegrant, *et al.* 2002). The growth of the non-food uses (including in recent years for the production of biofuels in some countries) was also a major factor in the growth of the sector, as was the availability of ample expansion potential of land suitable for the major oilcrops (e.g. oil palm in Southeast Asia). However, the growing interest in using vegetable oils in the production of biofuels leading to the rapid expansion of land areas under oilcrops can have significant adverse impacts on the environment, mainly by favouring deforestation (FAO, 2006).

Fish

The seemingly inexhaustible oceans have proved to be finite after all. Landings of wild fish have levelled off since the mid-1980s, and many stocks of fish are fished so heavily that their future is threatened. And yet the world's appetite for fish has continued to increase, particularly as urban populations and incomes grow in developing countries. Aquaculture – fish farming – has arrived to meet this increased demand. Production of fish from aquaculture has exploded in the past 20 years and continues to expand around the world. Developing countries will consume and produce a much greater share of the world's fish in the future, and trade in fish commodities will also increase. Per capita consumption is projected to grow in most of the developing world in the baseline, although it will remain unchanged in sub-Saharan Africa and the developed world. As aquaculture expands, especially in developing countries, environmental concerns such as effluent pollution, escaped farmed fish, land conversion, and pressure on stocks from fishmeal demand will increase with time unless technologies and policies promote sustainable intensification. And small, poor producers are at risk of being excluded from rapidly growing export markets unless ways can be found to facilitate affordable certification of food safety and environmentally sound production. See Table 5-2 (Delgado, *et al.* 2003)

Table 5-2 Projected growth rates for fish as food 1997–2020

REGION/COUNTRY	ANNUAL GROWTH RATE (%)			
	Total food fish consumption	Total food fish production	Wild production	Aquaculture production
China	2.0	2.0	1.1	2.6
Developing world excluding China	1.9	1.6	1.0	3.6
Developing world	2.0	1.8	1.0	2.8
Developed world	0.2	0.4	0.1	2.1
World	1.5	1.5	0.7	2.8

Source: Delgado, *et al.* (2003)

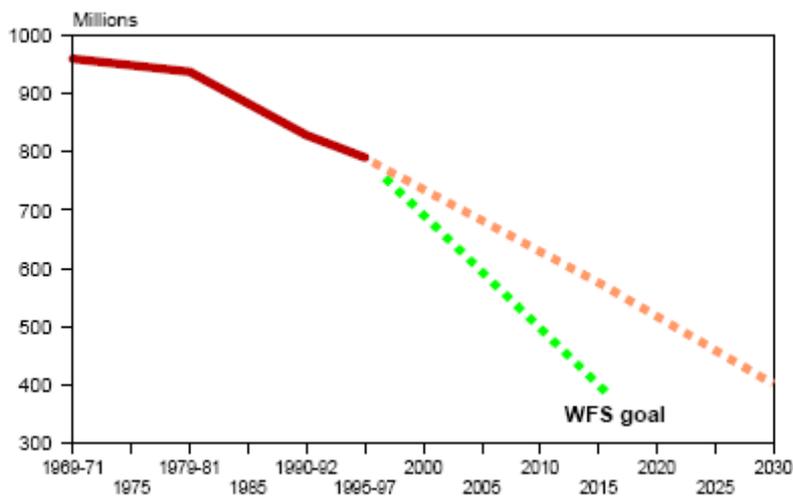
Global fish trade has already shifted from the North to the South, and South–South trade is projected to become increasingly important with the further emergence of urban middle classes. Developed countries will remain large net importers (Delgado, *et al.* 2003).

As world population continues to expand, with current projections being for an increase from 6 billion people in the year 2000 to 9-10 billion by 2050, fisheries products are one of the many food groups that will come under increasing pressure. Just about all of the world's natural fisheries resources are fully exploited (many being already over exploited), and the challenge for aquaculture is to expand to meet the future shortfall in fish supplies. A key way forward has been demonstrated over the last decade in China, where a substantial expansion of production has been grounded on small-scale pond culture (UN-Oceans 2006).

Malnutrition

The extent and depth of malnutrition in the developing world at the turn of the new century and millennium remains unacceptably high. About 800 million people – one-sixth of the developing world's population – do not have access to sufficient food to lead healthy, productive lives. Around 280 million of these food-insecure people live in South Asia, 240 million in East Asia, 180 million in sub-Saharan Africa, and the rest in Latin America, the Middle East, and North Africa. Although progress is being made in tackling food insecurity, it is slow. And in sub-Saharan Africa the number of food-insecure people has actually doubled since 1969–71. According to recent FAO projections, the World Food Summit (WFS) goal of halving the number of food-insecure people from 800 million in 1995 to 400 million by 2015 will not be achieved until 2030, see Figure 5-5.

Figure 5-5 Food insecure people in developing countries, 1969–2030



Source: Pinstруп-Anderson, 2000

Table 5-3 Projected trends in undernourishment in developing countries

	Percent of population					
	1990/92	2000/02	1999/01	2015	2030	2050
SOFI 04						
Developing countries	20.3	17.0	17.2	10.1	6.9	3.9
sub-Saharan Africa	35.7	32.7	33.3	21.1	12.4	5.8
<i>excl. Nigeria</i>	40.8	38.3	39.0	25.2	14.7	6.8
Near East / North Africa	7.6	10.1	10.2	7.0	5.7	3.7
Latin America and Caribbean	13.4	10.2	10.7	6.6	3.9	2.6
South Asia	25.9	22.1	22.3	12.1	8.4	4.1
East Asia	16.5	11.5	11.6	5.8	3.9	2.9
Million						
Developing countries	823	813	811	582	458	290
sub-Saharan Africa	170	203	201	179	140	88
<i>excl. Nigeria</i>	159	192	191	173	135	84
Near East / North Africa	24	40	39	36	36	29
Latin America and Caribbean	60	53	55	41	27	20
South Asia	291	301	299	203	166	90
East Asia	277	217	216	123	88	64

*The absolute numbers differ slightly from those published in FAO (2004a) because the latter include estimates for some small countries.
SOFI 04 = *State of World Food Insecurity in the World 2004 (FAO, 2004a)*

Source: FAO, 2006

Per capita food consumption will have grown significantly by 2015, and even more by 2030. The world average will be approaching 3000 kcal/person/day in 2015, and will be just over 3000 by 2030. These changes in world averages will reflect above all the rising consumption of the developing countries, whose average will have risen from the present 2650kcal to over 3000kcal in 2050. More and more people will be living in countries with medium to high levels of per capita food consumption (FAO, 2006).

These rises are often a mixed blessing as the diet transitions experienced by many countries imply changes in diets towards energy-dense ones, high in fat. In combination with lifestyle changes, largely associated with rapid urbanisation, such transitions, while beneficent in many countries with still inadequate diets, are often accompanied by a corresponding increase in obesity-related diseases. The two problems co-exist and these countries are confronted with a 'double burden of malnutrition' resulting in new challenges and strains in their health systems (FAO, 2006).

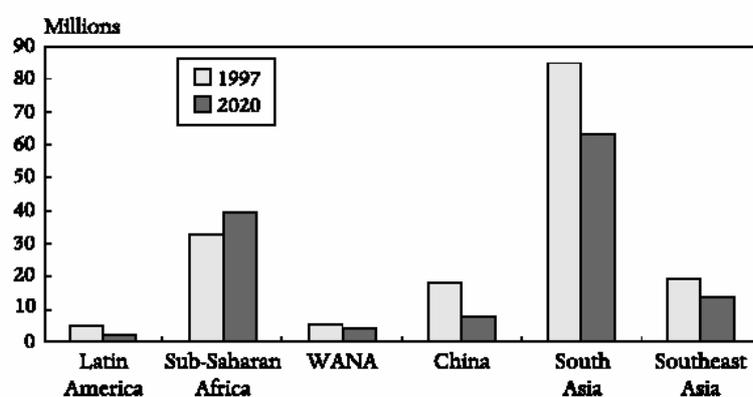
Since the 1960s, developing countries have made impressive reduction in malnutrition rates among children under the age of five, declining from an aggregate rate of more than 46% in 1967 to 31% in 1997. Nevertheless, as a result of high population growth rates in developing countries (averaging 2.1% annually), the percentage decline in child malnutrition has translated into an absolute decline of 37 million malnourished children since 1970 to approximately 166 million children in 1997. These aggregate declines mask striking regional trends (see Table 5-4).

Although a downward trend is evident in the number of malnourished children in developing countries, this trend does not demonstrate a pattern of inevitable, steady progress. The timing and size of gains have been uneven and interspersed with periods of worsening or stagnant malnutrition. The largest declines have occurred in Asia during the 1970s. Sub-Saharan Africa was stable between 1970 and 1975, steadily increasing thereafter; improvements in West and North Africa have emerged only recently, and progress in Latin America slowed during the 1980s (Garrett 1997).

Table 5-4 Number of malnourished children since 1970 (by million under 5s)

Region	1970	1975	1980	1985	1990	1995	1997	2004 (est.)	2020
Latin America and Caribbean	9.5	8.2	6.2	5.7	6.2	5.2	5.1	6.0	1.1
sub-Saharan Africa	18.5	18.5	19.9	24.1	25.7	31.4	32.7	39.0	51.9
West Africa/North Africa	5.9	5.2	5.0	5.0	n.a.	6.3	5.9		
South Asia	92.2	90.6	89.9	100.1	95.4	86.0	85.0	105.0	66.0
East Asia	77.6	45.1	43.3	42.8	42.5	38.2	37.6		21.4
All regions	203.8	167.6	164.3	177.7	176.7	167.1	166.3	150.0	140.3

Source: Smith and Haddad (2000); Heinig (2004)

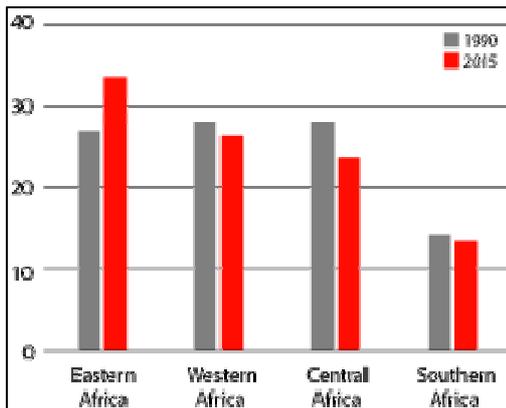
Figure 5-6 Number of malnourished children by region

Source: IFPRI IMPACT Projections (2002)

The number of malnourished children under the age of five in developing countries is projected to decline to 140.3 million in 2020. The projections to 2020 for the developing countries as a whole mask wide variation across the regions. Under all scenarios, South Asia will continue to be the region with the highest prevalence and numbers of malnourished children, although both will fall rapidly. Little progress in reducing the prevalence of child malnutrition will be made in sub-Saharan Africa. Given slow rates of decrease in prevalence and large expected increases in the total number of African children under five, the number of malnourished children will increase under all scenarios, rising as high as 52 million (Smith and Haddad, 2000). All other regions are predicted to see declines in the number of children who are malnourished (see Figure 5-6). China will witness the largest decline, followed by Latin America (IFPRI 2002).

Sub-Saharan Africa is the only region where absolute number and prevalence of malnourishment among the under fives is projected to increase. Within sub-Saharan Africa, all regions except east Africa will see a declining share of undernourished children by 2015 (Figure 5-7).

Figure 5-7 Share of malnourished children under the age of 5 in sub-Saharan Africa (in %)



Source: World Bank (2006)

MAJOR SOURCES

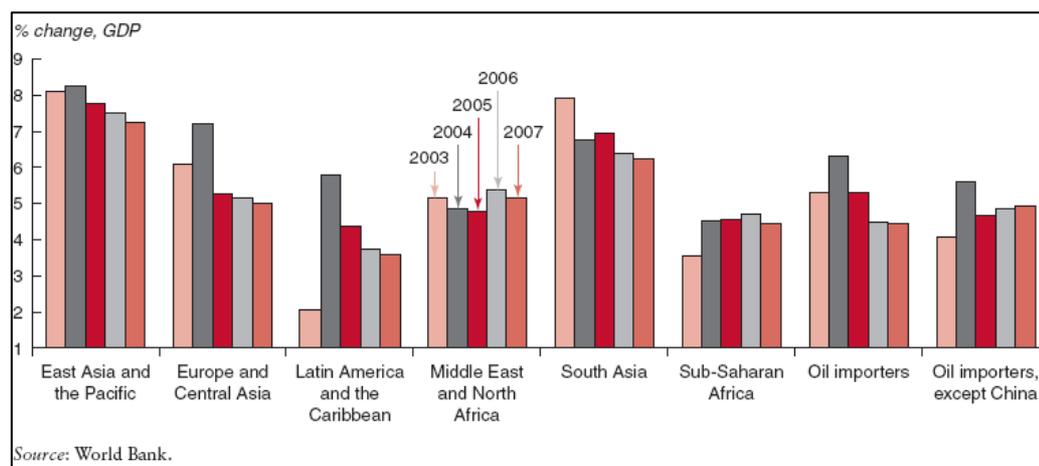
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6 ECONOMIC GROWTH

The world economy grew by 3.3% in 2005, less significant than in 2004. Developing countries have experienced faster GDP growth (6.4%) than high-income countries (2.8%). The relatively stronger growth of GDP in developing countries is expected to remain strong, above 5%, during the period 2006–2008. Sub-Saharan Africa has also been doing well.

However, it is difficult to project overall trends in economic growth not only due to the significant variations in regional economic strength and politics, but also due to the fact that long-term prospects are particularly vulnerable to unpredicted external shocks.

Figure 6-1 Regional growth, 2003–2007



Industrial production in high income countries declined from 5% in 2004, to less than 1.5% in the 2005 (Global Economic Prospects, 2006). Among industrialised regions, Europe has been underperforming in economic growth expectations. Industrialised countries in the Euro areas, such as Germany, Sweden, Denmark, and the United Kingdom, have a slower economic growth rate than had previously been expected. The Euro area's real GDP growth in 2003 was 0.7%. It improved in 2004 to 1.7%, but it slowed down to 1.1% in 2005. It is expected to improve to 1.4% and 2.0% in 2006 and 2007, respectively.

In North America, the problem seems to be resulting from high oil prices mainly caused by natural disaster and high short-term interest rates. Real GDP growth improved somewhat in 2004 to 4.2%, from 2.7% in previous year. However, growth slowed down from 2005 slightly, that is, to 3.5–3.6% in 2006 and 2007. In the case of Japan, although GDP increased up to 2.3%, largely because of tight labour market conditions and reduced industrial restructuring, short-term forecast estimations of prospects for real GDP growth show a decline to 1.7% in 2007 (Global Economic Prospects, 2006).

Developing and emerging regions and countries have shown significant variation in growth. The most notable countries are India and China. It is worth noting that these two countries together account for about 40% of world population.

India and China performed remarkably well between 1995 and 2004, with China contributing 12.8% of the global output growth and India 3.2%. India's performance may appear low, but in comparison to other economies, the average real growth rate of India, which is 6.1%, is much higher than other industrialised countries.

In the longer term, high-income countries are expected to perform better than at the turn of the millennium. Real GDP per capita growth for the period of 2006–2015 is expected to recover among high-income countries after the recession of the 1990s and early 2000s, with the exception of Japan (Table 6-1).

Table 6-1 Long-term prospects

	1980s	1990s	Forecast	
			Medium-term 2001–06	Long-term 2006–15
World Total	1.3	1.2	1.5	2.1
<i>High-income countries</i>	2.5	1.8	1.6	2.4
OECD	2.5	1.8	1.6	2.4
United States	2.3	2.0	1.8	2.5
Japan	3.4	1.1	1.1	1.9
European Union	2.1	1.8	1.4	2.3
Non-OECD	3.5	4.0	2.0	3.5
<i>Developing economies</i>	0.7	1.5	3.7	3.5
East Asia & Pacific	5.8	6.3	6.4	5.3
Europe & Central Asia	0.9	-1.8	5.0	3.5
Latin America & Caribbean	-0.9	1.6	1.2	2.3
Middle East & North Africa	-1.1	1.0	2.5	2.6
South Asia	3.3	3.2	4.5	4.2
Sub-Saharan Africa	-1.1	-0.5	1.8	1.6

Source: World Bank.

Real GDP per capita, annual revenue percentage change

Among developing countries, East Asia and the Pacific are expected to grow more than 5% in the long term. Per capita GDP growth in Latin America and sub-Saharan Africa, which suffered from negative or marginal growth, is estimated to recover.

Table 6-2 GDP in six large economies, %

Economy	Share of world GDP (2004 dollars and exchange rates)		Average real growth rates		Average contribution to world growth	
	2004	2020	1995–2004	2005–20	1995–2004	2005–20
China	4.7	7.9	9.1	6.6	12.8	15.8
India	1.7	2.4	6.1	5.5	3.2	4.1
United States	28.4	28.5	3.3	3.2	33.1	28.6
Japan	11.2	8.8	1.2	1.6	5.3	4.6
Germany	6.6	5.4	1.5	1.9 ^a	3.0	3.3
Brazil	1.5	1.5	2.4	3.6	1.5	1.7
World	100.0	100.0	3.0	3.2	100.0	100.0

Source: World Development Indicators.

Note: Average growth rates are calculated as the average of annual real growth rates (US\$ constant 2000) for the period. Similarly, average contributions are calculated as the average of annual contributions. The calculation for the period 2005–2020 is based on GDP in 2004 and the projected growth rates.

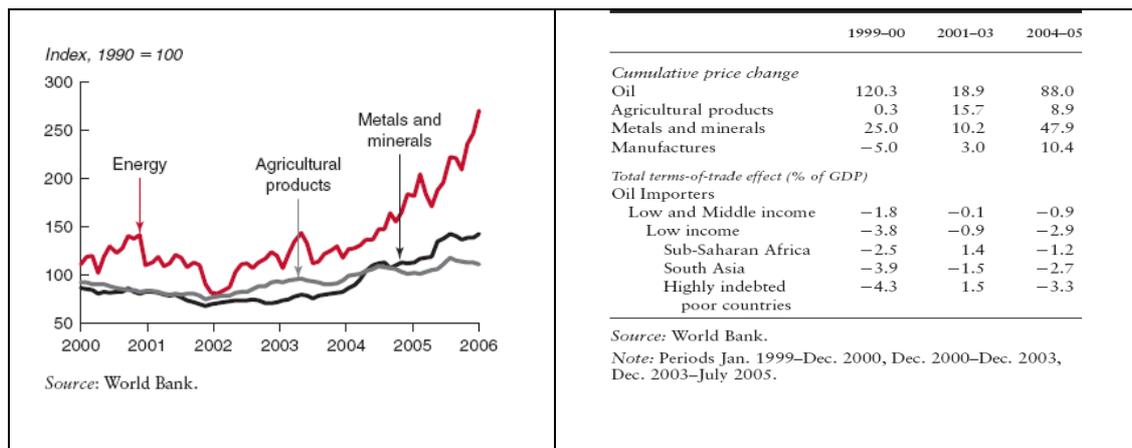
a. The World Bank projects an annual growth rate of 2.3 percent for the 25 countries of the European Union plus the European Free Trade Association, from which we derive the figure for Germany.

Source: http://siteresources.worldbank.org/INTCHIINDGLOECO/Resources/CE_Ch01pp.001-026_FINAL.pdf

Table 6-2 shows that China and India are expected to dominate over 10% of world GDP in 2020 with expected annual growth of 6.6% and 5.5%, respectively, over 2005–2020. In the near future, China and India will not yet be the dominant countries in the world economy. Instead they will be among the ‘second-largest’ tier nations after the current industrialised economies.

GDP growth in the Middle East and North Africa, South Asia, and sub-Saharan Africa is expected to pick up slightly (Global Economic Prospects, 2006). However, it will depend largely on the risks currently being faced by these regions. These risks are unpredictable and largely due to political instability or terrorist activities. This may have undermined future growth prospects

Figure 6-2 Commodity process and terms-of-trade impacts of commodity price changes



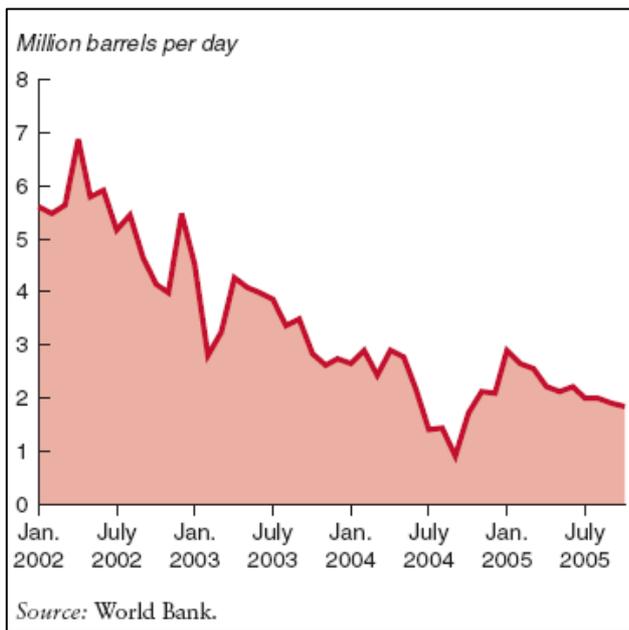
After declines in commodity prices over the past decades, prices for agricultural raw materials, and metals and minerals are rising or maintaining relatively high prices over the past few years. In recent years, commodity prices for metals and minerals and agricultural products have risen. According to the UNCTAD price index for non-fuel commodities, there was a 44.8% rise between 2002 and 2005 in current dollar terms (UNCTAD Commodity Bulletin). Since 2002, metal prices have risen by 180% in real terms, food by only 20%, and agricultural raw materials even lower by 4%. The rise in commodity prices has significant implications for trade balances, growth of the world economy, and major policy decisions (World Economic Outlook, 2006). As evidenced in Figure 6-2, terms-of-trade impacts of commodity price changes after 2001 show a 50% approximate change for metals and minerals.

It could also be that due to an increase in the productivity of agricultural and metallic industries, the prices of non-fuel commodities are not as high as historically recorded, but in recent years real prices have been increasing. Records also show that non-fuel prices have a high correlation with growth. Though it may not be historically significant, the increase in non-fuel prices could translate into much stronger performance in the world economy.

The UNCTAD Trade and Development Report 2006 points out that high commodity prices are caused by a rapid increase in world demand, slow supply response, low level of inventories in commodities, and pressure from financial markets as a result of heavy investments as financial assets. The IMF World Economic Outlook suggests that the rise in commodity prices is partly caused by the growth in emerging market and investment in commodity markets. In particular, the role China has played in recent years in the metals market is noteworthy. The level of China's contribution to the metal market exceeds its contribution to world PPP-adjusted GDP growth and world output – these rates are 29% and 15%, respectively. However, based on historical trends, it is likely that China would soon reduce its presence in the metal commodity market because once the economy exceeds US\$15,000–US\$20,000 per capita, China would become a more service-oriented economy.

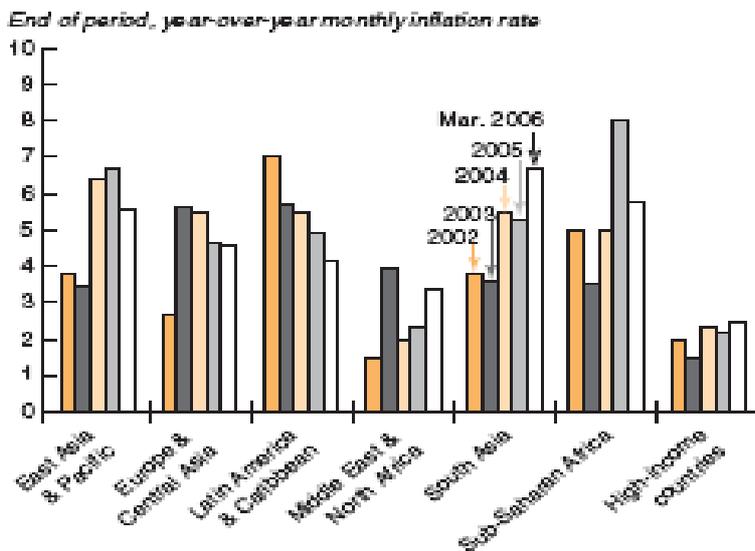
An increase in energy prices since 2003 has had a considerable impact on the world economy. Spot prices have risen from US\$26.5 per barrel in September 2003 to US\$40 in May 2004, and in the immediate aftermath of Katrina in August 2005, it was more than US\$70 per barrel.

Figure 6-3 Levels of spare oil capacity



A major driving force behind the rise in oil prices seems to be the imbalance between a significant increase in world oil demand, and the limited oil capacity. Oil prices have been rising continuously since 2002. With the rapid growth of China, recent war in the Middle East, subsequent disruptions caused by natural disasters in oil producing regions, and declining oil production capacity, it seems the rise in oil prices will persist, at least in the short term. And in the longer term, high oil prices could potentially hinder growth potential for developing and emerging regions.

Figure 6-4 Moderate increases in inflation



Source: World Bank.

Interestingly, inflation has responded only weakly to the rise in oil prices (Figure 6-4). Unlike the oil shocks of the 1970s, most regions are not influenced by changes in energy prices in a major way (Global Development Report 2006).

However, as shown in Figure 6-4, South Asia and sub-Saharan Africa seem to be affected more. According to the Global Development Report 2006, this is because of the rise in food prices. Unlike other regions where lower oil-intensive industries dominate, and credible monetary and fiscal policies regulate the economy, a significant increase in 2005 food prices affected these regions considerably. As crop production in sub-Saharan Africa is expected to pick up in 2006, the region's inflation rate is slated to decline.

A potential threat to global economic growth is environmental change. Climate change affects agricultural production, the frequency of natural disasters, and human health/mortality, which are closely related to economic performance in the world. The poorest countries and regions suffer most from economic damage caused by global climate change. The 1992–2002 CO₂ emissions responsible for climate change for various countries show that richer countries and CO₂ emissions are correlated.

Table 6-3 Annual growth rates in energy-related CO₂ emissions and their components, 1992–2002 (%)

Country/grouping	CO ₂ emissions (GtCO ₂)	GDP per head	Carbon intensity	Energy intensity	Population
USA	1.4	1.8	0.0	-1.5	1.2
EU	0.2	1.8	-0.7	-1.2	0.3
UK	-0.4	2.4	-1.0	-2.3	0.2
Japan	0.7	0.7	-0.5	0.2	0.3
China	3.7	8.5	0.5	-6.4	0.9
India	4.3	3.9	1.1	-2.5	1.7
OECD	1.2	1.8	-0.3	-1.1	0.7
Economies in transition	-3.0	0.4	-0.6	-2.7	-0.1
Non-Annex 1 parties	3.3	3.5	0.2	-2.0	1.6
World	1.4	1.9	-0.1	-1.7	1.4

Source: WRI (2006).

The Stern Report estimates that the losses of climate change caused by 'business as usual' are between 5 and 20% of consumption. This is large compared to the costs of ex-ante mitigation, with a central estimate for costs of 1% of gross domestic product per year by the middle of the century, with a range of plus or minus 3%, reflecting the uncertainties.

The WB global economic prospects 2007 provides growth forecast until 2030. One of the implications is that the global middle class is rising rapidly which will bring structural changes to economies.

Figure 6-5 The global middle class (percentage shares)

	1993		2000		2030	
	Pop.	Income	Pop.	Income	Pop.	Income
Poor (per capita income below the average of Brazil)	76	29	82.0	28.7	63.0	17.0
Middle class (per capita income between Brazil and Italy)	8	12	7.6	13.8	16.1	14.0
High-income country nationals			3.4	6.8	1.2	1.0
Low- and middle-income country nationals, of which:			4.2	7.0	14.9	12.9
East Asia and the Pacific			1.3	2.0	7.3	6.4
Eastern Europe and Central Asia			0.8	1.3	2.2	1.9
Latin America and the Caribbean			1.5	2.7	2.6	2.2
Middle East and North Africa			0.4	0.6	0.8	0.7
South Asia			0.1	0.1	1.6	1.3
Sub-Saharan Africa			0.2	0.3	0.5	0.4
Rich (per capita income at or above the average of Italy)	16	58	10.5	57.5	20.9	69.0
Total	100	100	100.0	100.0	100.0	100.0

Source: Authors' calculations.

Note: Totals may not sum to 100 because of rounding. Estimates for 1993 are from Milanovic (2002).

Thresholds of Brazil and Italy are annual per capita incomes (2000 PPP) of US\$3,914 and US\$16,746.

Source: The WB global economic prospects 2007.

Major sources

World Bank (2006), *Global Economic Prospects 2007*, World Bank

World Bank (2005), *Global Economic Prospects 2006*, World Bank

The Stern Review (2006): *The Economics of Climate Change*

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7 POVERTY

After a wave of market reforms and increased openness in developing countries during the 1990s – both of which prompted acceleration of technological progress and brought about a more stable macroeconomic environment – long-term economic growth prospects for developing countries are optimistic. Growth patterns could lead to a significant reduction of poverty. Thus, the MDG of halving poverty by 2015 could be reached on a global level, although growth will be insufficient to achieve poverty targets in all regions (World Bank 2003b).

The reason why the goal is very likely to be reached lies almost entirely in the poverty reduction achievement of fast-growing India and China. At the same time, the majority of individual poor countries, especially in sub-Saharan Africa, appear very unlikely to halve poverty by 2015, as it would take implausibly high growth rates during the next ten years to achieve the poverty target (Clemens, *et al.*, 2004, World Bank, 2005a). World Bank (2004) suggests that the typical African country will need to grow on average at least 7% for the next 15 years in order to halve poverty rates.

There are a number of methodological concerns in the estimation of poverty data, which suggest that such data should be treated with caution. Such limitations include the lack of comparable data, the different periods between each wave of data collection, the different poverty lines utilised, the potential inaccuracy of purchasing power parity exchange rates through which data are transformed, and intrinsic limitations of the welfare measures based on the surveys used.

In 2001, there were about 1.1 billion people in extreme poverty, living on, or below, the US\$1 per day (PPP adjusted) criteria (World Bank 2005a). Of these, between 300 million and 420 million people lived in chronic poverty – people who remain poor for much or all of their lives (CPRC 2005).

If the poverty line is raised to US\$2 per day then 2.8 billion, over half of the world's population was below this line in 2001 (World Bank 2005a).

During the 1990s, the absolute number of people in extreme poverty dropped only slightly but, because of population growth, the share of the world's population living in extreme poverty fell from 28% in 1990 to 21% in 2001.

The income of the world's richest 5% is 114 times that of the poorest 5%. The range of economic performance across countries and regions means that inequality has increased between some regions and decreased between others (Bourguignon and Morrisson, 2001; Schultz 1998). The most important factors increasing global inequality have been:

- rapid economic growth in already rich countries in Western Europe, North America and Oceania relative to the rest of the world
- slow growth on the Indian subcontinent until the late 20th century, and consistently slow growth in Africa.

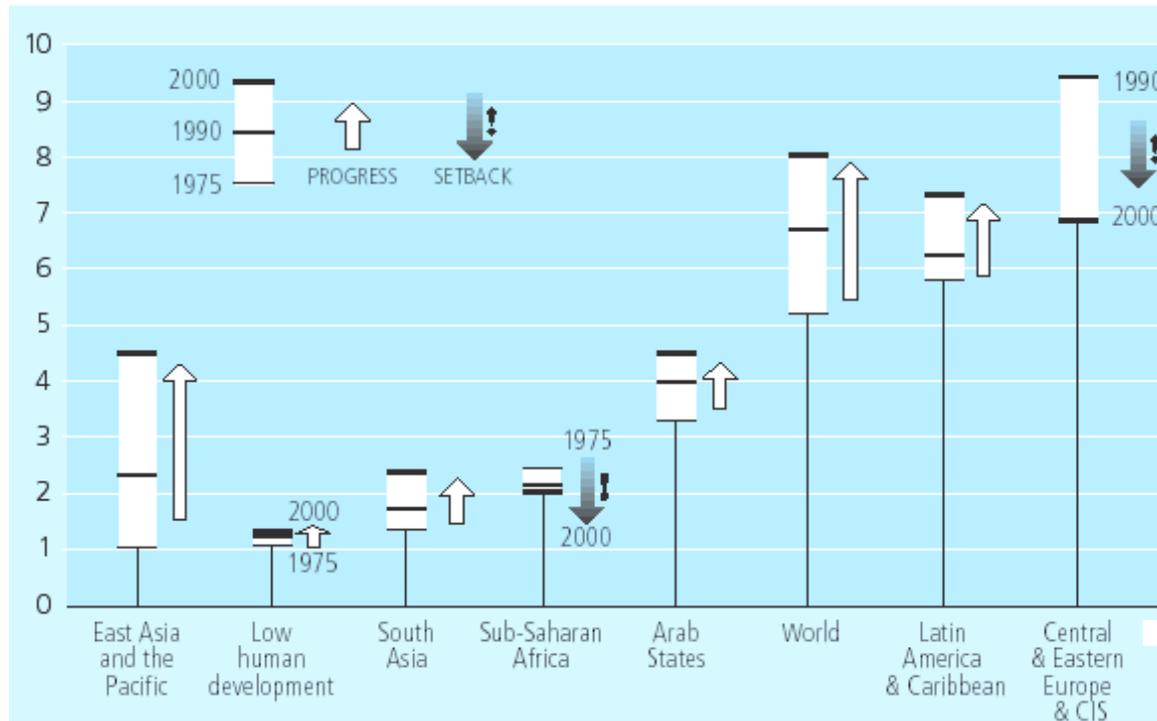
Factors decreasing inequality were:

- rapid growth in China since the 1970s and India since the late 1980s
- catch-up between European countries and the United States until the 1990s.

The estimation of poverty is usually done by using income rather than consumption as a welfare measure, as the latter is difficult to obtain for most countries. A country's income poverty rate is determined by its per capita income and the distribution of that income. Since the mid-1970s growth in per capita income has varied considerably across regions (see Figure 7-1). East Asia and the Pacific's impressive poverty reduction is primarily due to a quadrupling in its per capita GDP between 1975 and 2000. Sub-Saharan Africa was 5% poorer in 200 than in 1990. Central and Eastern Europe was the only other region to suffer

a decline in per capita income during the 1990s (UNDP 2002a). In terms of income inequality within countries, the limited available evidence indicates that worldwide, within-country income inequality has been increasing for the past 30 years (Dikhanov and Ward 2001). Among 73 countries for which data was available (accounting for 80% of the world's population), 48 have witnessed increased inequality since the 1950s, 16 have experienced no change and only nine – with just 4% of the world's population – have seen equality fall (Cornia and Kiiski 2001). The increase in inequality has impeded poverty reduction.

Figure 7-1 Global disparities in income – GDP per capita (2000 purchasing power parity US dollars, thousands)



Source: UNDP (2002a) and World Bank (2004c).

The problem of poverty is already highly regionalised and this concentration is intensifying. South Asia and sub-Saharan Africa are becoming the core areas for absolute poverty: sub-Saharan Africa has the highest levels of extreme poverty while South Asia contains the majority of the world's poor. These two areas contain nearly 70% of all people living in extreme poverty; an increase of ten percentage points over the last decade. However, while South Asia is likely to significantly reduce the number of people living in extreme poverty, sub-Saharan Africa is likely to increase that number (although reduce the share of people in extreme poverty).

Economic growth is important for achieving all the MDGs, but it relates most directly to the poverty target. As argued by Clemens, *et al.* (2004), 'economic growth is central to the poverty reduction goal because it is the only source of increased income for the poor that can be (comparatively) rapidly achieved.' Many studies have calculated an 'elasticity of poverty to average income' – the percentage decline in headcount poverty ratio for each 1% increase in per capita income. The exact level of this elasticity depends on the local conditions and may differ significantly across countries and regions. A typical estimate, holding constant the distribution of income, is that the poverty rate declines by 2% for each 1% increase in average per capita income (Bruno, *et al.* 1996; Adams 2002). This elasticity suggests that cutting headcount poverty in half requires a 41% increase in per capita income, implying an annual growth rate of 1.4% (UNDP 2003). Such figure is in line with a recent study carried out in 14 countries, which found that on average the elasticity of poverty to GDP per capita was 1.7 in the 1990s (World Bank 2005b). However, others suggest lower estimates for the level of the elasticity (i.e. between 0.73 and 1).

Table 7-1 sets out projections of poverty to 2015. We decide to use World Bank (2005a) data instead of the more recent estimates by World Bank (2006), as recent data in the latter are preliminary and not strictly comparable to previous years.

The MDG of halving extreme poverty by 2015 from the 1990 poverty level should be achieved on a global level, though with wide regional disparities. The latest poverty projections indicate a world (extreme) poverty rate of 10.2% in 2015 compared with 27.9% in 1990 (12.9% from 26.1% excluding China). The actual number of poor would decline to around 622 million from 1.2 billion in 1990 and 1.1 billion in 2001. Asia should readily achieve the target, but the Middle East, North Africa and sub-Saharan African regions will make little progress in improving poverty incidence. In fact the share (and the number) of people living on less than US\$1 per day and on less than US\$2 per day in sub-Saharan Africa has even increased between 1990 and 2001.

Table 7-1 Estimates of the world's poor

Region	People living on less than US\$1 per day (millions)			People living on less than US\$1 per day (%)		
	1990	2001	2015	1990	2001	2015
East Asia & Pacific	472	271	19	29.6	14.9	0.9
Excluding China	97	60	2	21.1	10.8	0.4
Europe and Central Asia	2	17	2	0.5	3.6	0.4
Latin America & the Caribbean	49	50	43	11.3	9.5	6.9
Middle East & North Africa	6	7	4	2.3	2.4	0.9
South Asia	462	431	216	41.3	31.3	12.8
sub-Saharan Africa	227	313	340	44.6	46.4	38.4
Total	1218	1089	622	27.9	21.2	10.2
Excluding China	844	877	606	26.1	22.5	12.9
Region	People living on less than US\$2 per day (millions)			People living on less than US\$2 per day (%)		
	1990	2001	2015	1990	2001	2015
East Asia & Pacific	1116	864	230	69.9	47.4	11.3
Excluding China	292	271	95	63.2	49.2	14.7
Europe and Central Asia	23	93	25	4.9	19.7	5.2
Latin America & the Caribbean	125	128	122	28.4	24.5	19.6
Middle East & North Africa	51	70	46	21.4	23.2	11.9
South Asia	958	1064	912	85.5	77.2	54.2
sub-Saharan Africa	382	516	612	75	76.6	69.2
Total	2654	2735	1946	60.8	52.9	32
Excluding China	1829	2142	1812	56.6	54.9	38.6

Source: World Bank (2005a)

These regional disparities in poverty reduction are confirmed by Chen and Ravallion (2004), who find that globally, 390 million people have been lifted out of poverty between 1981 and 2001. However, the progress has been uneven, with serious setbacks in some regions and time periods. Moreover more people living on around US\$2 per day became worse-off over the 1981–2001 period than the number who gained.

In order to assess the relative advancement in the achievement of the MDG targets, Table 7-2 compares how estimates of poverty rates in 2015 have changed from the last version of this *Source Book* (which used data from World Bank, 2003). From the table it is clear that expectations on the number of poor people and on the incidence of poverty achievable by 2015 have significantly improved over the past two years. This is true for all regions, including sub-Saharan Africa.

Table 7-2 Difference in 2015 prediction of poverty

Region	World Bank 2005		World Bank 2003	
	<i>People living on less than US\$1 per day</i>			
	Millions	%	Millions	%
East Asia & Pacific	19	0.9	80	3.9
Excluding China	2	0.4	7	1.1
Europe and Central Asia	2	0.4	7	1.4
Latin America & the Caribbean	43	6.9	47	7.5
Middle East & North Africa	4	0.9	8	2.1
South Asia	216	12.8	264	15.7
sub-Saharan Africa	340	38.4	404	46.0
Total	622	10.2	809	13.3
Excluding China	606	12.9	735	15.7

Region	World Bank 2005		World Bank 2003	
	<i>People living on less than US\$2 per day</i>			
	Millions	%	Millions	%
East Asia & Pacific	230	11.3	339	16.6
Excluding China	95	14.7	120	18.4
Europe and Central Asia	25	5.2	45	9.3
Latin America & the Caribbean	122	19.6	117	18.9
Middle East & North Africa	46	11.9	62	16.0
South Asia	912	54.2	1139	68.0
sub-Saharan Africa	612	69.2	618	70.4
Total	1946	32.0	2320	38.1
Excluding China	1812	38.6	2101	44.7

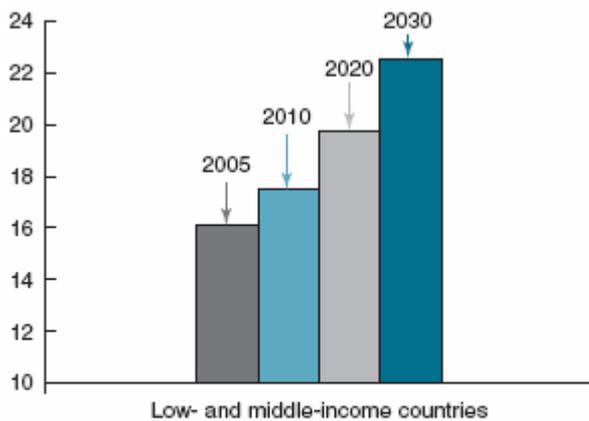
Source: World Bank (2003) and World Bank (2005a)

UNCTAD's Least Developed Countries 2004 report suggests that on current trends, the number of people living in extreme poverty in the LDCs will increase from 334 million people in 2000 to 471 million in 2015.

World Bank (2005) highlights possible downside risks which may have negative impacts in the near future and in the long-term on poverty, despite the relatively positive picture for both medium- and long-term prospects. One such risk is the potential increase in oil prices, which would have negative effects on all oil-importing economies, particularly those of low- and middle-income countries that face current account constraints. For the most vulnerable of these countries, an additional US\$10 per barrel increase in oil prices could reduce domestic incomes by as much as 4 %, and on average, incomes of oil-importing low-income countries are expected to fall by about 1% of GDP.

The World Bank Global Economic Prospects 2007 produced forecasts until 2030. They expect that average incomes are likely to converge between developed and developing countries (Figure 7-2).

Figure 7-2 Per capita incomes as percent of high-income countries

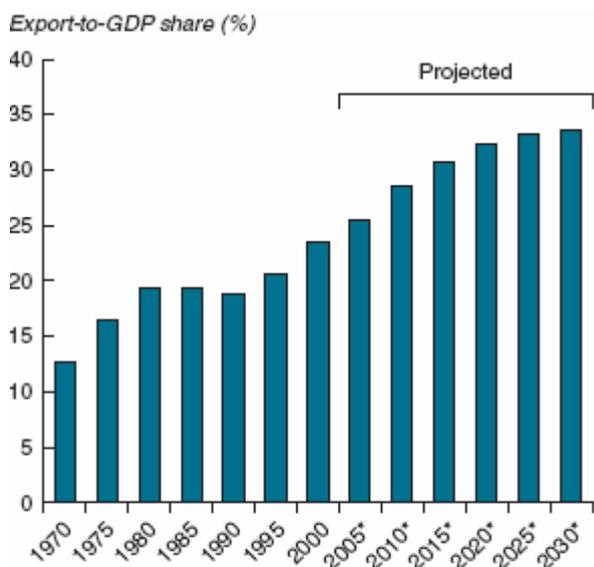


Source: World Bank simulations using the Linkage model.

Note: Ratio of Purchasing Power Parity (PPP)-adjusted per capita incomes relative to high-income average. PPP is fixed at base year (2001) level.

They further argue that globalisation is likely to enter a new phase, with trade growing in importance in virtually every country. The average increase is shown in Figure 7-3.

Figure 7-3 Exports – to –GDP ratio.

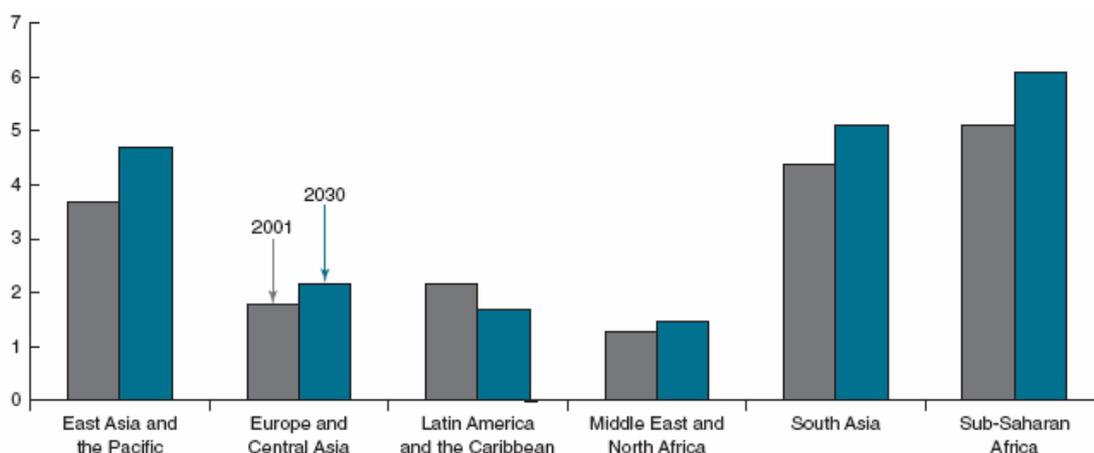


Sources: Development Data Platform (DDP) and staff calculations. *Indicates World Bank using the Linkage model.

Note: Export-to-GDP ratio for the world. The export share is calculated in nominal dollar terms. Observations are smoothed using five-year moving averages.

This globalisation would result in widening income inequality among and within countries, with Africa falling further behind. The wages of skilled workers are expected to rise further than wages of less skilled workers (Figure 7-4).

Figure 7-4 Ratio skilled to unskilled wages



Source: WB GEP 2007

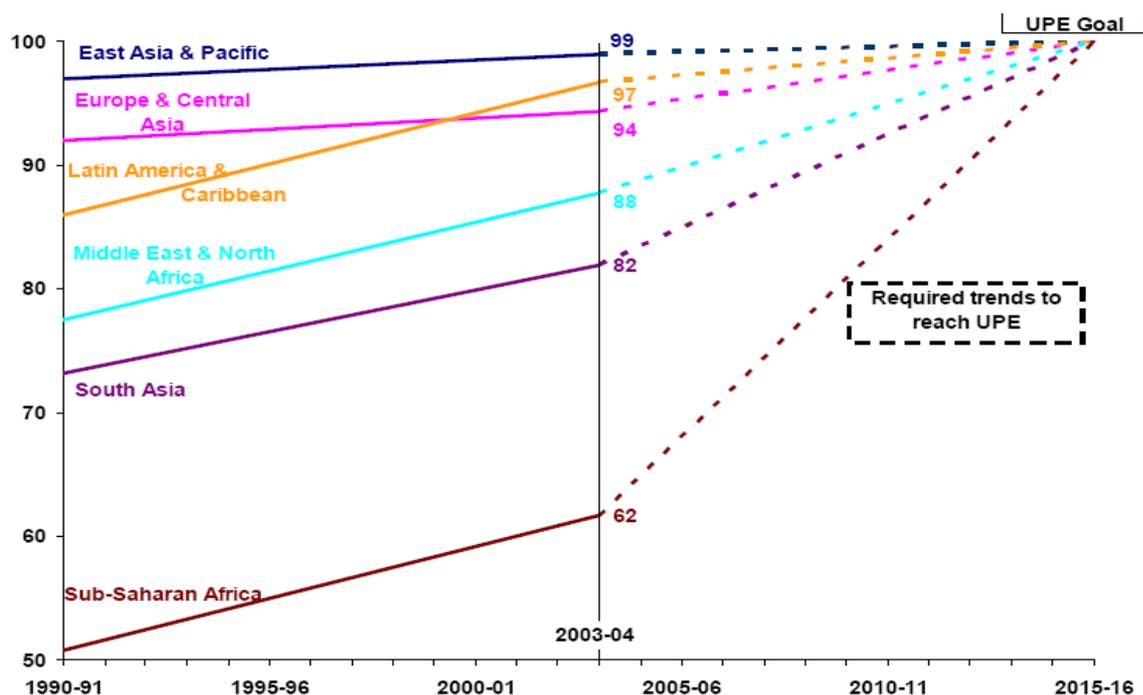
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8 EDUCATION

The Education for All (EFA) Global Monitoring Report 2006 and the WB/IMF Global Monitoring Report 2006 discuss progress on reaching education goals including reaching universal primary education. East Asia and Pacific and Europe and Central Asia were fairly close to the target, with population-weighted completion rates of 99% and 94.4%, respectively. Although both regions would need to accelerate progress slightly over the general trend observed in the 1990s, the required pace appears achievable (see Figure 8-1).

Figure 8-1 Primary completion rates – observed versus required improvement



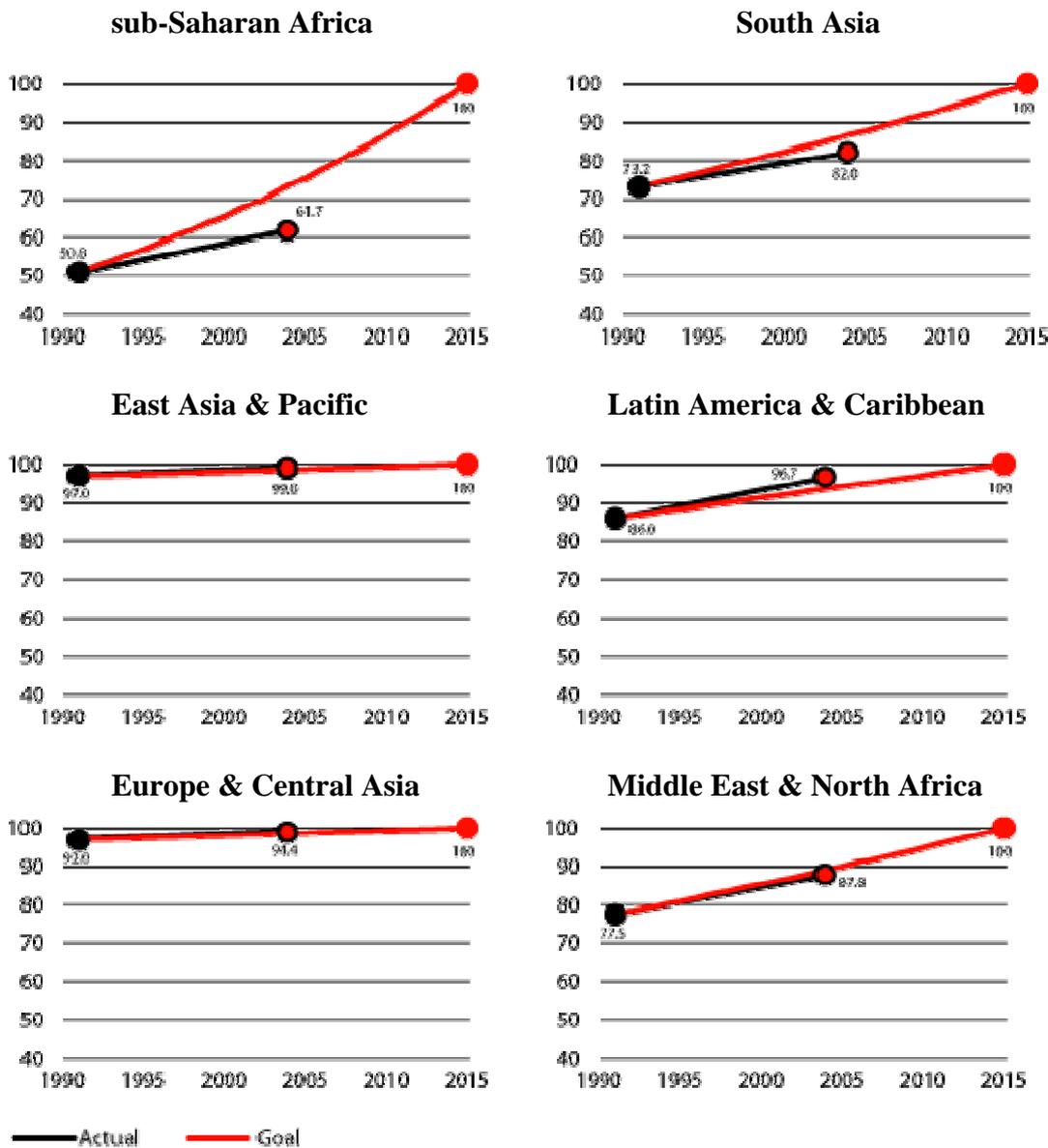
Source: WB and IMF Global Monitoring Report 2006

Regionally, Latin America has continued to register the fastest progress and is on track towards the goal. In South Asia, the Middle East and North Africa, progress on primary completion rate needs to be faster than recent trends in order to meet the goals of UPE. Although sub-Saharan Africa has made significant progress since 1990/91, fewer than half of the children of primary-school age are enrolled in school and the region still lags far behind by a large margin. Because the annual improvement in completion rates was just 0.2% in the 1990s, an annual improvement of more than 4.5% will be needed in 2000–15 to achieve the target and this is unlikely to be achieved even if economic growth rates double (Figure 8-2). UPE will be achieved only when all children have access to and complete primary school. Moreover, most completion indicators currently available are gross rates that include all children of a cohort and do not distinguish between children who do not complete primary education because they had no access to it in the first place and those who were enrolled but failed to reach or complete the last grade. Only the latter are relevant for an assessment of the internal efficiency of a school system. Therefore, ensuring that children remain in school until the last grade of primary school is a major challenge.

In about one-third of countries with data, less than two-thirds of the pupils enrolled in primary school reach the last grade. The problem is particularly acute in sub-Saharan Africa, but also severe in Bangladesh, Cambodia, India, Nepal and a few countries of Latin America and the Caribbean. In most countries with data not all children who reach the last grade of primary school complete it. Low levels of primary completion may in some countries reflect strong selection policies being applied because of the limited

number of places available in lower secondary education. Improving the quality of education and expanding access to secondary education are thus conditions for UPE to be fully achieved (Global Monitoring Report 2006).

Figure 8-2 Progress on universal primary education: primary completion rate (% of relevant group)



Source: World Bank Staff Estimates 2006

Table 8-1 shows that between 1998 and 2002, total enrolment in primary education rose from 655 million to 671 million children. Sub-Saharan Africa and South and West Asia saw the highest increase in enrolment, nearly 20 million children each. Enrolment remains a challenge in sub-Saharan Africa, still facing high fertility: the region's school-age population is likely to increase by 34 million or 32% between 2000 and 2015. Major barriers in this aspect have been, first and foremost, the HIV/AIDS epidemic, and other impediments to progress such as disease and armed conflict. These stumbling blocks will leave a major proportion of children (one-tenth) orphaned by 2010 (Fredriksen, 2005). Substantial increases in the school age population (by about 20%) over this period are also expected in South and West Asia, and the Arab states. Meanwhile the school-age population in Latin America and the Caribbean will likely remain

constant, and decreases are expected in East Asia and the Pacific (by 4%), Central Asia and Eastern Europe (by 17%), and Central Asia (by 23%). Enrolment declined between 1998 and 2002 in East Asia and the Pacific, partly because China's birth rate fell. A decline for that period is also observed in Latin America and the Caribbean, though this resulted principally from a change to the definition of primary education in Brazil (UNESCO, EFA/Global Monitoring Report 2006).

Table 8-1 Enrolment in primary education by region, 1998 and 2002

	Total enrolment				Gross enrolment ratios			Net enrolment ratios		
	1998	2002	Difference		1998	2002	Difference	1998	2002	Difference
	(Thousands)		%		%	%	(percentage points)	%	%	(percentage points)
World	655 343	671 359	16 015	2	101	104	3.1	83.6	84.6	1.0
Developing countries	569 072	589 291	20 219	4	100	104	3.6	82.0	83.2	1.2
Developed countries	70 399	67 880	-2 519	-4	102	101	-1.5	96.6	95.6	-0.9
Countries in transition	15 872	14 187	-1 685	-11	101	106	5.1	85.4	89.1	3.7
Sub-Saharan Africa	81 319	100 670	19 351	24	80	91	11.2	56.2	63.5	7.3
Arab States	34 725	37 137	2 411	7	90	94	4.1	78.1	82.6	4.5
Central Asia	6 891	6 396	-495	-7	99	102	2.7	88.9	89.9	1.0
East Asia and the Pacific	217 317	207 054	-10 263	-5	112	111	-0.6	95.7	92.1	-3.7
South and West Asia	158 096	175 527	17 431	11	95	102	7.4	78.6	82.5	3.9
Latin America and the Caribbean	78 656	69 498	-9 158	-12	121	119	-2.0	94.4	96.4	2.0
North America and Western Europe	52 856	51 945	-911	-2	103	101	-1.8	96.3	95.3	-1.0
Central and Eastern Europe	25 484	23 133	-2 351	-9	97	99	2.1	87.2	89.0	1.7

Source: Statistical annex, Table 5.

Source: UNESCO 2006

Progress is being made regarding gender parity in enrolment, as 104 countries out of the 180 for which 2002 data are available have achieved parity in primary education as measured by the GPI of gross enrolment ratios. Major gender disparities that impede girls are now concentrated in the Arab States, South and West Asia and sub-Saharan Africa, though the situation has improved considerably since 1998 (see Table 8-2) (UNESCO, EFA/Global Monitoring Report (2006)).

Table 8-2 Gross enrolment ratios by gender in primary education, by region, 1998 and 2002

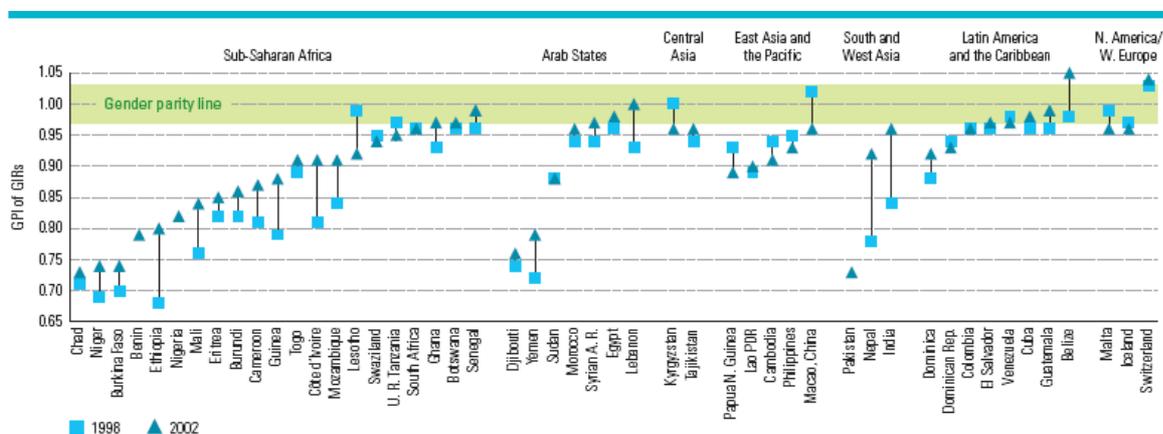
	Gross enrolment ratios					
	1998			2002		
	Male %	Female %	GPI (F/M)	Male %	Female %	GPI (F/M)
World	104.5	96.3	0.92	106.6	100.4	0.94
Developing countries	104.9	95.5	0.91	107.3	100.3	0.93
Developed countries	101.8	102.3	1.00	100.7	100.4	1.00
Countries in transition	101.1	99.9	0.99	106.0	105.1	0.99
Sub-Saharan Africa	86.8	73.1	0.84	97.9	84.3	0.86
Arab States	95.7	83.5	0.87	98.6	88.8	0.90
Central Asia	99.5	98.4	0.99	102.5	100.7	0.98
East Asia and the Pacific	112.1	111.0	0.99	111.7	110.2	0.99
South and West Asia	102.9	85.6	0.83	106.2	97.5	0.92
Latin America and the Caribbean	122.9	119.9	0.98	120.8	118.0	0.98
North America and Western Europe	102.1	103.0	1.01	100.9	100.7	1.00
Central and Eastern Europe	99.3	95.3	0.96	100.8	98.1	0.97

Source: Statistical annex, Table 5.

Source: UNESCO 2006

Gender disparities in primary education first and foremost stem from disparities in enrolment in the first grade. About 60% of the 159 countries for which data are available had achieved gender parity in the intake rate by 2002 (see Figure 8-3). Most of these countries are in North America and Western Europe, Central and Eastern Europe, Latin America and the Caribbean, Central Asia, and East Asia and the Pacific. Significant gender disparities in intake rate remain in countries such as Burkina Faso, the Central African Republic, Chad and Niger, with particularly low GPIs (under 0.75). As Figure 8-3 shows, however dramatic progress was made between 1998 and 2002 in many countries, notable Ivory Coast, Ethiopia, Guinea, Lebanon, Mali, Mozambique and Yemen. There is still much variation within South and West Asia: Pakistan has one of the world's lowest GPIs (0.73); India and Nepal have made much progress since 1998 and nearly reached gender parity in 2002 (India's GPI increased from 0.84 to 0.96 and Nepal's from 0.78 to 0.92); Bangladesh, the Islamic Republic of Iran, the Maldives and Sri Lanka had already reached parity by 1998 (UNESCO, EFA/Global Monitoring Report 2006).

Figure 8-3 Gender disparities in GIRs in primary education, 1998 and 2002

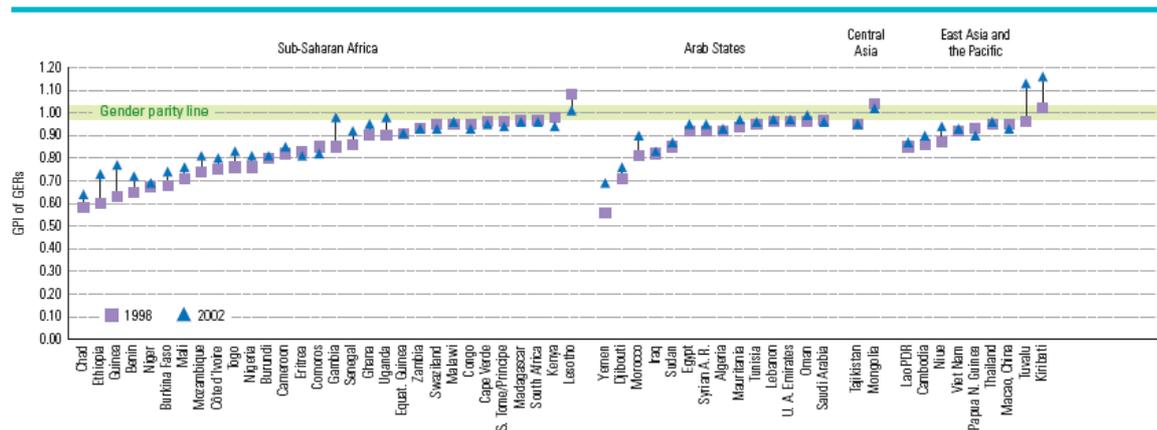


Note: Only countries with GPI below 0.97 or above 1.03 in at least one of the two years are included. No data are available for Pakistan for 1998. See source table for detailed country notes.
Source: Statistical annex, Table 4.

Source: UNESCO 2006

Figure 8-4 indicates that very rapid progress towards gender parity can be achieved in poor countries with low enrolment ratios, as demonstrated by Afghanistan, Benin, Chad, Ethiopia, Gambia, Guinea, India, Morocco, Nepal and Yemen. Even so, several of these countries still have GPIs below 0.80 in 1998 to 0.52 in 2002. Once enrolled, girls tend to perform better than boys, which may reflect the gender-differentiated attitudes to learning or, more simply, the fact that in countries where fewer girls than boys are enrolled the average female student tends to come from a more privileged socio-economic background than the average male student (UNESCO, EFA/ Global Monitoring Report 2006).

Figure 8-4 Changes in gender disparities in GERs between 1998 and 2002



Note: Countries with a GPI between 0.97 and 1.03 in 1998 or 2002 are not included. No data for Pakistan in 1998. See source table for detailed country notes.
Source: Statistical annex, Table 5.

Source: UNESCO 2006

Results show that 46 countries have an EDI above 0.95 and can thus be considered as having achieved EFA or being close to doing so. These countries are mostly located in North America and Europe, where education has been compulsory for decades; 49 countries, in all regions, have EDI values between 0.80 and 0.94. Quality remains an issue, especially in Latin America and the Caribbean. In the Arab States, low adult literacy rates pull the EDI down; 29 countries have EDI values below 0.80. More than half are in sub-Saharan Africa. In these countries, all four components of the EDI are at low levels. They are unlikely to achieve EFA by 2015 without dramatically stepped-up efforts (Table 8-3).

Table 8-3 Distribution of countries by EDI values and region, 2002

	Far from EFA: EDI below 0.80	Intermediate position: EDI between 0.80 and 0.94	Close to EFA: EDI between 0.95 and 0.97	EFA achieved: EDI between 0.98 and 1.00
Sub-Saharan Africa	16	7	1	
Arab States	5	10	1	
Central Asia		2	1	2
East Asia and the Pacific	3	7	2	1
South and West Asia	3	1		
Latin America/Caribbean	1	20	4	1
North America/West. Europe		1	9	8
Central and Eastern Europe		1	12	4
Total	28	49	30	16

Source: UNESCO (2006).

Figure 8-5 The EDI in 2002 and its evolution since 1998 in countries with low EDI



Note: Countries with an EDI below 0.800 in 2002 are included.
Source: Appendix 1, Table A1.3.

Source: UNESCO (2006).

Changes in EDI between 1998 and 2002 were moderate. On average the index increased by 1.2% and the ranking of countries was stable. Significant progress was made in Cambodia, Ivory Coast, Ethiopia and Mozambique. Several countries registered sharp decreases (between 5% and 11%), resulting from deterioration in the survival rate to Grade 5, including Chad, Guyana, Papua New Guinea and Trinidad and Tobago. In more than three-quarters of the 58 countries included in the analysis, at least one indicator moved in the opposite direction to the others (Figure 8-5) (UNESCO, EFA/Global Monitoring Report 2006).

The number of children in primary education school rose from 596 million in 1990 to 648 million in 2000 (UNESCO 2003). The number of out of school children decreased from 109 million in 1990 to 104 million in 1998. The number of illiterate adults (aged 15+) decreased from 879 million in 1990 to 862 in 2000 and is expected to decrease further to 799 million in 2015. By 2000, 85% of all men and 74% of all women could read and write up from 82% and 69% in 1990 and this is expected to rise to 89% and 81% respectively. Predictions for literacy rates in 2015 show increases for all countries. Regional literacy rates grew between 1990 and 2000, by at most one-third (in sub-Saharan Africa and the Arab States). Projected increases to 2015 (on the basis of past trends) are lower than these values (Table 8-4 and Figure 8-6).

According to conventionally obtained data reported by countries for the most recent year in the reference period 2000-2004, the world has 771 million illiterate adults, some 18% of the adult population. Since 1990, the number of illiterates has fallen by 100 million, mainly due to a marked reduction (by 94 million) in China (Table 8-5). The vast majority of the 771 million adults who lack minimal literacy skills live in

three regions: South and West Asia, East Asia and the Pacific, and sub-Saharan Africa. Although East Asia and the Pacific has the highest literacy rate among the developing regions, at 91%, its large population means it is still home to 17% of the world's illiterates. The share of the world's illiterate population living in sub-Saharan Africa, South and West Asia and the Arab states has increased since 1970, partly owing to the relatively high population growth rates; these regions' literacy rates cluster around 60%.

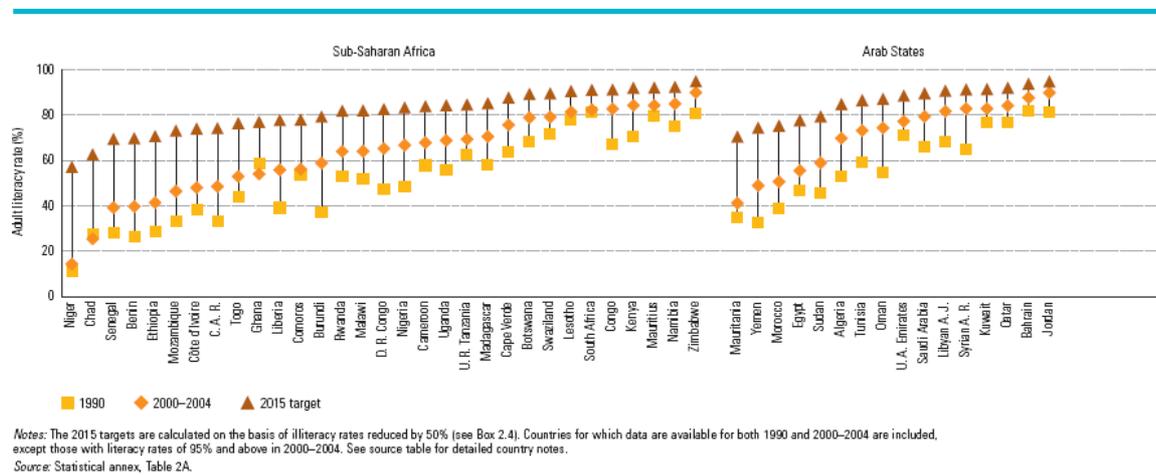
Table 8-4 Estimates of adult illiterates and literacy rates (population aged 15+) by region, 1990 and 2000–2004

	Number of illiterates (thousands)		Literacy rates (%)		Change from 1990 to 2000–2004 in:		
	1990	2000-2004	1990	2000-2004	Number of illiterates		Literacy rates
					(thousand)	(%)	(percentage points)
World	871 750	771 129	75.4	81.9	-100 621	-12	6.4
Developing countries	855 127	759 199	67.0	76.4	-95 928	-11	9.4
Developed countries	14 864	10 498	98.0	98.7	-4 365	-29	0.7
Countries in transition	1 759	1 431	99.2	99.4	-328	-19	0.2
Sub-Saharan Africa	128 960	140 544	49.9	59.7	11 564	9	9.8
Arab States	63 023	65 128	50.0	62.7	2 105	3	12.6
Central Asia	572	404	98.7	99.2	-168	-29	0.5
East Asia and the Pacific	232 255	129 922	81.8	91.4	-102 333	-44	9.6
South and West Asia	382 353	381 116	47.5	58.6	-1 237	-0.3	11.2
Latin America and the Caribbean	41 742	37 901	85.0	89.7	-3 841	-9	4.7
Central and Eastern Europe	11 500	8 374	96.2	97.4	-3 126	-27	1.2
North America and Western Europe	11 326	7 740	97.9	98.7	-3 585	-32	0.8

Note: Figures may not add to totals because of rounding.
Source: Statistical annex, Table 2A.

Source: UNESCO 2006

Figure 8-6 Estimated adult literacy rates (15+): 1990, 2000–2004 and 2015 target



Notes: The 2015 targets are calculated on the basis of illiteracy rates reduced by 50% (see Box 2.4). Countries for which data are available for both 1990 and 2000–2004 are included, except those with literacy rates of 95% and above in 2000–2004. See source table for detailed country notes.
Source: Statistical annex, Table 2A.

Source: UNESCO 2006

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9 HEALTH

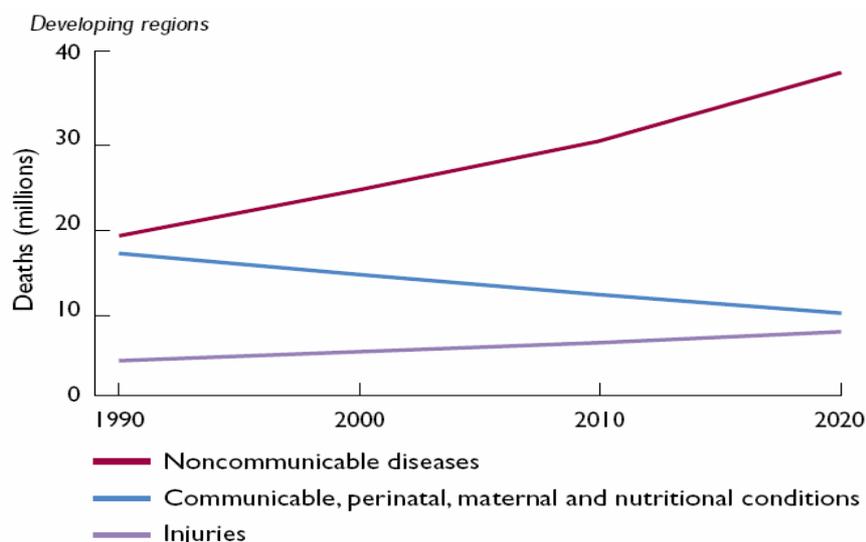
The next two decades will see dramatic changes in the health of the world's population, not least due to the HIV/AIDS epidemic. In developing countries (accounting for four-fifths of the world's population) non-communicable diseases such as depression and heart disease are fast replacing traditional problems such as infectious diseases and malnutrition. By the year 2020, non-communicable diseases are expected to account for seven out of every ten deaths in developing countries, compared with less than one-half today (GBD 2000).

Global life expectancy at birth, which is estimated to have risen from 47 years in 1950–1955 to 65 years in 2000–2005, is expected to keep on rising to reach 75 years in 2045–2050. Life expectancy is expected to increase for women in most regions (to 88 years in developed countries). For men, life expectancy is predicted to grow more slowly due to increased exposure to tobacco (GBD 2000). In the more developed regions, the projected increase is from 76 years at present to 82 years by mid-century. Among the least developed countries, where life expectancy today is 51 years, it is expected to be 67 years in 2045–2050. Because many of these countries are highly affected by the HIV/AIDS epidemic, the projected increase in life expectancy is dependent on the implementation of effective programmes to prevent and treat HIV infection. Estimates suggested that the advent of HIV/AIDS is expected to reverse the gains in life expectancy made in sub-Saharan Africa, which reached a peak of 49.2 years during the late 1980s and which is projected to drop to under 46 years by 2010 (UN 2003). In the rest of the developing world, under similar conditions, life expectancy is projected to rise from 66 years today to 76 years by mid-century. (UN, 2005).

Communicable diseases

Deaths from communicable diseases, perinatal, maternal and nutritional conditions are expected to fall in developing countries to 2020 (see Figure 9-1). This decline is a result of ageing populations, increased income, educational progress and technological innovations (GBD 2000).

Figure 9-1 Projected health trends by broad cause in developing countries



Source: GBD (2000).

HIV/AIDS

An estimated 38.6 million (33.4 million–46.0 million) people worldwide were living with HIV at the end of 2005. Of these, an estimated 4.1 million (3.4 million–6.2 million) became newly infected with HIV and an estimated 2.8 million (2.4 million–3.3 million) lost their lives to AIDS in the same year (UNAIDS 2006). Although these figures compare slightly positively with those from last sourcebook (3 million deaths in 2003 and 5 million newly infected from UNAIDS, 2003), the number of countries with a significant number of infected people has increased from 53 in 2002 to 60 in 2004 (UN 2005). Overall, it is estimated that the HIV incidence rate (the proportion of people who have become infected with HIV in that year) peaked in the late 1990s and has stabilised subsequently, although several countries have experienced increasing incidence.

Over the last 25 years nearly 65 million people were infected with HIV and an estimated 25 million have died of AIDS-related illnesses (UNAIDS 2006).

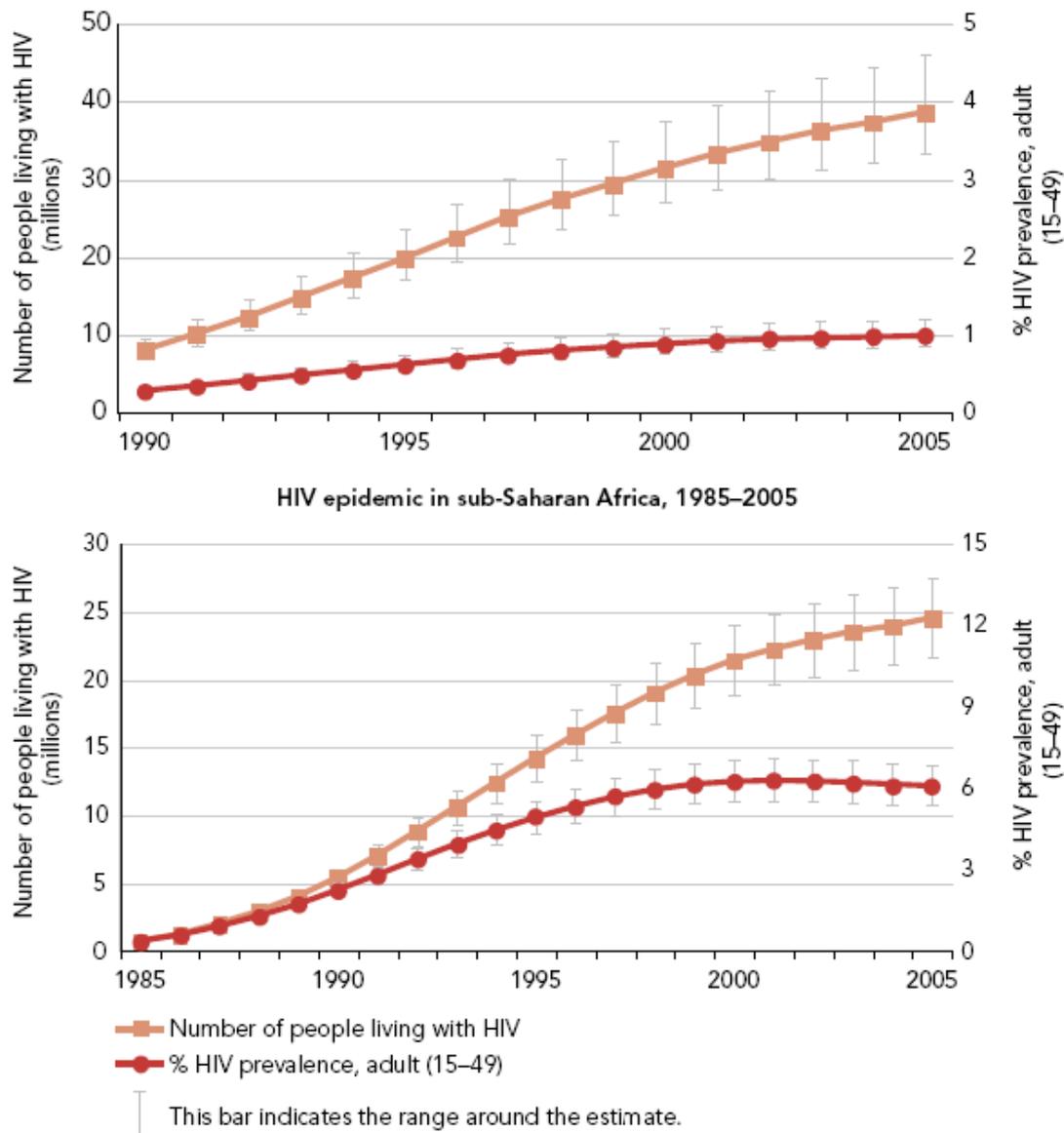
Changes in incidence along with rising AIDS mortality have caused global HIV prevalence (the proportion of people living with HIV) to level off, although the numbers of people living with HIV have continued to rise (see Figure 9-2). This is due to population growth and, more recently, the life-prolonging effects of antiretroviral therapy.

The prolonged time lag between infection with HIV and the onset of the full disease (on average nine to 11 years in the absence of treatment) means that the numbers of HIV-associated tuberculosis cases, AIDS cases and deaths have only recently reached epidemic levels in many of the severely affected countries. Globally, the greatest mortality impact is on people between the ages of 20 and 40 years (UN 2003).

In 2003, two-thirds of HIV/AIDS sufferers lived in Africa (which accounts for 11% of the world's population). Today, about one in 12 African adults has HIV/AIDS. One-fifth of the people infected with HIV live in Asia.

Analysis of the regional spread of HIV/AIDS shows major differences between regions, within regions and within countries. Sub-Saharan Africa is the region with the largest burden of the AIDS epidemic and where the HIV incidence rate has peaked in most countries, with some signals of a slightly decreasing incidence (Figure 9-2). However, the epidemics in this region are highly diverse and especially severe in southern Africa, where some of the epidemics are still expanding. Epidemics in the countries of Southern Africa are much larger than elsewhere in sub-Saharan Africa. South Africa's AIDS epidemic, the largest in the region, shows no evidence of a decline: an estimated 5.5 million (4.9 million–6.1 million) people were living with HIV in 2005 and an estimated 18.8% (16.8%–20.7%) of adults (15–49 years) were living with HIV in 2005 (UNAIDS 2006).

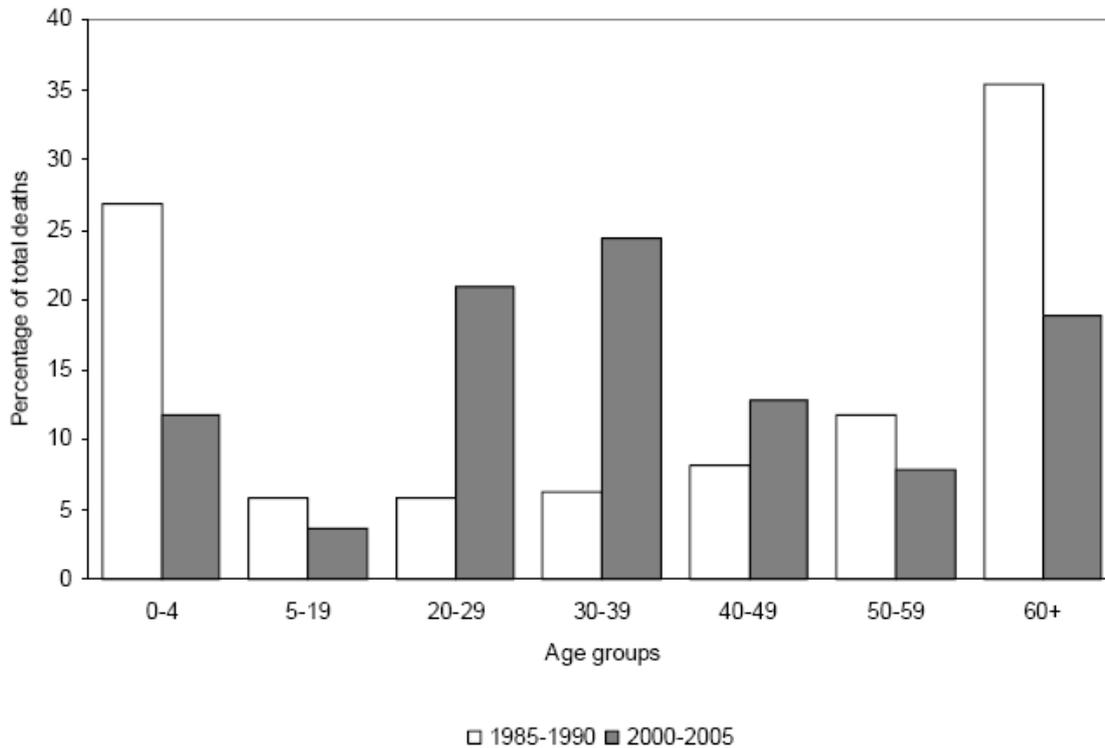
Figure 9-2 Estimated number of people living with HIV, and adult HIV prevalence, globally and in sub-Saharan Africa, 1985–2005



Source: UNAIDS (2006).

In the whole of Southern Africa, life expectancy has fallen from 62 years in 1990–1995 to 48 years in 2000–2005, and is projected to decrease further to 43 years over the next decade. In Botswana, Lesotho and Swaziland, the population is projected to decrease as deaths outnumber births (UN, 2005). The demographic impact of HIV/AIDS is clear if we analyse the trend in the distribution of deaths by age groups in Southern Africa. While the core of deaths in the 1985–90 period occurred in the 0–4 and over 60 age groups, this drastically changed 15 years later, with deaths being concentrated in the 20–39 age groups (Figure 9-3).

Figure 9-3 Percentage distribution of deaths by age, Southern Africa, 1985–1990 and 2000–2005



Source: UN (2004)

In the rest of sub-Saharan Africa the situation is not as dramatic, although HIV/AIDS remains one of the largest constraints to development: in eastern Africa HIV prevalence is now less than half that reported in southern Africa and there is evidence of a modest decline. In western Africa prevalence is now roughly one-fifth of that of southern Africa and no rapid growth is occurring (Boerma, *et al.* 2003).

Moreover, the problem of children having lost either or both parents to HIV/AIDS has been afflicting Africa for a decade, and will get worse. At present, there are 14 million such children in the world of whom the vast majority are in Africa, but the projected total number will nearly double to 25 million by 2010 (UNICEF 2004).

The course of the epidemics in the most populous continent – Asia – will have a decisive influence. Latest estimates show some 8.3 million (5.7 million–12.5 million) people were living with HIV in Asia at the end of 2005 – more than two-thirds of them in one country, India. While progress has been strongest in Thailand, coverage still remains well below 10% in India (which has more than 70% of the region’s total treatment need). Approximately 650 000 (390 000–1.1 million) people in China were living with HIV in 2005. The epidemics in Eastern Europe and central Asia continue to expand. Some 220 000 (150 000–650 000) people were newly infected with HIV in 2005, bringing to about 1.5 million (1.0 million–2.3 million) the number of people living with HIV – a twenty-fold increase in less than a decade. In Latin America, some 140 000 (100 000–420 000) people were newly infected with HIV in 2005, bringing the total to 1.6 million (1.2 million–2.4 million). In Western Europe and the US, the estimated number of infections greatly exceeds the number of deaths, largely as a result of antiretroviral therapy in lowering death rates (Nicoll and Hamers 2002). In the Americas, the most affected area is the Caribbean, which has the second highest prevalence in the world after sub-Saharan Africa: overall adult prevalence rates are 2 to 3%.

The interaction of HIV/AIDS with other infectious diseases is an increasing public health concern. In sub-Saharan Africa malaria, bacterial infections and tuberculosis have been identified as the leading causes of HIV-related morbidity (Holmes, *et al.* 2003).

In many countries, the cumulative effects of HIV/AIDS could have negative consequences for long-term economic growth and poverty reduction. Until recently, most studies predicted that a generalised HIV/AIDS epidemic at 10% adult prevalence would reduce economic growth by about 0.5% per year (World Bank 1999a). Several country studies have suggested that HIV/AIDS results in a reduction of GDP of around 1% but the latest estimates suggest that the adverse effects could be even worse (Bell, *et al.*, 2003).

In recent years, AIDS has helped drive a global revolution in the delivery of complex therapy in resource-limited settings. Between 2001 and 2005, the number of people on antiretroviral therapy in low- and middle-income countries increased from 240,000 to approximately 1.3 million. The number of sites providing antiretroviral drugs increased from roughly 500 in 2004 to more than 5,000 by the end of 2005. Expanded treatment access was estimated to have averted 250,000 to 350,000 AIDS deaths between 2003 and 2005. Globally, however, antiretroviral drugs still reach only one in five who need them. Ongoing obstacles to expanding treatment access include out-of-pocket costs for patients, the concentration of treatment sites in urban areas, and inadequate efforts to address the needs of vulnerable populations, including sex workers, men who have sex with men, injecting drug users, prisoners and refugees (UNAIDS 2006).

Tuberculosis

There were an estimated 8.9 million new cases of tuberculosis (TB) in 2004, up from 8.4 in 2000 and 8.0 million in 1997. Asia has the highest share of new cases and of prevalence, although Africa was the region with the highest spread of the disease (0.5% of prevalence), as it appears in Figure 8-1. The estimated incidence per capita in sub-Saharan Africa is nearly twice that of the Southeast Asia Region, at nearly 400 cases per 100,000 population. It is estimated that 1.7 million deaths resulted from TB in 2004. Both the highest number of deaths and the highest mortality per capita are in Africa, where HIV has led to rapid growth of the TB epidemic, and increases the likelihood of dying from TB (WHO 2006).

In 2004, estimated per capita TB incidence was stable or falling in five out of six WHO regions, but growing at 0.6% per year globally. The exception is the African region, where TB incidence was still rising, in line with the spread of HIV. However, the number of cases notified from the African region is increasing more slowly each year, probably because the HIV epidemics in African countries are also slowing. In Eastern Europe (mostly countries of the former Soviet Union), incidence per capita increased during the 1990s, but peaked around 2001, and has since fallen.

Many large, high-tuberculosis-burden countries (Brazil, Indonesia, Nigeria, Pakistan, Russian Federation) have inadequate controls for the disease – a problem due principally to a lack of resources and input into health care structures. The largest countries (China and India) have put tuberculosis control high on the political agenda but the magnitude of their populations and caseloads means that much remains to be done. However, a number of (smaller) developing countries (Peru and Vietnam) are effectively controlling tuberculosis through effective early detection and treatment systems.

Table 9-1 Estimated incidence, prevalence and TB mortality, 2004

	Incidence				Prevalence		TB Mortality	
	All forms		Smear-positive*		number (000)	per 100,000 pop	number (000)	Per 100,000 pop
WHO region	number (000) (% of global total)	per 100,000 pop	number (000)	per 100,000 pop	number (000)	per 100,000 pop	number (000)	Per 100,000 pop
Africa	2 573 (29)	356	1 098	152	3 741	518	587	81
Americas	363 (4)	41	161	18	466	53	52	5.9
Eastern Mediterranean	645 (7)	122	289	55	1 090	206	142	27
Europe	445 (5)	50	199	23	575	65	69	7.8
Southeast Asia	2 967 (33)	182	1 327	81	4 965	304	535	33
Western Pacific	1 925 (22)	111	865	50	3 765	216	307	18
Global	8 918 (100)	140	3 939	62	14 602	229	1 693	27

* Smear-positive cases are those confirmed by smear microscopy, and are the most infectious cases. pop indicates population

Source: WHO (2006).

HIV and Tuberculosis

HIV and TB hasten each other's progress. HIV weakens the immune system. Someone who is HIV-positive and infected with TB bacilli is many times more likely to become sick with TB than someone infected with TB bacilli who is HIV-negative. TB is a leading cause of death among people who are HIV-positive. It accounts for about 13% of AIDS deaths worldwide. In Africa, HIV is the single most important factor determining the increased incidence of TB in the past ten years (WHO, 2006).

Non-communicable diseases (NCD)

Deaths from non-communicable diseases (such as strokes, heart attacks, cancer and diabetes) are predicted to increase from 28.1 million in 1990 to 49.7 million in 2020 (GBD 2000). By 2020, NCDs will be the biggest cause of death in all regions apart from sub-Saharan Africa. It is predicted that in 2010, the number of people with diabetes worldwide will be double the level in 1995 and that the biggest increase (both proportionately and in absolute number) will be in poorer regions (Unwin 2001). NCDs are already major health problems for adults in the poorest countries of the world. For example, cardiovascular disease occurs at an earlier age in developing countries, increasing the potential adverse economic and social consequences. In developing countries as a whole, deaths from non-communicable diseases are expected to rise from 47% of the burden to almost 70%. The steep projected increase in the burden of non-communicable diseases worldwide will be driven by ageing populations, augmented by the large numbers of people in developing countries who are now exposed to tobacco use.

Malaria

One million people die each year from malaria, mostly children and pregnant women. Nine in ten of these deaths are in Africa (WHO 2003b). In some African countries, malaria accounts for 40% of public health spending and up to half of hospital admissions and outpatient visits. Malaria is on the increase owing to insecticide resistance, anti-malarial drug resistance and environmental change. Global warming could increase the annual number of malaria cases from the present 50 million a year to 80 million by 2100.

Tobacco

Over 1.3 billion people in the world smoke tobacco (World Bank 1999b), with 84% of these living in low- or middle-income countries (Guindon and Boisclair, 2003). At the country level, tobacco consumption varies by socioeconomic group. In many countries, at all levels of development and income, it is the poor

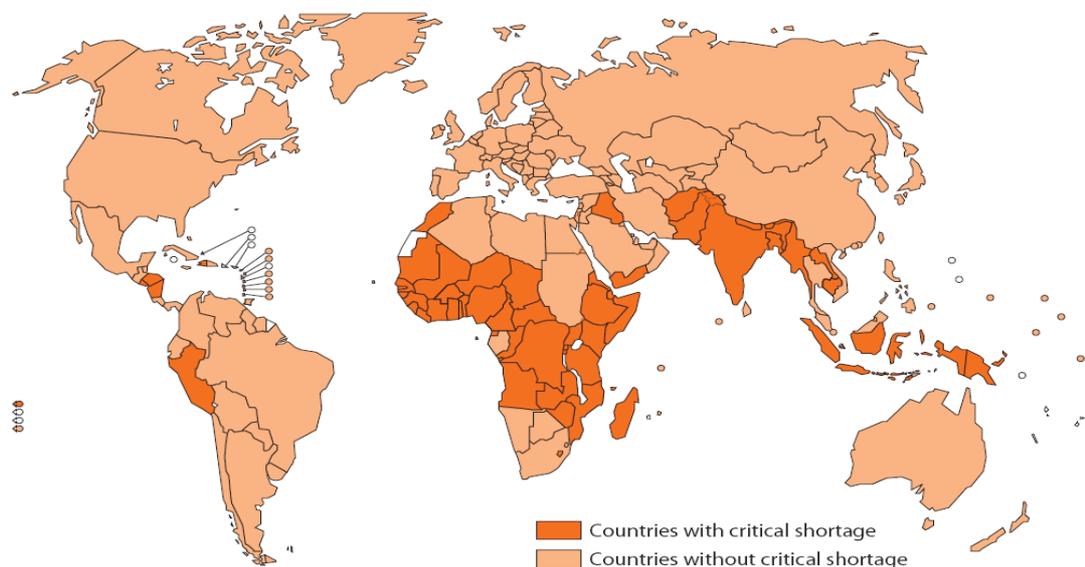
who smoke the most and who bear most of the disease burden of tobacco use. Within 20 years, tobacco use, if unchecked, will lead to 1 billion deaths, four-fifths of which will occur in developing countries. As such, tobacco dependence could become the world's single largest cause of premature death or years lived with disability (WHO 2003c). The largest populations of China and India are anticipated respectively to have 18% and 13% of adult disease burden attributable to tobacco by 2020 (GBD 2000).

Skill shortages

One major potential obstacle to the successful treatment of diseases at a global level, and especially in developing countries, is the shortage of supply capacity in the health sector. The World Health Report 2006 (WHO 2006a) argues that the 59.2 million full-time paid health workers worldwide are experiencing increasing stress and insecurity as they react to a complex array of forces. WHO (2006b) identifies a threshold in workforce density below which high coverage of essential interventions, including those necessary to meet the health-related MDGs, is very unlikely (see Figure 9-4). Based on these estimates, there are currently 57 countries with critical shortages equivalent to a global deficit of 2.4 million doctors, nurses and midwives. The proportional shortfalls are greatest in sub-Saharan Africa, although numerical deficits are very large in Southeast Asia because of its population size. Paradoxically, these insufficiencies often coexist in a country with large numbers of unemployed health professionals.

This crisis has the potential to deepen in the coming years. Demand for service providers is expected to escalate in all countries. Richer countries face a future of low fertility and large populations of elderly people, which will cause a shift towards chronic and degenerative diseases with high care demands. Technological advances and income growth will require a more specialised workforce even as needs for basic care increase because of families' declining capacity or willingness to care for their elderly members. Without massively increasing training of workers, these growing gaps will exert even greater pressure on the outflow of health workers from poorer regions.

Figure 9-4 Critical shortages of health service providers around the world



Data source: World Health Organization. Global Atlas of the Health Workforce (<http://www.who.int/globalatlas/default.asp>).

Source: WHO (2006).

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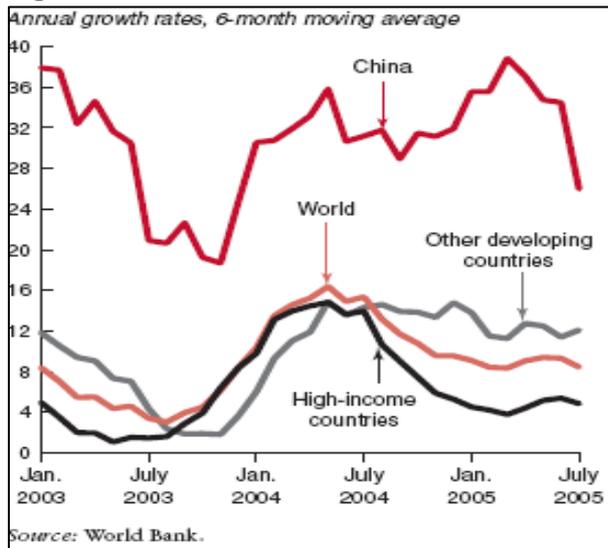
10 TRADE AND FINANCE

Trade

World merchandise export increased in value by 13% (to US\$10.1 trillion) in 2005, and commercial services increased 11% (to US\$2.4 trillion) in 2005. Merchandise trade growth has been decelerating, for developed and oil-importing countries in particular, in real terms, to only slightly higher than the average for the last decade. Global merchandise trade increased by 8.9% in 2005, down from 11.8% in 2004; the increase in high income countries export volumes in 2005 was 6%, compared to 10.2% in 2004 (Global Development Finance); see Figure 10-1.

There has been a sectoral variation in development in trade values because of relative price differentials. Prices for metal and fuel saw a sharp rise in trade value in recent years, while prices for food, agricultural raw materials, and manufactured goods have been weak. Thus the former category increased its share in world merchandise trade to 16%. In contrast, the share of agricultural products in trade marked the lowest since 1950, reaching 9% currently. Within manufactured goods, iron and steel, and chemical products performed well, but unlike the 1990s, when the role of electronic products was significant in the world trade, the rate of growth of these products was stagnant. Expansion of textiles and clothing has been below the average of that of global trade (WTO World Trade Report 2006).

Figure 10-1 World trade volumes



Worldwide merchandise export increased by 6%, down from 9.5% in the previous year. Merchandise export volumes in developing countries (excluding China) increased by 12%, and that of China grew rapidly, a 24% increase.

Table 10-1 World trade and output developments, 2002–05 (at constant prices, annual percentage change)

	2002	2003	2004	2005
Merchandise exports	3.5	5.0	9.5	6.0
Merchandise production	0.8	3.5	4.0	...
GDP at market exchange rates	1.7	2.6	4.0	3.1
GDP at PPP	3.0	4.0	5.1	4.3

Source: WTO; IMF, World Economic Outlook.

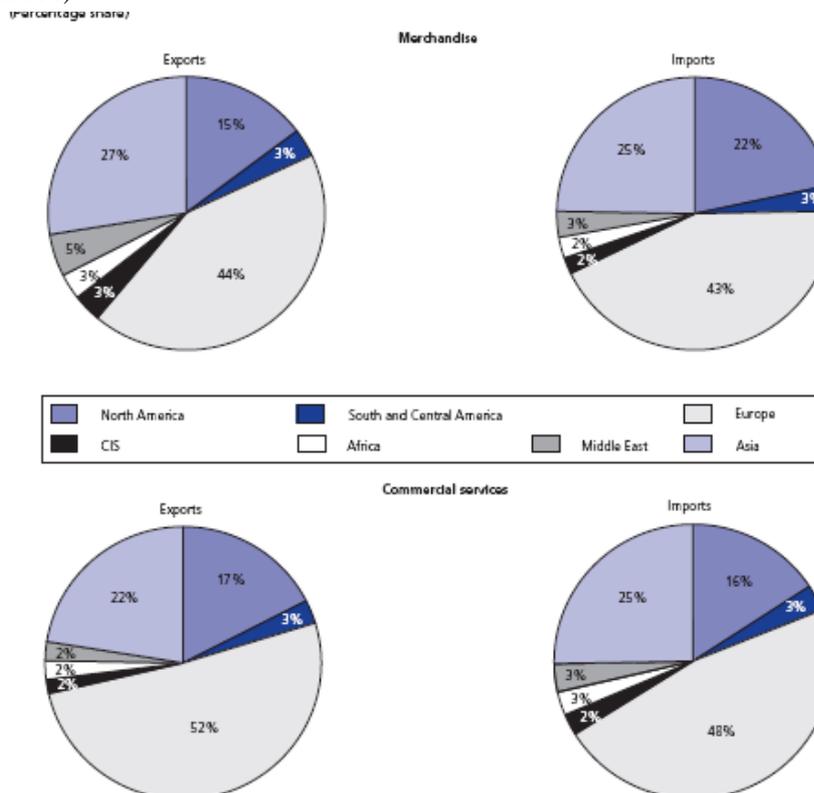
Table 10-2 GDP and merchandise trade by region, 2004–05 (annual percentage change, at constant prices)

	GDP		Exports		Imports	
	2004	2005	2004	2005	2004	2005
North America	4.1	3.4	8.0	6.0	10.5	6.5
United States	4.2	3.5	8.5	7.0	11.0	5.5
South and Central America ^a	6.8	4.9	12.5	10.0	18.5	14.0
Europe	2.3	1.7	7.0	3.5	7.0	3.0
European Union (25)	2.2	1.6	7.0	3.5	6.0	2.5
Commonwealth of Independent States	8.0	6.6	13.0	4.5	16.0	16.5
Africa and Middle East	5.7	4.5	7.0	7.5	13.5	12.0
Asia	4.2	4.2	14.0	9.5	14.0	7.5
China	10.1	9.9	24.0	25.0	21.5	11.5
Japan ^b	2.3	2.8	10.5	1.0	7.0	2.5
World	3.9	3.3	9.5	6.0

^a Including the Caribbean.

^b Trade volume data are based on Japan's customs statistics. National account data report a markedly stronger export and import growth in 2005.
Source: WTO.

Figure 10-2 Share in world merchandise and commercial services trade by region, 2005 (percentage share)



Source: WTO.

The EU recorded the weakest growth of all regions; with an expansion of merchandise export it was only 3.5% in 2005. North America expanded its real merchandise exports and imports by approximately 6% South America and the Caribbean recorded ‘the most dynamic trade flows’ (World Trade Report 2006) in 2005 for both merchandise and commercial services trade. It benefited from favourable commodity prices, exchange rates, and strong increases in oil demand.

As a reflection of higher energy prices, the Middle East and North Africa marked the highest export growth of 37%, a significant increase from a 28% growth in 2005

Oil exporting countries in Africa showed export growth of 45% induced by the large volume and higher oil prices, and reached a trade surplus of over US\$100 billion. However, in Africa as a whole, where the majority of countries are non-oil exporting, economies only increased their merchandise export by approximately 12%, and recorded a trade deficit of US\$40 billion in 2005 (World Trade Report 2006). This shows the significance of the export product structure.

In Asia, growth in merchandise exports and imports decelerated, but expanded by 15% and 16% respectively in 2005. This increase in trade seems to have resulted mainly from China’s performance. China accounted for one quarter of the total Asian merchandise export, India’s import growth in 2005 was also impressive, reaching 35% in 2005. These two countries far exceed other countries’ trade performance.

Table 10-3 Trade in goods and services for six large economies (per cent)

Economy	Export of goods and services				Imports of goods and services			
	Share (2004)	Share of growth (1995–2004)	Projected growth rate (2005–20)	Share of growth 2005–20	Share (2003)	Share of growth (1995–2003)	Projected growth rate (2005–20)	Share of growth 2005–20
China	5.7	8.9	7.8	15.4	4.8	7.8	6.6	11.0
India	1.2	1.8	7.5	2.7	1.1	1.8	6.3	2.2
United States	11.2 ^a	10.7	3.4	9.9	16.5	24.1	3.5	15.4
Japan	5.4 ^a	–3.7	4.2	6.3	4.7	–0.8	3.5	4.4
Germany	9.1	7.7	1.8	3.8	8.2	3.6	2.0	3.9
Brazil	1.0	0.5	1.7	0.4	0.7	0.3	4.3	0.8

Source: World Development Indicators.

Note: Average contribution to growth for the period 2005–20 was calculated using the projected average export growth rates.

a. 2003.

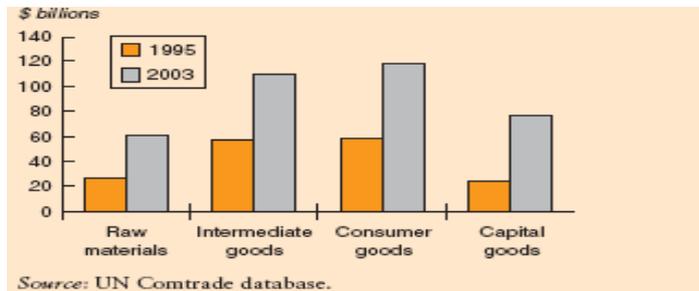
Chinese trade expansion was not a result of productivity growth or lower wages, but from the exploitation of its comparative advantage in relation to new markets, and the expansion of product varieties. The Global Development Finance Report (2006) suggests that other developing countries could learn from the Chinese path for trade growth, and market share expansion.

Developing countries are likely to have been influenced by the world leading developed countries’ economic performance. The global imbalances are expected to remain stable in the current status, but could be affecting the trade flows between the United States and East Asia particularly in case of a rapid reduction in the US trade deficit. Furthermore, it is likely to be the case that further widening the US current account deficit will occur in the near future (World Trade Report).

Developing countries are likely influenced by economic factors prevailing in developed countries, such as growth, cyclical and structural change, but also economic policies, as these are influential for market access for developing countries. Although average tariffs in developing countries were 12.2% in 2005 down from 16.3% in 1997 (Global Monitoring Report 2006), developed country markets imposed high tariff as a protection for their labour intensive manufacturing industries and primary goods during the period of 1994–2005 – there was an increase in the number of international tariff peaks by developed to developing countries’ goods, by over 13% (UNCTAD Trade and Development Report 2006). High tariffs are harmful

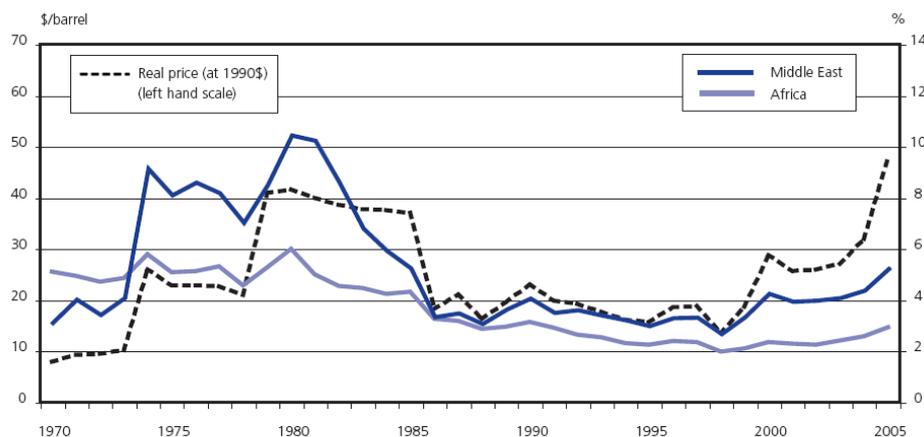
for developing countries' exports, South–South trade has grown rapidly from US\$222 billion in 1995 to US\$562 billion in 2004, with an annual growth rate of 17.5% (2002–2004), which is higher than South–North and North–South exports (12.6% and 9.7%, respectively). In fact, South–South trade accounted for 26% of developing countries' exports in 2004.

Figure 10-3 Composition of South–South exports, 1995 and 2003



Oil-exporting countries, unlike in previous oil shocks, used the increased earnings for more imports of goods and services. Export growth of oil producing countries over the last three years has increased these countries' share in world trade. As can be seen in Figure 10-4, oil prices and share of African and the Middle Eastern merchandise export are closely matched, especially since 1985.

Figure 10-4 Real oil price and shares of Africa and Middle East in world merchandise exports, 1970–2005



Note: Real price is obtained by deflating the nominal IMF crude oil spot price by the WTO world export unit value index.
Source: IMF and WTO calculations.

In the short term, high oil prices will lead to an increase in value share, but this is not expected to last. Additionally, the rise in oil prices would mean the rise in transportation costs, as oil is used as a fuel, and it will have a significant impact in medium- and long-term world trade. Products that are vulnerable to the rise in transport costs (i.e. less value added) and long distance trade flows are of particular concern.

It has been difficult to reach full agreements in multilateral negotiations, with only modest improvements at the 6th WTO ministerial meeting in Hong Kong in December 2005: a phase-out of agricultural export subsidies in developed countries by 2013 and a provision of duty- and quota-free market access for LDCs products by 2008. In the meantime the number of Regional Trade Agreements is increasing rapidly.

Full liberalisation of merchandise trade would benefit developing countries by US\$86 billion a year. This figure does not account for services liberalisation, trade facilitation, or productivity gains, so potential gains

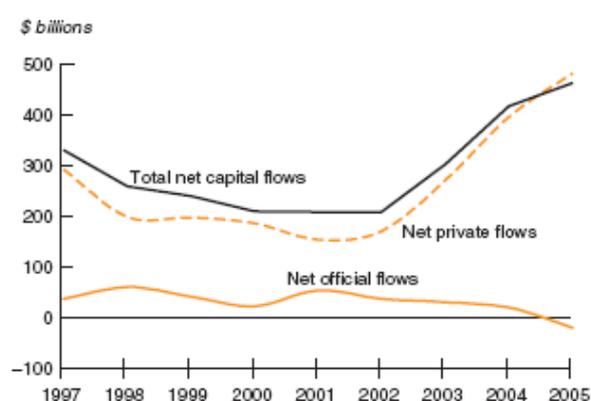
would be higher. Recent models suggest that wealth in developing countries would increase by US\$78 billion (37% of global increase in exports) as a result of global trade liberalisation under the current WTO round, and will increase trade with developed countries by US\$62 billion by 2015 .

Finance

Overall net capital inflows to developing countries increased to US\$472 billion in 2005, compared to US\$418 billion in 2004. However, behind the increase in net flows, there was a marked difference between trends in official and private sources.

Net official flows have been falling steadily since 2001– net official lending was -US\$71.4 billion in 2005. The negative trends came as a result of repayments to the IMF and bilateral official creditors – the 2005 net debt outflows from developing countries to the IMF was US\$41.1 billion (Global Development Finance 2006). In addition, the official bilateral creditors net lending saw a fall of US\$27 in 2005 (Figure 10-5)

Figure 10-5 Financial flows to developing countries 1997–2005



Source: World Bank Debtor Reporting System and staff estimates.

In contrast, net flow of private capital to developing countries has increased significantly, at US\$491 billion in 2005. The growth in real terms in East Asia and the Pacific region, Europe and Central Asia is impressive, reaching US\$137.7 billion and US\$191.7 billion respectively. Although there has been slow growth in the Middle East and North Africa, Asia, sub-Saharan Africa and Latin America and the Caribbean received a slightly fluctuated but steady level of private capital inflows during the period of 1998–2005 (Global Development Finance 2006), Table 10-4.

Table 10-4 Net private capital flows to developing countries by region, 1998–2005

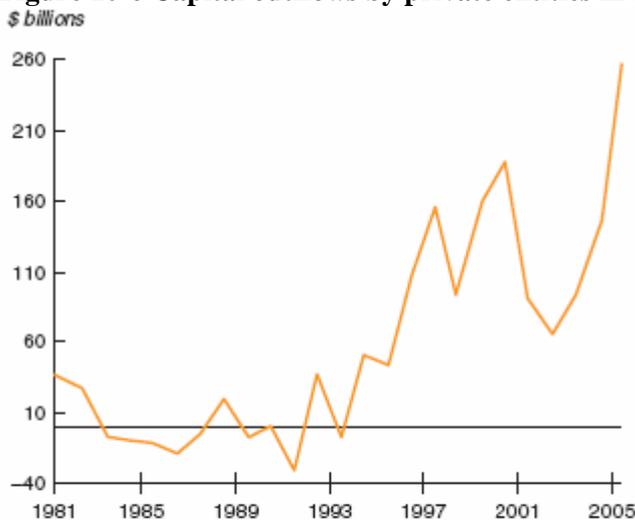
Region	1998	1999	2000	2001	2002	2003	2004	2005
East Asia and Pacific	6.5	28.8	28.0	39.2	58.9	81.5	125.4	137.7
Europe and Central Asia	66.7	50.9	51.5	33.1	59.7	101.1	160.2	191.7
Latin America and the Caribbean	98.9	95.8	85.2	59.5	28.2	49.9	59.3	94.4
Middle East and North Africa	8.1	2.6	3.3	4.8	8.3	7.8	8.3	14.6
South Asia	5.3	3.5	9.7	5.8	10.1	15.8	22.7	23.6
Sub-Saharan Africa	13.7	16.7	9.9	12.1	6.3	15.8	20.7	28.4

Sources: World Bank Debtor Reporting System and staff estimates.

A notable phenomenon is the emergence of developing countries as exporters of capital flows to other developing countries – partly because of the integration of developing countries into the world economy. In

2005, FDI from developed to developing countries reached 17% in its share of world FDI flows, compared to mere 3% in 1985, see Figure 10-6.

Figure 10-6 Capital outflows by private entities in the developing world, 1981–2005



Sources: International Financial Statistics, IMF; and World Bank staff calculations.

Note: The size of the increase in private assets is hard to judge, since it is calculated as a residual and thus includes errors and omissions from elsewhere in the balance of payments.

In recent years, aid has become particularly important for low income countries. According to Global Development Finance (2006), disbursement of Official Development Assistance (ODA) has increased to US\$106.5 billion in 2005 compared to US\$79.6 billion in the previous year. Since 2005, ODA increased by 8.7% (real terms) compared to 5.6% increase during the period of 2002–2004.

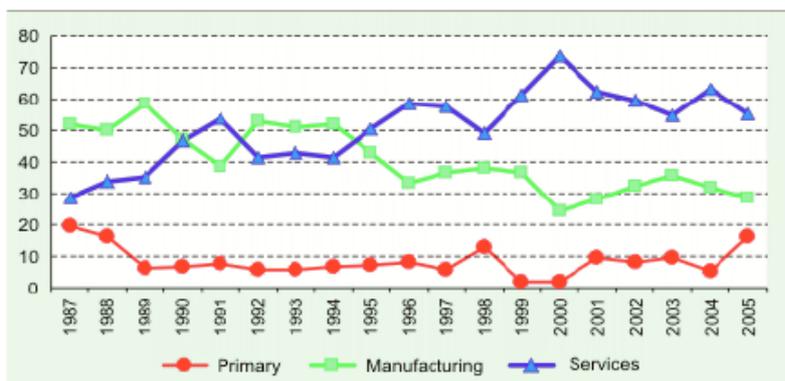
ODA's share in gross national income (GNI) in donor countries has also increased from 0.22% in 2001 to 0.33% in 2005. However, ODA is expected to decrease its share in GNI in 2006–2007, as the debt relief component falls to more normal levels. Nevertheless, targeting sub-Saharan Africa up to 2010, ODA donors are to provide another US\$50 billion – this would increase the ODA share in GNI to 0.36% in 2010.

Since the early 1990s, FDI has become the most important form of financial flows to developing countries, and the world FDI inflow has reached US\$916 billion, a 29% increase, in 2005, for both developed and developing countries (for 126 out of 200 economies) (UNCTAD's World Investment Report 2006). Growth in 2005, however, was more for developed countries rather than for developing countries, resulting in a widening gap between developed and developing countries over US\$200 billion in 2005. Although the FDI destinations are developed countries, the developing countries' share of world FDI stock has been growing, accounting for 25% of the FDI stock.

The volume of FDI relative to gross fixed capital formation (GFCF) shows that relative importance of FDI for smaller economies in Africa, Latin America and the Caribbean, and transition economies of Southeast Europe and the CIS. In particular, the FDI stock in transition economies has increased by four times, from marginal levels in the 1990s to US\$70 billion in 2004 – largely because of waves of privatisation. In contrast, FDI seems to have less importance in South Asia.

The bulk of FDI inflows have gone into services, and the manufacturing sector has been losing its share in FDI destination since the mid 1990s. With the recovery of FDI in the primary sector and the increase in services sector as a share of FDI, there has been a considerable decline of the manufacturing sector in total FDI flows and stock. This, naturally, has led to the concentration of FDI flows and stocks.

Figure 10-7 Sectoral breakdown of cross-border M&A sales, 1987–2005, %



Source: UNCTAD, based on its FDI/TNC database ([www.unctad.org/fdi statistics](http://www.unctad.org/fdi/statistics)).

Inward FDI’s winner of 2005 was oil and gas, utilities (telecommunications and energies), banking and real estate (World Investment Report 2006). The petroleum industry, finance, and telecommunications are the three largest FDI recipient sectors, accounting for more than one-third of the total value of mergers and acquisitions deals in 2005. On the contrary, it was only natural resource intensive industries that increased FDI inflows in manufacturing sector (Figure 10-7).

In addition, service industries such as software business and construction and transport have become large industries that have attracted a significant portion of the world’s inward FDI. Shares of the service industry in the FDI stock in developing countries are expected to increase, but that of manufacturing industries to decline. For instance, in Asia and Latin America and the Caribbean, the share of FDI stock in services has dominated over half of total stock since 2002, while that in manufacturing has been declining.

Inward FDI in developing countries has increased by 22% (to US\$334 billion) in 2005, after the massive growth of 2004 (57%). FDI outflows from developing regions have also increased, reaching US\$133 billion in the same year.

Table 10-5 Distribution of FDI by region and selected countries, 1980–2005, %

Region	Inward stock				Outward stock			
	1980	1990	2000	2005	1980	1990	2000	2005
Developed economies	75.8	79.3	88.5	70.3	87.3	91.7	86.2	88.9
European Union	42.5	42.9	37.6	44.4	37.2	45.2	47.1	51.3
Japan	0.6	0.6	0.9	1.0	3.4	11.2	4.3	3.6
United States	14.8	22.1	21.7	16.0	37.7	24.0	20.3	19.2
Developing economies	24.4	20.7	30.3	27.2	12.7	8.3	13.5	11.9
Africa	6.0	3.3	2.6	2.6	1.3	1.1	0.7	0.6
Latin America and the Caribbean	7.1	6.6	9.3	9.3	8.5	3.4	3.3	3.2
Asia and Oceania	10.5	10.8	18.4	15.4	2.9	3.8	9.5	8.2
West Asia	1.4	2.2	1.1	1.5	0.3	0.4	0.2	0.3
South, East and South-East Asia	8.8	8.5	17.2	13.8	2.5	3.4	9.3	7.8
South-East Europe and CIS	..	0.01	1.2	2.5	..	0.01	0.3	1.2
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Region	Inflow			Outflow				
	1978-1980	1988-1990	1998-2000	2003-2005	1978-1980	1988-1990	1998-2000	2003-2005
Developed economies	79.7	82.5	77.3	59.4	97.0	93.1	90.4	85.8
European Union	39.1	40.3	46.0	40.7	44.8	50.6	64.4	54.6
Japan	0.4	0.04	0.8	0.8	4.9	19.7	2.6	4.9
United States	23.8	31.5	24.0	12.6	39.7	13.6	15.9	15.7
Developing economies	20.3	17.5	21.7	35.9	3.0	6.9	9.4	12.3
Africa	2.0	1.9	1.0	3.0	1.0	0.4	0.2	0.2
Latin America and the Caribbean	13.0	5.0	9.7	11.5	1.1	1.0	4.1	3.5
Asia and Oceania	5.3	10.5	11.0	21.4	0.9	5.6	5.1	8.6
West Asia	-1.6	0.3	0.3	3.0	0.3	0.5	0.1	1.0
South, East and South-East Asia	6.7	10.0	10.7	18.4	0.6	5.1	5.0	7.7
South-East Europe and CIS	0.02	0.02	0.9	4.7	..	0.01	0.2	1.8
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: UNCTAD, FDI/TNC database (www.unctad.org/fdistatistics) and annex tables B.1 and B.2.

Asia, especially East and Southeast Asia, attracted approximately half of FDI inflow into developing countries during 2003 and 2005, an increasing of 20%. Amongst those, China has become the single largest FDI recipient in all developing countries. Favourable domestic conditions for investment in these countries could be one reason, but the successful integration into the world economy would be another (UNCTAD Trade and Development Report 2006).

FDI outflows from West Asia has doubled to US\$16 billion, but the region also received an ‘unprecedented level of inflows’, worth US\$34 billion. This is an 85% increase compared to 2004. FDI flows to Africa and Latin America have increased since 2001 – but largely into primary industries, the extractive industries in particular. The early 1980s saw a decline in African FDI stock, whereas there was an increase in inflows during the 1980s and 1990s. In 2004 and 2005, Africa has received US\$31 billion FDI inflows (UNCTAD World Investment Report 2006).

After the debt crisis of the 1980s, Latin America had received a large sum of FDI during the 1990s as a result of privatisation programmes. The increase in FDI inflows stopped as a response to the unsuccessful privatisation and unfavourable macroeconomic conditions, and dipped in the early 2000s. The region has received a small increase in FDI in the past few years.

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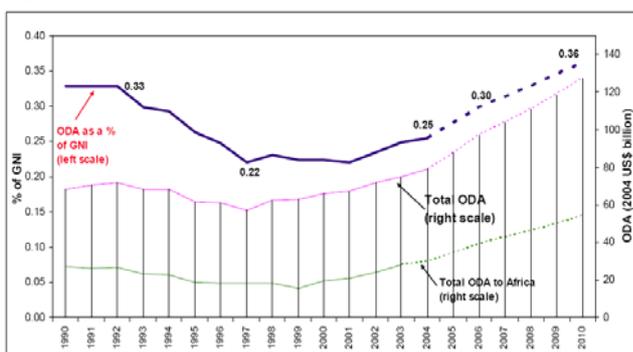
11 OFFICIAL DEVELOPMENT ASSISTANCE

Official development assistance (ODA) is a variable that is difficult to predict in the long run because it depends almost entirely on policy decisions. However, precisely for this reason, it is easier to forecast aid in the short run.

ODA fell consistently over the period 1990–97 but has recovered in recent years. ODA as a percentage of GNI fell to an all time low at 0.22% in 1997 from 0.35% at the beginning of the decade. However, it has recovered and is now increasingly rapidly to a planned 0.36% in 2006.

The aid industry is undergoing significant change. Real volumes of aid are rising – from around US\$60 billion a year throughout the 1990s to US\$100 billion in 2005 and a projected US\$130 billion by 2010 (Figure 11-1). Donors committed themselves at Monterrey in March 2002 to a large increase in aid in real terms, and this was followed up by pledges during the G8 meeting in Gleneagles in 2005. ODA, as measured by the Development Assistance Committee (DAC), has been rising both in real terms (since 1997) and as a share of national income (since 2001). Annual ODA spending from the EU is expected to be US\$38 billion higher in real terms in 2010 than in 2004 (and will rise by a further US\$28 billion from 2010–15). The DAC Secretariat estimates that DAC members’ total net disbursements of ODA will rise from US\$79.5 billion in 2004 to US\$128.1 billion in 2010 (in constant 2004 US dollars), an increase of virtually US\$50 billion. See Figure 11-1.

Figure 11-1 DAC members' net ODA 1990–2004 and simulations for 2006–2010



Source: OECD DAC (2006).

The United States remains the world’s largest aid donor in volume terms, followed by Japan, France, Germany and the United Kingdom. Denmark, Luxembourg, the Netherlands, Norway and Sweden meet the United Nations ODA target of 0.7% of GNI. Three other countries have given a firm date to reach the 0.7% target: Belgium (2010); Ireland (2007), France (2012).

Table 11-1 DAC members' ODA prospects for 2010: latest projections

	2004		Assumptions	2005				2010			
	Net ODA (2004 US\$ m)	ODA/GNI		Net ODA (2004 US\$ m)	ODA/GNI	Real change in ODA compared with 2004		Net ODA (2004 US\$ m)	ODA/GNI	Real change in ODA compared with 2004	
						(2004 US\$ m)	Percent			(2004 US\$ m)	Percent
Austria	578	0.29%	0.35% in 2005 and 0.51% in 2010	1 080	0.39%	302	48%	1 572	0.51%	994	147%
Belgium ¹	1 462	0.41%	0.7% in 2010	1 815	0.46%	353	24%	2 807	0.70%	1 344	82%
Denmark	2 037	0.69%	Minimum 0.6%	2 037	0.61%	0	0%	2 165	0.60%	1 48	7%
Finland ^{1, 2}	555	0.39%	0.44% in 2007 and 0.7% in 2010	797	0.41%	241	22%	1 475	0.70%	920	125%
France ³	8 472	0.41%	0.5% in 2007 and 0.7% in 2012	9 583	0.47%	1 110	18%	14 118	0.61%	5 646	67%
Germany	7 534	0.29%	0.35% in 2005 and 0.51% in 2010	9 271	0.39%	1 737	23%	15 508	0.51%	7 974	105%
Greece	465	0.29%	0.35% in 2005 and 0.51% in 2010	715	0.39%	250	54%	1 196	0.51%	730	156%
Ireland ⁴	607	0.39%	0.5% in 2007 and 0.7% in 2012	765	0.44%	158	26%	1 121	0.60%	514	85%
Italy	2 462	0.15%	0.35% in 2005 and 0.51% in 2010	5 537	0.39%	3 075	125%	9 262	0.51%	6 800	276%
Luxembourg ⁵	236	0.69%	1% in 2009	272	0.90%	36	15%	328	1.00%	92	39%
Netherlands	4 204	0.79%	Minimum 0.6%	4 681	0.82%	477	14%	5 078	0.80%	874	21%
Portugal ⁶	1 031	0.69%	0.35% in 2005 and 0.51% in 2010	555	0.39%	-476	-46%	932	0.51%	-98	-10%
Spain ^{1, 2}	2 437	0.24%	0.5% in 2005 and 0.7% in 2012	3 589	0.39%	1 152	48%	6 925	0.59%	4 488	184%
Sweden	2 722	0.39%	1% in 2006	3 719	1.00%	997	37%	4 025	1.00%	1 303	48%
United Kingdom ^{1, 2}	7 582	0.39%	0.47% in 2007-08 and 0.7% in 2013	9 582	0.42%	1 779	22%	14 604	0.59%	7 022	85%
EU members, total	42 506	0.35%		54 440	0.40%	11 934	27%	81 221	0.59%	38 715	89%
Australia	1 468	0.25%	0.39% in 2010	1 765	0.28%	297	21%	2 468	0.39%	1 000	69%
Canada ⁷	2 558	0.25%	See footnote 4	2 897	0.28%	339	11%	3 548	0.39%	1 048	40%
Japan ⁸	8 906	0.19%	See footnote 5	9 985	0.20%	1 079	11%	11 906	0.25%	3 000	34%
New Zealand	212	0.29%	0.27% in 2005-06 and 0.28% in 2007-08	258	0.27%	46	22%	328	0.29%	77	36%
Norway	2 159	0.65%	1% over 2005-09	2 687	1.00%	528	21%	2 876	1.00%	677	31%
Switzerland ⁹	1546	0.41%	See footnote 6	1 595	0.41%	49	3%	1 728	0.41%	182	12%
United States ⁷	19 705	0.17%	See footnote 7	24 080	0.19%	4 375	22%	24 008	0.19%	4 293	22%
DAC members, total	79 512	0.29%		87 530	0.30%	78 005	23%	128 128	0.39%	48 616	61%

1. ODA/GNI ratios interpolated between 2004 and year target scheduled to be attained.
2. Finland aims to achieve 0.7% by 2010 "subject to economic circumstances". Spain aims for a minimum of 0.5% by 2008, with the intention then to aim for 0.7% by 2012; the UK has announced a timetable to reach 0.7% by 2011.
3. Portugal's ODA in 2004 was above trend due to an exceptional debt relief operation for Angola.
4. Canada intends to double its 2001 International Assistance Envelope (IAE) level by 2010 in nominal terms. The ODA portion estimated here, supplied by the Canadian authorities, includes adjustments for inflation (approximately 2 per cent per annum) and for ODA expenditures outside the IAE.
5. Japan intends to increase its ODA volume by USD 30 billion in aggregate over the next five years (2005-09) compared to its net ODA in 2004. The Secretariat estimate assumes an extra USD 1 billion extra in 2005 and USD 2 billion extra in 2010.
6. Switzerland's ODA will increase by 6% in nominal terms from 2005 to 2006. A new goal will be determined for the following years. The Secretariat estimate assumes maintenance of 0.41% of GNI in 2006 and 2009.
7. Secretariat estimate based on 2004 ODA plus USD 5 billion per annum to cover the Glenageary G8 commitments on increased aid to Africa, the Millennium Challenge Account, and initiatives on HIV/AIDS, malaria and humanitarian aid.
8. The Netherlands' ODA in 2004 was below its target as it is repaid all its outstanding Dutch aid loans. The Netherlands intends to maintain its target of 0.6% of GNI, on average, over the period 2004-07.

Source: OECD DAC (2006).

Aid is affected heavily by one-off issues. For instance, the Paris Club agreed to reduce the debt owed by Iraq at the end of 2004. The reduction of the debt owed by Nigeria will also have a substantial impact on reported ODA. The OECD DAC 2005 report expected a temporary spike in aid levels in 2005 and 2006 because of major debt relief for Iraq and Nigeria amounting to around US\$19 billion in 2005 and US\$11 billion in 2006. So an apparent 'boom' in ODA is likely in the short term. But much of the boom will not lead to increased resource transfers to developing countries. Aid to least developed countries was boosted by aid to Afghanistan in 2002 and 2003 and by debt relief to the Democratic Republic of Congo in 2003, but has since stalled.

ODA is the main source of external financing for low-income countries, nearly double their export earnings (excluding oil). Trade provides middle income countries with most of their external finance from OECD countries, followed by foreign direct investment, other private flows and remittances all ahead of ODA. The consistent rise in the share of activities reported to the DAC as 'technical cooperation' brought the total to US\$19 billion in 2004, accounting for about a quarter of total net ODA. African and other poor countries receive the lowest shares of technical cooperation in their aid.

Privately-funded NGOs' spending has risen from US\$6.9 billion in 2000 to a record US\$11.3 billion in 2004 (a 37% increase in real terms). ODA provided by governments to and through NGOs has also been on the increase, reaching nearly US\$5 billion in 2004.

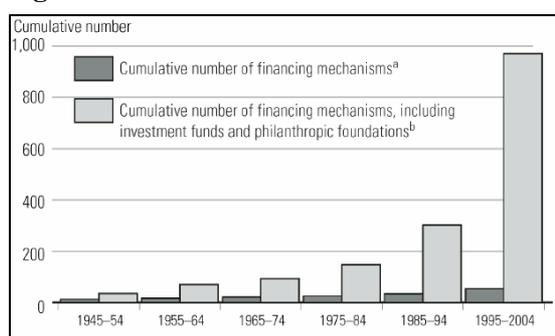
The long-term trend (since 1985) shows a decline in project and programme aid, in favour of more technical cooperation and emergency aid. Despite this trend, funds going directly to long-term aid programmes and projects – i.e. excluding debt relief and emergency aid – increased by 13.3% from 2003 to 2004. This additional aid is going towards improving infrastructure, especially in the transport,

communications and energy sectors. There have also been increases in aid for education and for water supply and sanitation. A third of the extra aid – US\$2.6 billion – went to Iraq and Afghanistan.

General budget support – a new instrument in the past ten years – has become a significant form of resource transfer in a few aid-dependent poor countries, and a focus for coordinated donor support of local priorities. DAC members' allocate between 20% and 40% of their total ODA to multilateral organisations.

The emergence of single-purpose multilateral funds, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, may increase the multilateral share in the future. Donors are in practice putting a larger share of their country funding through multilateral agencies for specific projects or programmes, which is shown as bilateral rather than multilateral aid in DAC statistics. Kaul and Conceição (2006) find that the number of global funds have exploded and amount to 1,000 this year, see Figure 11-2.

Figure 11-2 Number of international financing mechanisms



Source: Kaul and Conceição (2006).

Table 11-2 Net ODA disbursements from DAC members

	US\$ million						
	1988-1989 average	1993-1994 average	2000	2001	2002	2003	2004
I. Official Development Assistance	46 399	57 484	53 749	52 435	58 292	69 085	79 512
1. Bilateral grants and grant-like flows	25 290	34 329	33 040	33 522	39 813	50 908	57 322
of which: Technical co-operation	9 560	12 911	12 767	13 602	15 452	18 352	18 764
Developmental food aid (a)	1 771	1 733	1 180	1 007	1 086	1 196	1 169
Emergency & distress relief (a)	766	3 359	3 574	3 276	3 869	6 221	7 332
Debt forgiveness	455	3 077	2 045	2 514	4 534	8 338	7 084
Administrative costs	1 734	2 571	3 083	2 964	3 027	3 520	3 999
2. Bilateral loans	7 173	5 665	3 024	1 602	939	-1 153	-2 937
3. Contributions to multilateral institutions	13 936	17 489	17 685	17 311	17 540	19 330	25 126
of which: UN (b)	3 457	4 205	5 185	5 233	4 634	4 694	4 925
EC (b)	2 711	4 399	4 950	4 946	5 695	6 946	8 910
IDA (b)	4 309	4 788	3 672	3 599	3 279	3 120	5 700
Regional development banks (b)	2 050	2 548	2 187	1 491	1 813	1 734	2 275
II. Other Official Flows	4 862	9 330	-4 326	-1 589	-45	-348	-5 599
1. Bilateral	4 472	8 087	-4 303	-797	2 401	-818	-5 347
2. Multilateral	390	1 243	-23	-792	-2 446	470	-252
III. Private Flows at market terms	28 809	77 777	78 128	49 745	6 252	47 031	64 082
1. Direct investment	24 767	43 446	71 729	66 041	36 286	49 799	66 041
2. Bilateral portfolio investment	1 049	32 304	2 416	-14 946	-26 902	-6 164	-3 658
3. Multilateral portfolio investment	799	-2 172	-3 369	-4 086	-3 146	1 083	-4 766
4. Export credits	2 195	4 200	7 352	2 736	14	2 313	6 465
IV. Net grants by NGOs	4 138	5 869	6 934	7 289	8 768	10 240	11 307
TOTAL NET FLOWS	84 208	150 461	134 485	107 881	73 267	126 009	148 646
Total net flows at 2003 prices and exchange rates (c)	111 475	163 971	152 418	127 669	83 230	126 009	136 675

Source: OECD/DAC statistical tables (2006).

Table 11-3 Regional distribution of ODA by individual DAC donors and multilateral agencies (as % of gross disbursements)

	Sub-Saharan Africa			South and Central Asia			Other Asia and Oceania		
	1993-1994	1998-1999	2003-2004	1993-1994	1998-1999	2003-2004	1993-1994	1998-1999	2003-2004
Total DAC	28.3	26.5	35.8	11.4	13.0	14.9	24.6	29.6	17.6
<i>of which:</i>									
EU Members	41.2	40.4	49.8	8.4	9.0	12.0	16.7	16.4	9.8
EC	48.6	38.6	44.3	9.2	7.6	9.2	4.1	5.8	4.7
IFIs ^b	42.4	37.8	43.1	32.5	29.7	31.5	15.1	13.6	11.7
UN Agencies	43.0	36.8	37.7	13.5	15.6	15.0	9.4	10.6	7.3
Overall total	32.9	30.2	37.9	14.5	15.8	17.2	20.6	23.6	15.1
	Middle East and North Africa			Europe			Latin America & Caribbean		
	1993-1994	1998-1999	2003-2004	1993-1994	1998-1999	2003-2004	1993-1994	1998-1999	2003-2004
Total DAC	17.7	11.4	15.1	4.3	6.3	4.9	13.7	13.1	11.7
<i>of which:</i>									
EU Members	14.1	12.1	11.2	7.2	7.0	6.0	12.5	15.2	11.2
EC	16.2	20.4	18.9	12.2	14.6	14.1	9.6	13.0	8.8
IFIs ^b	1.3	3.3	1.5	0.8	2.8	3.1	7.9	12.8	9.1
UN Agencies ^c	13.2	20.8	24.9	14.2	2.4	3.9	6.8	13.8	11.2
Overall Total	14.8	11.1	13.5	5.1	6.2	5.3	12.0	13.1	11.0

Source: OECD/DAC statistical tables (OECD 2005).

Sub-Saharan Africa gets a third of all aid, up from a quarter ten years ago. Aid to Africa is set to double by 2010. Asia receives another third, while Latin America and the Caribbean and the Middle East and North Africa each get around a tenth, the latter due to aid to Iraq. In a reversal to the previous report, the EC has now become more concentrated in sub-Saharan Africa than the IFI and UN agencies.

The percentage of aid going to the least developed countries from DAC members was 25% in 1991-92 and at 30% has increased significantly by 2004 (Table 11-4) (OECD 2005).

Table 11-4 Aid from selected DAC countries to Least Developed Countries

	1993-1994			2004		
	US\$ million	% of donor's total	% of donor's GNI	US\$ million	% of donor's total	% of donor's GNI
Australia	211	21	0.07	350	24	0.06
Austria	114	43	0.06	168	25	0.06
Belgium	255	33	0.12	645	44	0.18
Canada	556	24	0.10	702	27	0.07
Denmark	485	35	0.36	735	36	0.31
Finland	100	31	0.12	153	23	0.08
France	1 938	24	0.15	3 169	37	0.15
Germany	1 789	26	0.09	2 312	31	0.08
Greece	65	14	0.03
Ireland	38	40	0.09	322	53	0.21
Italy	625	22	0.06	788	32	0.05
Japan	2 276	19	0.05	1 684	19	0.04
Luxembourg	16	30	0.11	87	37	0.31
Netherlands	699	28	0.22	1 453	35	0.25
New Zealand	21	20	0.05	65	31	0.07
Norway	465	43	0.45	837	38	0.33
Portugal	178	66	0.21	878	85	0.53
Spain	119	9	0.03	424	17	0.04
Sweden	566	32	0.31	762	28	0.22
Switzerland	297	33	0.12	399	26	0.11
United Kingdom	806	26	0.08	2 988	38	0.14
United States	2 581	26	0.04	4 504	23	0.04
Total DAC	14 136	25	.07	23 490	30	0.08
<i>of which:</i>						
EU Members	7 729	26	0.11	14 949	35	0.12

Source: OECD/DAC Statistical tables (2005).

The sectoral direction of aid is changing. Over the last 15 years, education and health have received a steady 15% of all aid. Aid to strengthen government capacity has doubled to over 20% by 2004. Infrastructure slumped from 26% in 1993 to 11% in 2003, recovering partially in 2004. Aid to production, including agriculture, has halved to only 7%. Debt relief varies greatly from year to year, peaking at 19% in 2003. Emergency aid averaged 5% in the 1990s, but has averaged 9% since.

Table 11-5 Table major aid uses for total DAC donors (% of total bilateral commitments)

	Social and administrative infrastructure		Economic infrastructure		Agriculture		Industry and other production		Commodity aid and programme assistance		Emergency aid		Other	
	1983–1984	2003–2004	1983–1984	2003–2004	1983–1984	2003–2004	1983–1984	2003–2004	1983–1984	2003–2004	1983–1984	2003–2004	1983–1984	2003–2004
United Kingdom	21.4	38.4	28.3	8.2	11.4	4.1	12.7	1.6	3.7	1.4	0.8	11.3	21.7	35.1
Total DAC	###	34.1	18.8	13.1	11.4	3.2	8.9	2.6	12.1	4.1	1.6	9.1	20.5	33.7

Source: OECD DAC statistical tables (2005).

The share of spending attributed to the provision of international public goods has doubled from around 4% in 1980 to around 8% of total DAC donor contributions (commitments) at the end of the 1990s

The changing nature of the response in donor countries is of interest as well. The humanitarian donors fell victim to aid fatigue in the 1990s. Recent studies indicate large reductions in the levels of giving to charity, including fears of waste and corruption were paramount in a US study. A very skewed nature of response has been noted. Special appeals have generated figures of US\$ 16 and US\$8.40 per capita of targeted beneficiaries for countries such as Sierra Leone and Democratic Republic of Congo, respectively. The corresponding figure for the former Yugoslavia was US\$207 (Oxfam 1999). However, the recent Tsunami generated a lot of significant aid pledges.

Rogerson, *et al* (2004) identifies four factors underlying aid:

- *Multiple foreign and security policy objectives*, loosely bundled with anti-poverty goals, with no common weighting system.
- The continued existence of *institutional barriers* insulating aid programmes to different extents from hard budget constraints.
- *Reduced willingness, or ability, to use aid in its current form* at both ends of the client spectrum: more advanced countries reject foreign intrusion; weaker countries badly need aid but cannot demonstrate the ability to use it.
- *New cosy relationships with private and voluntary organisations*, funded by official aid, and competing with them for taxpayer and commercial support.

The aid system is adapting to recent attempts at structural change. The launch of new instruments (for example, the Global Fund to Fight AIDS, TB and Malaria (GFATM) and the US Millennium Challenge Account (MCA) or the broaching of others (the International Financing Facility) has serious implications for the system as a whole. Attitudes to multilateralism and aid in post-conflict environments have also shifted profoundly in the wake of 9/11 (Rogerson, *et al.* 2004).

There is also an increased consensus among donors that aid should go to countries with good policy environments. For instance, the US MCA will channel up to US\$5 billion to a handful of developing countries with 'sound policies'. There is heated debate about whether chosen countries have sufficient absorptive capacity to receive increased aid.

There are several instances of donor fragmentation which will raise the transaction costs of aid, see Box 11-1, and which relates to the effectiveness of aid. Donors have come together to sign the Paris Declaration in 2005 to emphasise harmonisation, alignment and ownership in donor aid programmes.

Box 11-1 **Examples of fragmented aid**

- In Ghana, 17 major official donors provide aid to the health system, all with different priorities and strategies.
- WHO has 4,600 separate agreements with donors and has to provide 1400 reports to donors each year
- Egypt has 22 donors in the health sector.
- The Rwandan education sector has 13 donors, and an estimated 48 projects, the majority of which are for less than US\$1m.
- 80% of the 80,000 aid projects underway at any one time [in 2005] were for less than US\$1million
- There were 28 UN agencies working on water [in 2005]
- There are 90 global health funds.
- In Vietnam, 11 UN Agencies provide between them only 2% of aid.
- Cambodia and Vietnam received 400 donor missions each, Nicaragua 289, Bolivia 270, Bangladesh 250.
- The Government of Uganda had to deal with 684 different aid instruments and associated agreements between 2003/04 and 2006/07.
- The Government of Mozambique has over 1000 bank accounts due to donor requirements

Source: Note drafted by Simon Burrall at ODI

Rocha Menocal, *et al.* (2006) point to the emergence of a significant number of non-DAC donors. Korea and Turkey reported figures larger than some existing DAC members in 2004. China has committed to provide US\$10billion in concessional loans and preferential export buyer's credit within the next three years and recently announced a doubling of aid to Africa. India is considering increasing its provision to Africa roughly ten-fold the levels in 2004/05. Non-DAC donors already provided up to 12% of humanitarian aid between 1999 and 2004.

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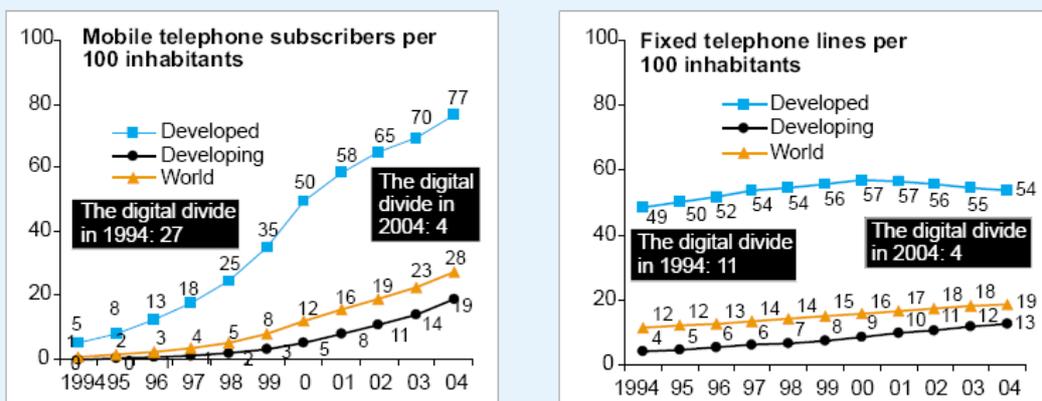
12 INFORMATION TECHNOLOGY

Goal eight of the MDGs is to Develop a Partnership for development. Target 18 of this goal calls upon the Declaration's adherents to: 'In cooperation with the private sector make available the benefits of new technologies, specifically information and communications'.

By the end of 2004, the telecommunication industry had experienced continuous growth, as well as rapid progress in policy and technology development, resulting in an increasingly competitive and networked world. Overall, the digital divide has been reduced and continues to shrink. ITU statistics show that over the last ten years, the digital divide between the developing and the developed countries has been narrowing in terms of fixed telephone lines, mobile subscribers and Internet users. In contrast to the slow fixed line growth, phenomenal growth rates in the mobile sector particularly, have been able to reduce the gap that separates the developed from the developing countries from 27 in 1994, to four in 2004. The fixed line gap has been reduced from 11 to four during the same period (Table 12-1) (World Telecommunication/ICT Development Report 2006).

Figure 12-1 Overall, the digital divide is shrinking...

Mobile telephone subscribers per 100 inhabitants, 1994-2004 (left) and fixed telephone lines per 100 inhabitants, 1994-2004 (right)



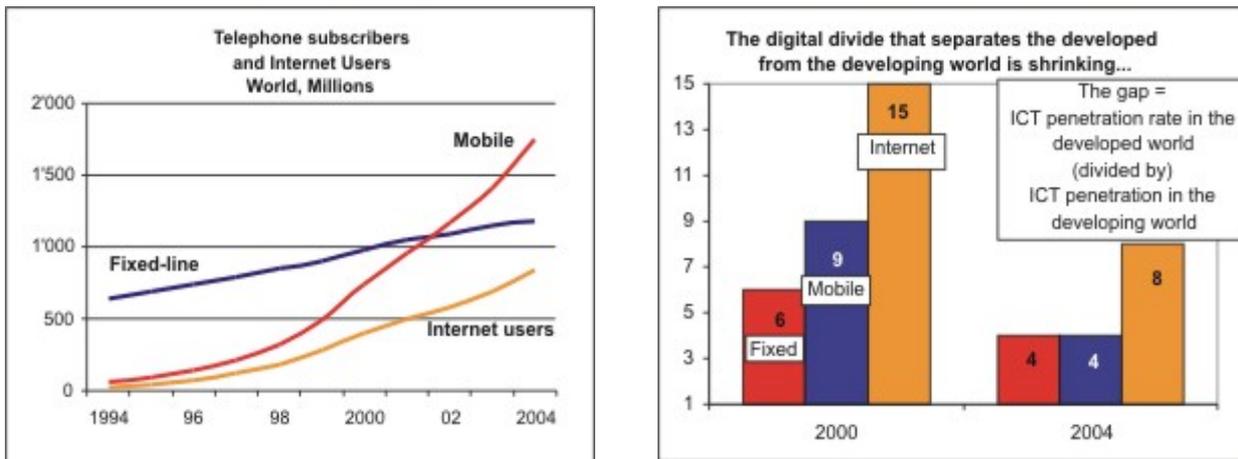
Source: ITU World Telecommunication Indicators Database.

Note: In these charts, the digital divide is calculated by dividing the penetration rates in the developed world by the penetration rate in the developing world. Penetration rates are rounded, whereas the digital divide is calculated based on actual numbers. For this reason, the digital divide results do not always correspond to the figures indicated in the graph.

Source: World Telecommunications/ICT Development Related Report (2006).

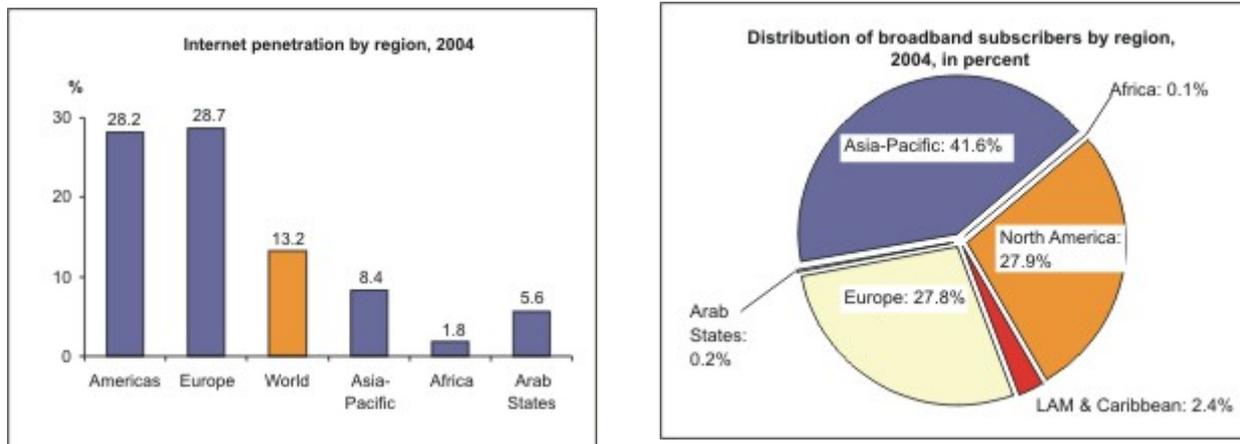
Europe had almost eight times the penetration rate of Africa, where less than one in ten people subscribed to a mobile service (Table 12-1, top left). These figures certainly highlight that access to, and use of, mobile services remain unevenly distributed between regions and countries. At the same time, they highlight potential market opportunities and new customers for operators whose revenues already – and despite high competition and falling tariffs – are on the rise, see World Telecommunication/ICT Development Report (2006).

Figure 12-2 Digital opportunities are growing...



Source: ITU World Telecommunication Indicators Database.

Figure 12-3 ...but major disparities remain



Source: ITU World Telecommunication Indicators Database.

Fixed line, mobile and internet users are increasing globally (Figure 12-2). It has become of growing importance to address these divides, especially given the fact that they have an impact on people and businesses that are closely linked to broadband intake which plays a vital role for countries working towards joining the information society. Reports highlight the fact that increasing efforts must be made to take advantage of the potentials offered by these new technologies. Apart from the impact of the mobile sector, signs show considerable effects on economic relationships amongst countries that have the highest Internet penetration levels (see Figure 12-3 for penetration levels). Sectors most impacted are e-commerce, tele-working, e-education and health. This highlights the need for developing countries to pay special attention to broadband deployment and strategies, World Telecommunication/ICT Development Report (2006).

Main Sources

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13 GOVERNANCE

There has been a surge of interest in the role of governance in the development process. Such interest has led to various measures of governance-related aspects. However, the multi-dimensionality and abstract nature of governance makes the task of properly assessing it very complicated and somewhat subjective. Because of the complexity of the issue, we limit ourselves to provide trends and data on some possible governance-related indicators.

Direct measures of governance

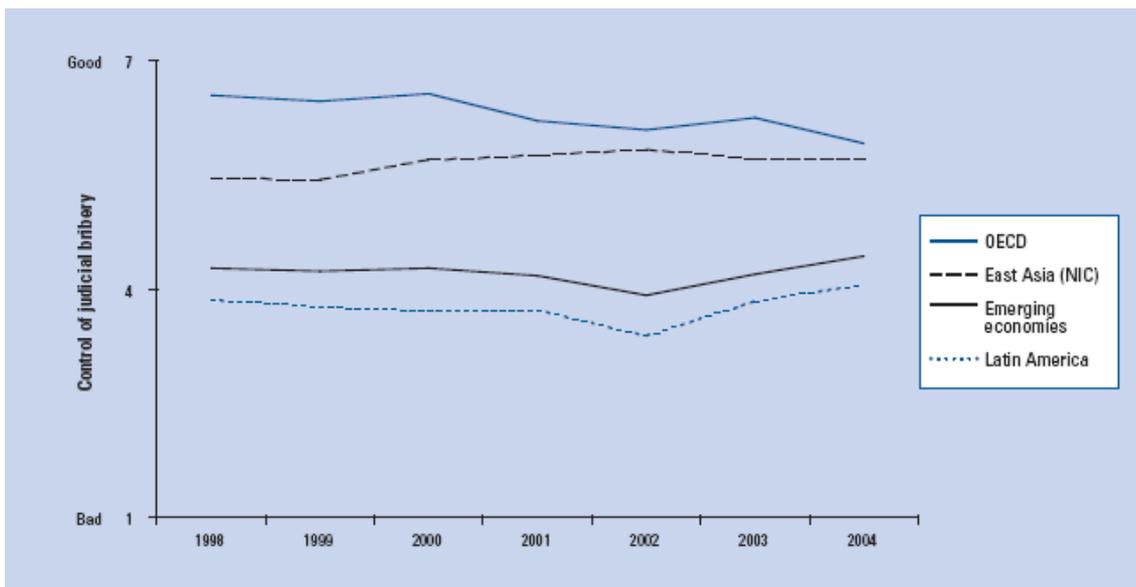
The World Bank has been constructing governance indicators aggregating a number of dimensions through an ongoing project led by Kaufmann and colleagues. Such dimensions are:

- voice and accountability
- political stability
- government effectiveness
- regulatory quality
- rule of law
- control of corruption.

The indicators are mainly used for cross-country comparison rather than for analysing how global averages evolve. Global trends show very little evidence of statistically significant improvements in governance worldwide over the period 1996–2005. Analysing various sources of data on the six indicators above, Kaufman, *et al.* (2005) find only six cases of statistically significant changes, with two improvements and four declines. There is also substantial disagreement among sources about even the direction of changes in global averages of governance. The authors conclude that if anything, the evidence over the 1996–2005 period is suggestive of a possible deterioration, especially in dimensions such as regulatory quality, rule of law, and control of corruption.

One source which has been used to rate governance is the Executive Opinion Survey (EOS) of the World Economic Forum. According to the opinions given by firms in the EOS, the perception of the control of judicial bribery has deteriorated in OECD countries since the late 1990s, while it has improved in the new industrialising countries (NICs) of East Asia, as well as in emerging economies (Figure 13-1). The NICs have approached the standards of OECD countries. The assessment of judicial bribery in Latin America has slightly improved since 2002, although it still remains below the average for all emerging economies.

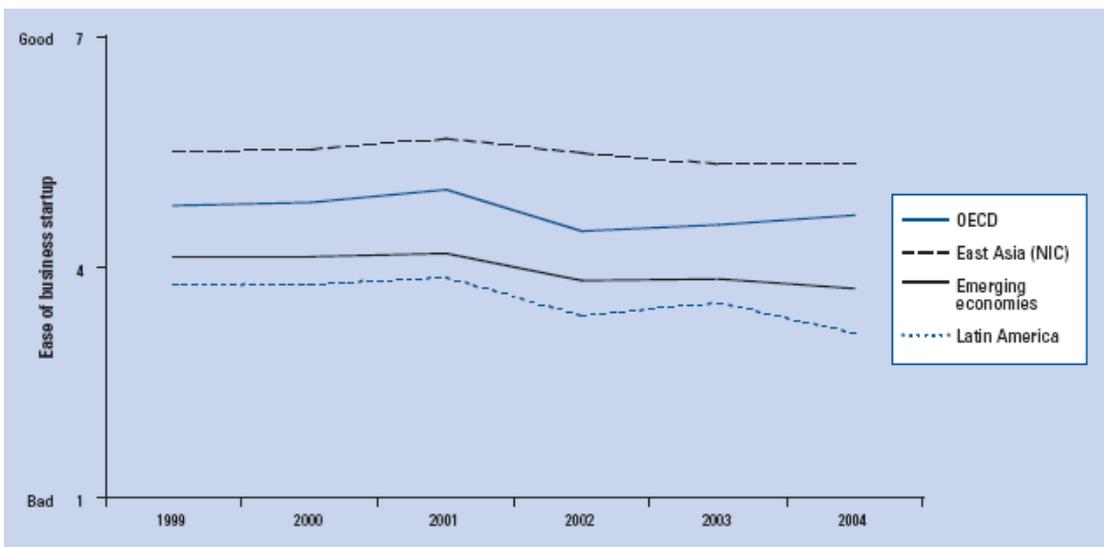
Figure 13-1 The assessment of judicial bribery according to executives



Source: Kaufman, *et al.* (2005).

The evidence on the ease of starting a business from EOS reveals that trends over the 1999–2004 are deteriorating across all regions (Figure 13-2). Firms in the NICs of East Asia report fewer obstacles to business entry than those in OECD countries, reflecting the highly regulated nature of economies in some OECD countries (Kaufman, *et al.* 2005). The gap between the NICs, on the one hand, and Latin America and the surveyed countries of the former Soviet Union on the other, is very significant and somewhat increasing over the period considered.

Figure 13-2 Ease of starting a business according to executives



Source: Kaufman, *et al.* (2005).

These perception-based data could be considered as *de facto* indicators of governance, as opposed to *de jure* indicators, which are based on the actual text of the law. The Doing Business reports construct *de jure* indicators on business regulations and the protection of property rights that can be compared across countries. In 2005/06 Africa ranks third behind only Eastern Europe and Central Asia and the OECD high-income countries in the pace of reform (Figure 13-3). This is a significant improvement after two years in

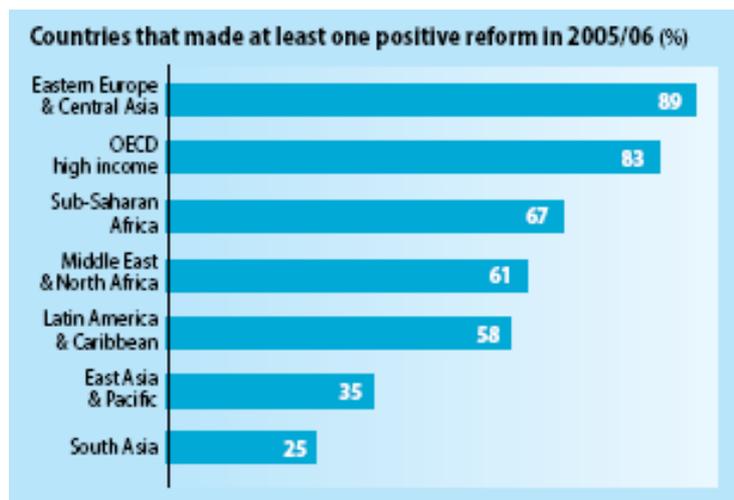
which Africa lagged behind all other regions. Two thirds of African countries made at least one reform, and Tanzania and Ghana rank among the top ten reformers. According to the World Bank (2006), Benin, Burkina Faso, Cameroon, Gambia, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria and Zambia have all started to simplify business regulation. However, Africa also hosts the worst reformer of the year.

China is a top-ten reformer: its government hastened business entry, increased investor protections and reduced red tape in trading across borders. China also established a credit information registry for consumer loans. Now 340 million citizens have credit histories. Eastern Europe improved the most in the ease of doing business. Regulatory competition in the enlarged union added to the impetus for reform. Several countries in all regions – including Bolivia, Eritrea, Hungary, Timor-Leste, Uzbekistan, Venezuela and Zimbabwe – went backward in terms of reforms according to the report (World Bank, 2006).

The most popular reform in 2005/06 was easing the regulations on starting a business; 43 countries simplified procedures, reducing costs and delays. The second most popular was reducing tax rates and the administrative problems that businesses endure when paying taxes.

In the top reforming economies in the past three years, nearly 85% of reforms took place in the first 15 months of a new government (World Bank, 2006).

Figure 13-3 The pace of the reform around the world



Source: World Bank (2006).

Democracy

As democracy is considered to be the most efficient form of the organisation of a political system, democratic rules are considered to increase governance.

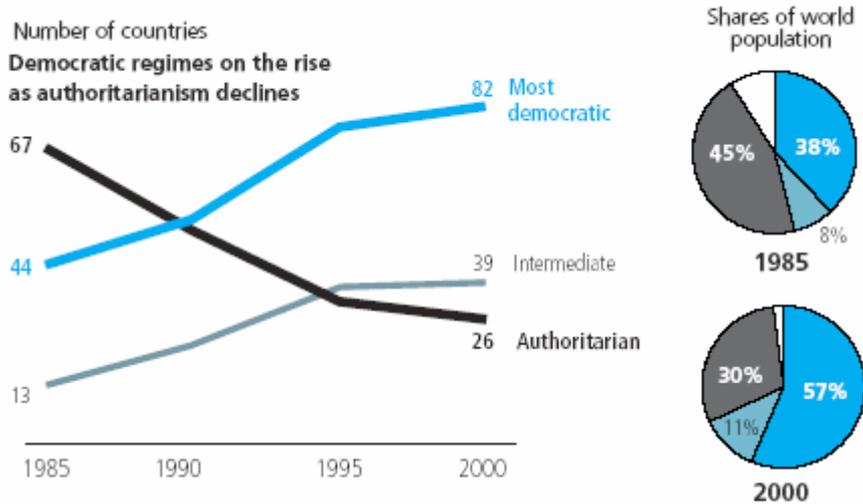
In the first few decades of the 21st century, it is predicted that, linked to the process of economic globalisation, there will be a dual process of democratisation within individual states. There is also a growing realisation that there is an increasing need for a ‘global democracy’ which gives equal rights to all citizens in the world.

The state is forecast to remain the single most important organising unit of political, economic, and security affairs through 2015 but will confront fundamental tests of effective governance. Foremost could be the ability to benefit from, while coping with, several facets of globalisation and to deal with increasingly vocal and organised publics (CIA 2000).

All states will confront popular demands for greater participation in politics and attention to civil rights. These are pressures that will encourage greater democratisation and transparency (UNDP 2002b).

There are more democratic countries and more political participation than ever before, with 140 countries holding multiparty elections. Of 147 countries, 121 (with 68% of the world's people) had some or all of the elements of formal democracy in 2000, see Figure 13-4. This compares with only 54 countries, with 46% of the world's people, in 1980. Since then, 81 countries have taken significant steps in democratisation, while six have regressed. Authoritarian regimes have been replaced by governments more accountable to the people (UNDP 2002b).

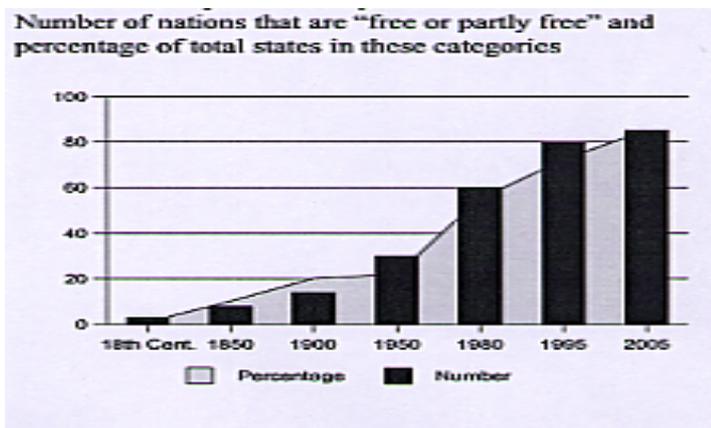
Figure 13-4 Rise in democracies



Source: UNDP (2002b) Human Development Report.

The percentage of countries in the world that could be roughly described as democratic may exceed 80% in 2005 (Mazarr 1997). The progress and projections in the growth of democracy seen in Figure 26 are likely in reality to be surpassed.

Figure 13-5 The advance of democracy



Source: www.freedomhouse.org

Increased access to global sources of information is already creating a more informed public throughout the world; this public is consequently anticipated to be less tolerant of repressive regimes 'Free markets generally produce free polities' (Mazaar 1997).

Non-state actors

Non-state actors could increasingly gain resources and power over the next 15 years as a result of the ongoing liberalisation of global finance and trade, as well as the opportunities afforded by information technology (CIA 1996).

Non-profit networks with affiliates in more than one country can be expected to grow through 2015. Within individual countries, the non-profit sector may expand rapidly. The number of international NGOs has grown over the 1990s.

Table 13-1 Number of international NGOs

Purpose	1990	2000	Growth (%)
Culture and recreation	2,169	2,733	26.0
Education	1,485	1,839	23.8
Research	7,675	8,467	10.3
Health	1,357	2,036	50.0
Social services	2,361	4,215	78.5
Environment	979	1,170	19.5
Economic development, infrastructure	9,582	9,614	0.3
Law, policy and advocacy	2,712	3,864	42.5
Religion	1,407	1,869	32.8
Defence	244	234	-4.1
Politics	1,275	1,240	-2.7
Total	31,246	37,281	19.3

Source: UNDP (2002b) Human Development Report.

The for-profit business sector is expected to grow rapidly over the next 15 years, spearheading legal and judicial reform and challenging governments to become more transparent and predictable. At the same time, governments will be challenged to monitor and regulate business firms through measures consistent with local standards of social welfare.

Multinational corporations are predicted to continue to multiply as governments continue to deregulate their economies, privatise state-owned enterprises, and liberalise financial markets and trade.

Western dominance is expected to persist but show a declining trend. Economic growth in Asia and Latin America should produce additional resources for the support of civil society. In addition, autocratic governments and Islamic states or groups may increasingly support non-profit groups sympathetic to their interests. International economic organisations are often dominated by a few countries. The US, Japan, France, UK, Saudi Arabia, Germany and the Russian Federation have 48% of the voting power of the International Monetary Fund (IMF) and 46% of the World Bank. Africa lacks full representation at the WTO headquarters; 15 countries have no representative, 16 countries between one and three, and six countries between four and six.

One of the potential advantages from the globalisation of governance is that wars may be less likely. 'Empirical studies reinforce the lesson that democracies seldom, if ever, fight wars with other democracies' (Mazaar 1997: 14), see Table 13-2.

Table 13-2 **Number of people killed in wars in 20th century**

Type of government	Number of unarmed people intentionally killed by government (millions)	Number of people killed in wars (millions)
Democratic	2	4
Authoritarian	29	15
Totalitarian	138	14

Source: UNDP (2002), Human Development Report.

Predictions in the field of governance should be treated with great caution and the major social transformations could engender reactionary movements. The world could experience socio-economic inequities, and ‘counter-globalisation’ could therefore be a future trend (Mazarr 1997).

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14 MIGRATION

It is estimated that the total number of international migrants may reach between 185 million and 192 million in early 2005 (IOM, 2005), representing 3.0% of the world's population. The growth of the international migrant stock is not likely to abate in the near future. This total represents more than a two-fold increase from 76 million in 1960. However, a significant part of this increase worldwide was due more to the emergence of newly independent states during the 1990s than to the growing international redistribution of the population. While rising, the total number of international migrants still accounts for a small percentage of the world's population. Europe and Asia shelter the largest number of migrants, but the percentage of migrants vis-à-vis total population is much higher in Oceania and North America (Table 14-1). Roughly half of all migrants are women (IOM 2003) and the proportion of females has tended to be higher in developed than in developing regions (IOM, 2005).

Table 14-1 World population and migrant stocks, 2000

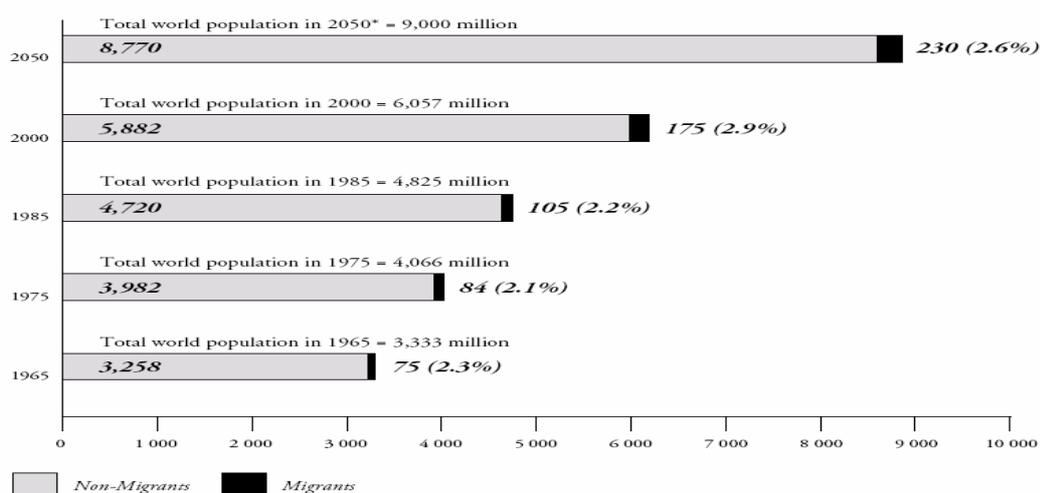
	Total population (m)	Migrant stocks (m)	% of population
Asia	3672.3	43.8	1.2
Africa	793.6	16.3	2.0
Europe*	727.3	32.8	6.4
USSR (former)	244.8	29.5	10.2
Latin America/Caribbean	518.8	5.9	1.1
Northern America	313.1	40.8	12.9
Oceania	30.5	5.8	18.8
Global	6071.0	174.9	2.9

* Exclude former USSR

Source: IOM (2005) World Migration Report.

The number of international migrants has grown steadily in the last 40 years and is expected to grow further to 230 million by 2050, although this represents a decline in percentage terms (Figure 14-1).

Figure 14-1 World population – non-migrants and migrants (stocks), 1965–2050



Source: IOM (2005), World Migration Report.

More than half of international migrants live in developing countries and the most rapid growth in migrations tends to occur as the result of a refugee crisis. In 2000, the 17 million refugees in the world constituted 9.7% of all international migrants, up from 4.5 million or 5.5% in 1970. The majority of these

had found asylum in developing countries, particularly in Africa and Asia. In 2000, refugees accounted for 23% of all international migrants in Asia and 22% of those in Africa.

During the 1990s, as longstanding conflicts came to an end, particularly in Africa, the repatriation of large numbers of refugees became possible. By 2000, the number reported to UNHCR had dropped to 12 million. The additional 5 million refugees in 2000 were those under the mandate of UNRWA (IOM, 2005).

Most migrant flows are South-South. Although the numbers of migrants appear to be significant, they represent a very small proportion of the host nation's population or workforce (IOM 2003).

Some of the major recent migratory moves include (IOM 2000):

- *Out of China to other East Asian economies.* International migration from China is expected to reach 400,000 persons annually. Estimates of the illegal numbers leaving China are in the region of 200,000 people annually. It is estimated that 30 million Chinese people are living abroad.
- *There are large-scale migrations from South Asia to the Middle East.* This mainly involves temporary workers and the return of remittances to home nations. The migration is in the order of 1 million workers per year, mainly from Bangladesh, India, Pakistan, and Sri Lanka.
- *Central America, the Caribbean and the United States provide the world's major immigration and emigration locations.* Up to 1 million Mexicans each year enter the US for more than three months of the year and 300,000 settle. Canada also receives 200,000 people per year. These two locations are likely to remain the major destinations of future migrations.
- *The most dynamic and diverse areas for migratory activity are in Central and Eastern Europe and the CIS.* Between 1990 and 1997, 2.7 million people returned to the Russia from other parts of the CIS and the Baltic States.

These migrations are likely to increase in the future with the development of communications, the growing need for skilled labour as dependency ratios increase in the developed world, the increasing disparities between regions and the growing prevalence of internal conflicts.

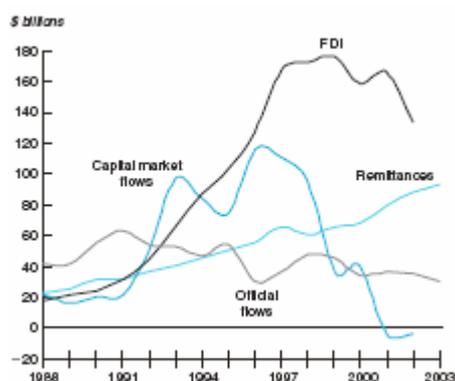
This 'brain drain' is a concern for future development prospects. Indian professionals and technical workers migrate in large numbers to jobs in Australia, Canada, UK and the US; an estimated 15 million Indians live outside their country (IOM 2000). This problem of skilled migration is also prevalent in Africa, where an estimated 23,000 qualified academics emigrate each year to Europe, the Middle East and North America (IOM 2000). The World Bank estimates that 70,000 African professionals and university graduates leave their country of origin each year to work in Europe or North America (IOM 2003).

The World Migration Report 2000 (IOM 2000) notes that overseas international migration will become more important in sub-Saharan Africa as prospects for beneficial internal migration are limited, the labour market is weak, and migration techniques are becoming more sophisticated (IOM 2000).

On the other hand, evidence of return migration has been seen in sub-Saharan Africa, as political situations improve and economic changes have resulted in increased rural incomes. Together with deteriorating living conditions in urban areas, this has resulted in a return to rural areas (IOM 2000). This return to rural areas could impact upon urbanisation rates previously discussed.

Also on a positive note, migration is associated with remittances to the home country. Figure 14-2 shows that remittances to developing countries amounted to US\$93 billion in 2003, about 1.5% of GDP, and about 50% more than aid flows to developing countries. For sub-Saharan Africa remittances are about a third of FDI flows.

Figure 14-2 Resource flows to developing countries 1988–2003



Source: World Bank (2004a), Global Development Finance.

The migratory pattern is likely to be driven by the prevailing conditions in the developed world. Fertility rates have fallen below replacement level in virtually all developed countries, accompanied by continuous declines in mortality, resulting in ageing populations (UN 2000).

Table 14-2 shows the trends in international migration in the 1950–2050 century. Since 1960, the more developed regions have been net gainers of migrants from the less developed regions and net migration to the more developed regions has been increasing steadily from 1960 to 2000. During 1990–2000, the more developed regions were gaining annually 2.6 million migrants, with Northern America accounting for about half of that net flow. During 2000–2010, the level of net migration to the more developed regions as a whole is expected to change only slightly, although there is some increase in the net number of migrants received by Northern America (1.4 million annually). Over the rest of the projection period, net migration to the more developed regions is projected to remain at about 2.2 million per year, of which 1.3 million are directed to Northern America. With respect to the other major areas, Asia was the major source of migrants during 1990–2000, followed by Latin America and the Caribbean and Africa. After 2000, over half of all migrants leaving the less developed regions are expected to be from Asia, about 25% to 30% from Latin America and the Caribbean and the remaining from Africa (UN, 2005).

At the country level, during 1990–2000, 34 of the 44 developed countries have been net receivers of international migrants. This group includes traditional countries of immigration such as Australia, Canada, New Zealand and the United States of America, most of the populous countries in Northern, Southern and Western Europe as well as the Russian Federation and Japan.

Several countries or areas in the less developed regions have also been attracting migrants in large numbers, including Hong Kong (China, Israel, Kuwait, Malaysia, Qatar, Saudi Arabia, Singapore, South Africa and the United Arab Emirates. During 2000–2010, the major countries of origin of migrants are China, India, Indonesia, Mexico and the Philippines.

Averaged over the 2000–50 period, the main net gainers of international migrants are projected to be the US (1.1 million annual net migrants), Germany (211 thousand), Canada (173 thousand), the UK (136 thousand) and Australia (83 thousand), whereas the major net senders are projected to be China (-303 thousand annual net number of migrants), Mexico, (-267 thousand), India (-222 thousand), the Philippines (-184 thousand) and Indonesia (-180 thousand).

Table 14-2 Net migration, medium variant (thousands of migrants)

Major area	1950–1960	1960–1970	1970–1980	1980–1990	1990–2000	2000–2010	2040–2050
More developed regions	5	431	1,104	1,521	2,569	2,462	2,158
Less developed regions	-5	-431	-1,104	-1,521	-2,569	-2,462	-2,158
Least developed countries	-95	-140	-462	-766	9	81	-270
Other less devel. count.	90	-291	-642	-755	-2,578	-2,543	-1,888
Africa	-116	-220	-293	-244	-269	-410	-322
Asia	165	77	-416	-595	-1,434	-1,244	-1,204
Europe	-480	-64	304	479	1 139	937	699
Latin America and the Car.	-58	-288	-388	-649	-798	-740	-567
Northern America	403	387	748	924	1,277	1,360	1,300
Oceania	85	109	44	84	86	98	94

Source: UN (2005) World Population Prospects, the 2004 revision.

Indeed, without migration, the population of the developed world is projected to begin to decline. If no migration is assumed, the European Union would lose 17% of its population by 2050, and the loss in the 15–64 age range would be 30% (UN 2000).

The UNDP has projected migration levels required to maintain elements of the developed world population structures (see Table 14-3). Scenario A is the migration level projected in the 1998 population revision. Scenario B is the level of migration required to maintain population at the maximum reached. Scenario C is the level required to maintain the 15–64 age range at the maximum reached and Scenario D is the level required to maintain the PSR at the 1995 level. That is the potential support ratio, defined as the ratio of population aged 15–64 years to the population aged 65 and over.

Table 14-3 Net number of migrants 1995–2050 by scenario and country

Country/region	Population with zero migration after 1995 (thousands)			Average annual number of migrants to fulfil scenario (thousands)			
	2000	2025	2050	A	B	C	D
Germany	80,985	72,643	58,812	207	324	458	3427
Japan	126,714	121,150	104,921	0	312	609	10,064
Russian Fed	144,960	131,824	114,248	135	508	650	4,675
UK	58,600	58,768	55,594	22	48	114	1,087
USA	274,335	296,616	290,643	760	116	327	10,777
Europe	723,482	684,055	600,464	428	1,821	2,934	25,203
EU	372,440	354,500	310,839	297	863	1,447	12,736

Source: United Nations Population Division (2001).

The projections point to large increases in migration to the developed world to prevent declining populations and worsening economic ratios. The EU population, for example, could decline by 100 million people by 2050 and would require nearly 3 million migrants a year to maintain the economically active age range at its highest level. The future could hold an increasing liberalisation of the labour market and relaxation of immigration laws to provide the work forces for developed countries (UN 2000).

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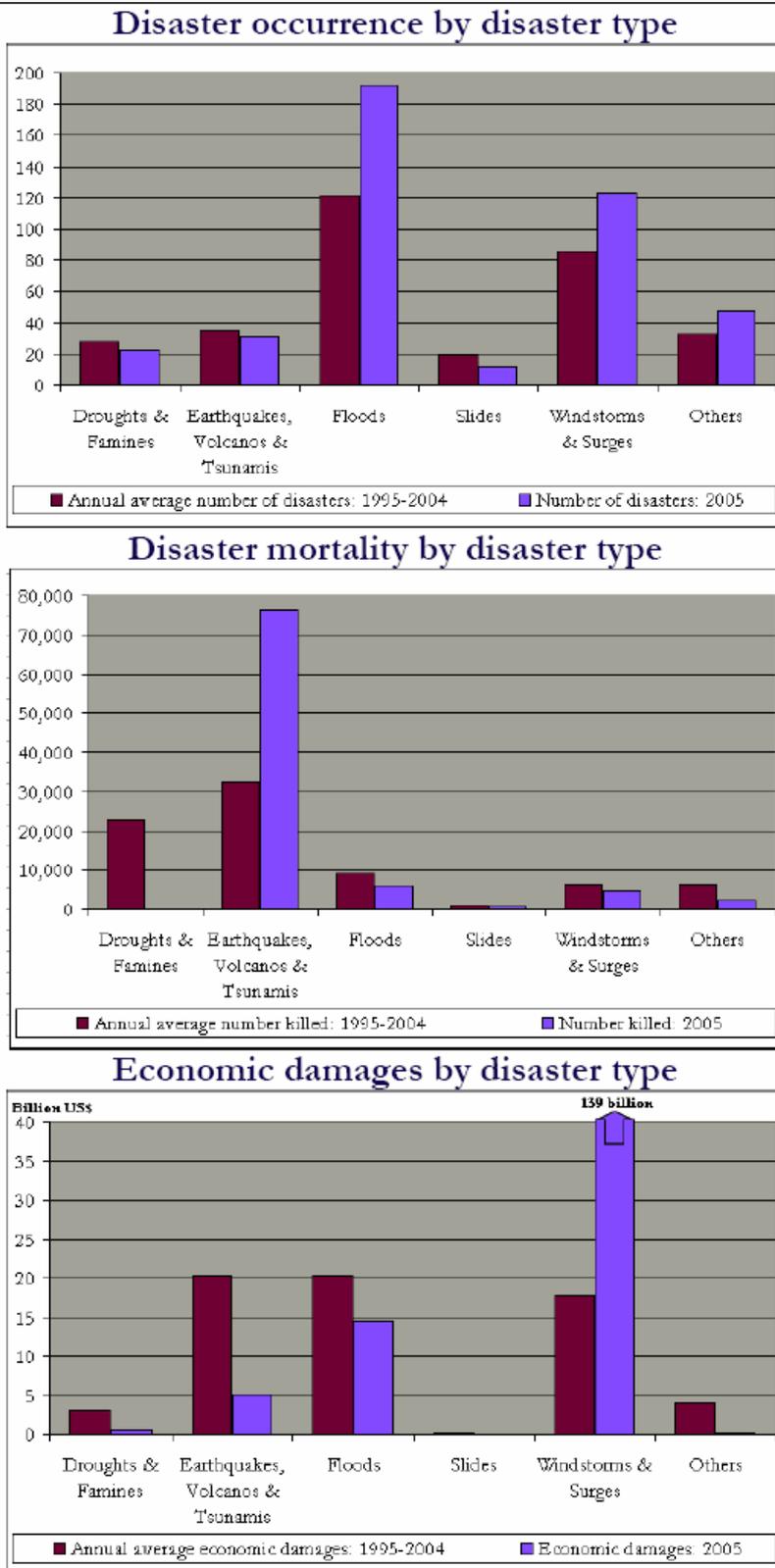
15 DISASTERS

The world is facing disasters on an unprecedented scale: more than 255 million people were affected by natural disasters globally each year, on average, between 1994 and 2003, with a range of 68 million to 618 million. During the same period, these disasters claimed an average of 58,000 lives annually, with a range of 10,000 to 123,000. In the year 2003, one in 25 people worldwide was affected by natural disasters (Guha-Sapir, *et al.* 2004).

In 2005, more than 97,000 people died in natural and human-made disasters – floods, storms, earthquakes, but also shipping and aviation disasters. Of these, more than 73,000 people died in the Kashmir earthquake. The death toll from the earthquake in Pakistan accounted for 75% of the total mortality for the year and 3% of total economic damages. By contrast, Hurricane Katrina accounted for 1.5% of total deaths and approximately 60% of total economic damages (Swiss Re, 2006).

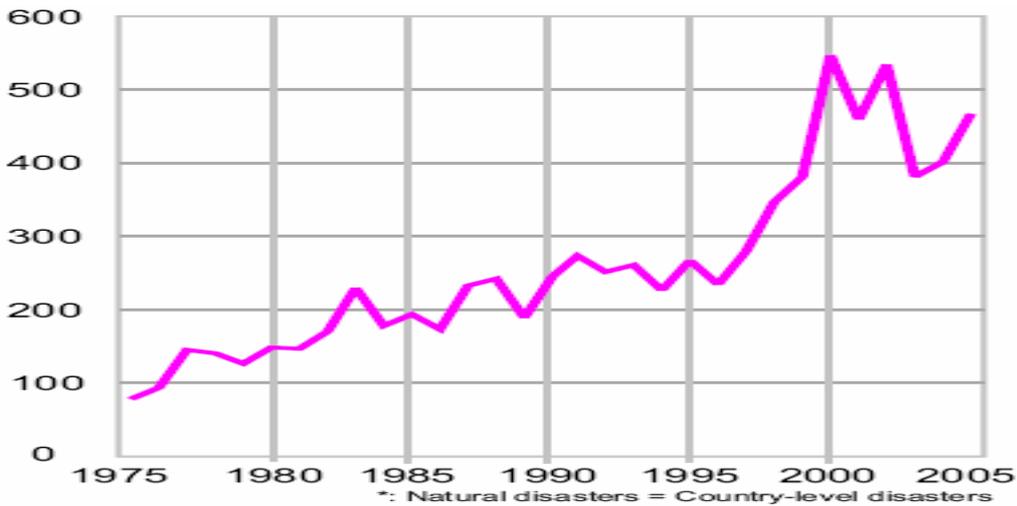
It is difficult to predict the future occurrence and casualties of disasters, whether natural or human-made. Figure 15-1 shows how one event – the earthquake in Kashmir in 2005 – can lead to significant deviations from long-term averages in the number of reported deaths, or how a series of events such as the above-average number of floods in 2005 – depending on mitigating measures taking place, where the event happens – leads to below-average mortality. Evidence indicates that global climate change will increase the number of extreme events, creating more frequent and intensified natural hazards such as floods and windstorms. Population growth, urbanisation and the inability of poor populations to escape from the vicious cycle of poverty makes it all the more likely that there will be an increase in the number of people who are vulnerable to natural hazards, with a resulting increase of natural disasters and environmental emergencies. With unmitigated emissions, sea levels will be about 40cm higher than today by the 2080s, and this is estimated to increase the annual number of people flooded from 13 million to 94 million. Additionally, coastal areas (within 30 km of the sea) are not only inhabited by 21% of the world's population, but a considerable portion of global GDP is also produced in coastal zones and many coastal locations exhibit a growth in population and GDP higher than their national averages and a strong urbanisation trend (Nicholls and Klein, 2000). Casualties and economic costs of climate change-related disasters are thus expected to rise considerably during the next decades.

Figure 15-1 Occurrence, mortality and economic costs of disasters in 2005 compared to 1995–2004 averages



Source: CRED (2006).

Figure 15-2 Trend of natural disasters, 1975–2005

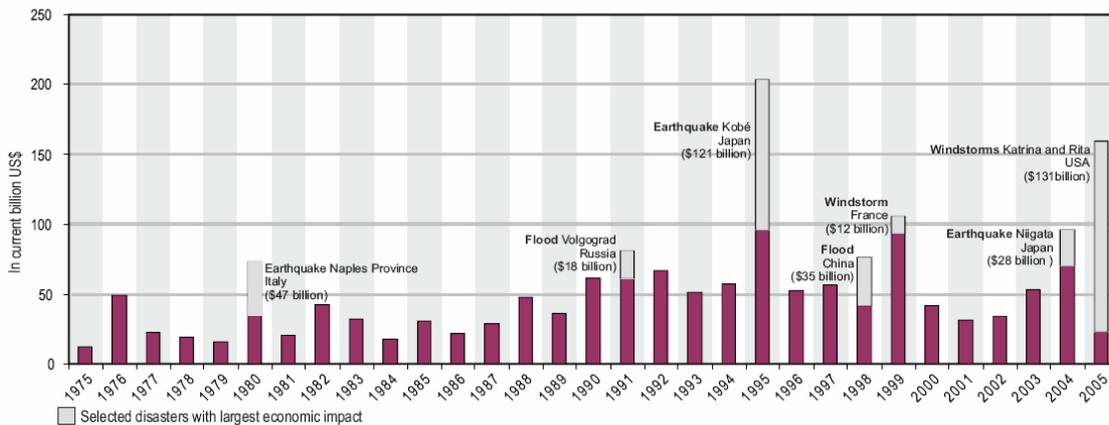


Source: EM-DAT (2006).

Between 1975 and 1995, the number of natural disasters increased continuously. A significant increase in the number of natural disasters was observed during the period from 1995 to 2000 (Figure 15-2). Reported natural disasters leading to human casualties and economic costs (Figure 15-3) are expected to increase over the next decades as a combined effect of climate change, increasing population densities and economic activities in vulnerable areas (e.g. coastal zones).

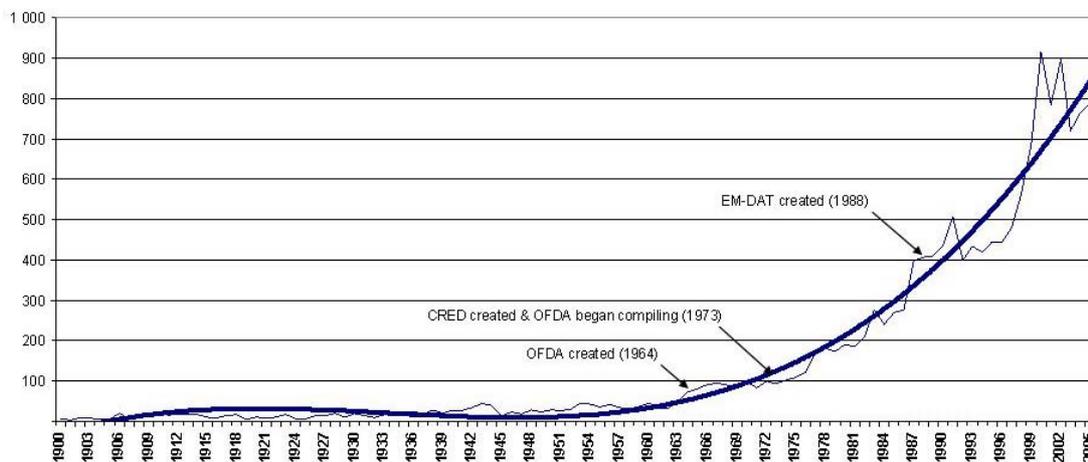
Figure 15-3 Economic costs of disasters, 1975– 2005

Annual reported economic damages from natural disasters: 1975-2005



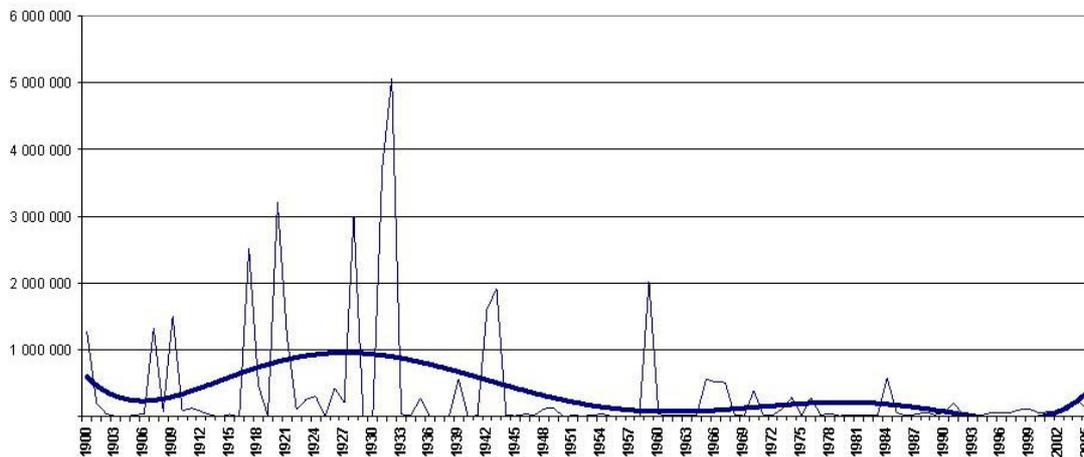
Source: Dilley at al. (2005).

Figure 15-4 Reported disasters (natural and human made) 1900–2005



Source: EM-DAT database.

Figure 15-5 Global deaths through disasters 1999–2005



Source: EM-DAT database (2006).

Disasters particularly affect the world's poorest. Of those killed in 2002, only 6% lived in countries of high human development. While low human development countries report fewer natural disasters, their death toll is highest.

The number of disaster events seemingly continues to rise, as do the social and economic costs. Disasters in 2005 caused some US\$159 billion in damage (of which US\$125 billion were losses caused by Hurricane Katrina in the United States), a 71% increase from the total losses of US\$93 billion in 2004. Although the number of overall deaths caused by natural disasters is decreasing, the number of those affected in terms of disruptions to daily life, loss of livelihoods, and deepening poverty continues to increase. The impacts of population and economic growth, rapid urbanisation, environmental degradation and climate change are a few of the factors that will continue to fuel this trend unless something is done to reduce disaster risks. (Arnold *et al.* 2006)

By contrast, while deaths remain low from disasters in highly developed countries, financial costs are high and rising. According to IFRC's analysis, disasters in industrialised countries have inflicted an average of US\$318 million of damage per event – over 11 times higher than the US\$28 million per disaster in developing countries. This is hardly surprising when the expensive infrastructure of rich countries is taken

into account, but the overall impact on the economies of rich countries is, in most cases, negligible. On the other hand, from 1994 to 2003, deaths per reported disaster were on average seven times higher in countries of low development than in highly developed countries (IRIN, 2005).

Weather-related disasters still outnumber geophysical disasters by nine to one over the past decade, while floods are the most-reported natural disasters in Africa, Asia and Europe. Storms with high winds are most frequent in the Americas and Oceania. Droughts and famines have proved the deadliest natural disasters worldwide in recent years, accounting for at least 275,000 deaths since 1994 – nearly half of all reported fatalities (IRIN, 2005). Floods affected more people across the globe than all other natural or technological disasters put together.

Weather-related disasters have risen from an annual average of 200 between 1993 and 1997 to 331 per year between 1998 and 2002. Comparing the decades 1983–92 and 1993–2002, reported global deaths from natural and technological disasters have fallen by 38%. However, numbers of people reported affected have risen by 54% over the same period (IFRC 2003).

Globally, the number of disasters has remained fairly constant until 1998. Since then, the number of reported disasters has increased considerably. Especially noteworthy is the almost four-fold increase of reported disasters in Africa (Table 15-1).

Table 15-1 Total numbers of reported disasters (natural, technical and others) by continent

Regions	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
Africa	55	49	58	61	58	56	84	144	195	186	946
Americas	88	94	81	97	93	100	112	135	144	127	1071
Asia	162	221	181	171	176	194	206	239	286	292	2128
Europe	51	46	69	64	54	60	65	78	121	90	698
Oceania	12	14	17	8	17	15	18	15	13	17	146
Total	368	424	406	401	398	425	485	611	759	712	4989

Source: IFRC (2002).

The nature of natural disasters is also changing. During the last decade, climate-based disasters have predominated. Floods have affected 1.2 billion people, that is 63% of the total numbers affected by disasters. Natural disasters accounted for over 99% of the affected population. The Red Cross estimates that 335 million people or 5% of the world's population lost their homes in 1998 as a result of climate-related disasters (IFRC 2000).

The long-term trends in technological disasters are also strongly upward, with the majority of this increase occurring in transport-related events (EM-Dat 2002). The increase in technical disasters has been especially marked since 1980. This has mainly been in the field of transport, especially road travel. These non-natural disasters account for a very small percentage of people affected by total disasters. However, future economic gains in developing countries could increase the prevalence and impact of these events.

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16 CONFLICT AND REFUGEES

Conflicts

Since the end of World War II, there have been a total of 231 armed conflicts active in 151 locations throughout the world. During the 17 years since the end of the Cold War, the corresponding numbers are 211 conflicts in 81 locations. In 2005 there were 31 ongoing armed conflicts in 22 locations. The highest number of armed conflicts was recorded in 1991 and 1992 with 51 conflicts active. Thus, the overall trend since the early 1990s has been that of a steep decline. In all years since the end of World War II, the majority of conflicts have been fought within states. In 2005, all 31 conflicts were intrastate, and six of these were internationalised (Harbom, *et al.* 2006).

During the year 2005, four peace agreements were concluded: Chad, Indonesia (Aceh), Ivory Coast, and Sudan (Southern Sudan). Since the end of the Cold War, 144 accords between warring parties were concluded. These are agreements solving, regulating, or deciding on a process for regulating the incompatibility (Harbom, *et al.* 2006).

The major trends in conflict since World War II have been the reduction in interstate wars, the increase in internal conflicts, and the increasing targeting of civilian populations and their displacement. Analysis of Correlates of War (COW) data by Lacina, *et al.* (2006) shows that battle-deaths have significantly been reduced since the end of World War II, and again after the end of the Cold War, while civilian casualties have increased dramatically.

Notwithstanding the enduring nature of certain contemporary conflicts, the past decades have seen major changes in both the dynamics and understanding of conflicts. In particular, the increasing prominence of non-state actors has given rise to challenges in managing and responding to conflict, and the limited capacity of the international community to hold non-state actors accountable for their abuse of civilians continued to pose a grave threat to human security in 2005 (SIPRI 2006).

Table 16-1 shows major armed conflicts defined as open, armed clashes between two or more centrally organised parties, with continuity between the clashes, in disputes about power over government and territory. Of the 118 armed conflicts that began between 1990 and 1999, only ten were classified as interstate conflicts. The global number of conflicts rose in the early 1990s (related to former Soviet Union) but has since stabilised.

Table 16-1 Regional distribution of major armed conflicts, 1990–2003

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Africa	11	11	7	7	6	5	3	4	11	11	9	7	6	4
Americas	4	4	3	3	3	3	3	2	2	2	2	3	3	3
Asia	13	11	12	10	10	11	10	9	9	9	9	9	9	8
Europe	-	1	3	5	4	3	1	-	1	2	1	1	1	1
Middle East	4	6	5	6	6	6	6	4	4	3	4	4	2	3
Total	32	33	30	31	29	28	23	19	27	27	25	24	21	19

Source: Uppsala Conflict Data Project.

Since 9/11 and the development of the ‘war on terror’, international terrorism has been promoted in Washington, London and other Western capitals as the greatest threat facing the world. A study on root causes of conflict and insecurity in today’s world and the likely determinants of future conflict shows that international terrorism is actually a relatively minor threat when compared to other more serious global trends, and that current responses to such trends are likely to increase, rather than decrease, the risks of

further terrorist attacks. The factors identified as being a root cause of conflict today and increasingly in future are (Abbott, *et al.* 2006):

1. climate change
2. competition over resources
3. marginalisation of the majority world
4. global militarisation.

World military expenditure in 2005 is estimated to have reached US\$1001 billion at constant (2003) prices and exchange rates, or US\$1118 billion in current dollars (Table 16-2). This corresponds to 2.5% of world GDP or an average spending of US\$173 per capita. World military expenditure in 2005 represents a real terms increase of 3.4% since 2004, and of 34% over the ten-year period 1996–2005. The USA, responsible for about 80% of the increase in 2005, is the principal determinant of the current world trend, and its military expenditure now accounts for almost half of the world total.

Table 16-2 World and regional military expenditures estimates 1988–2005

Region ^a	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	1988-2005 (%)
Africa ^a	10.3	(11.0)	10.7	9.6	9.0	8.9	9.2	8.8	8.6	8.7	9.4	10.5	11.1	11.1	12.1	11.9	12.6	12.7	+23
Americas	489	484	460	404	427	408	387	368	347	347	340	341	353	358	399	447	485	513	+5
<i>thereof</i> <i>North America</i>	469	463	444	390	411	390	369	347	328	326	319	320	332	335	375	425	463	489	+4
Asia & Oceania	92.8	97.0	100	102	107	110	111	112	116	118	119	122	126	132	138	144	152	157	+69
Europe	414	402	381	..	273	263	257	239	236	239	234	238	243	243	249	256	260	256	-38
<i>Thereof</i> <i>Western Europe</i>	241	242	243	241	232	225	219	210	209	210	210	214	215	214	218	223	226	220	-9
Middle East	38.7	37.5	51.2	57.1	46.8	43.0	42.1	40.0	39.0	43.4	46.5	45.8	51.5	55.0	52.6	55.0	58.9	63.0	+63
World	1044	1032	1003		863	833	806	768	747	756	748	757	784	800	851	914	969	1001	-4
Change (%)		-1.1	-2.8			-3.5	-3.2	-4.7	-2.7	+1.2	-1.1	+1.2	+3.6	+2.0	+6.4	+7.4	+6.0	+3.3	

^a) The World total and totals for regions are estimates in US\$. Angola, Benin, Cuba, Equatorial Guinea, Haiti, Iraq, Myanmar, Qatar, Somalia, Trinidad and Tobago and Viet Nam have been excluded.
Source: SIPRI Yearbook (2006).

The CIA review of conflicts to 2015 highlights the continuation of these themes: internal conflicts will pose the greatest threat to stability, interstate wars will be less frequent though more lethal in nature and internal conflicts will create increasing internal displacements, refugees and humanitarian emergencies. The report further identified changing power base, the rise of China and India, and the relative fall of Russia. It further identified increasing internal conflicts developing into interstate conflicts as neighbours either seek to protect or exploit their own self-interest. Interstate conflicts are likely to grow over the rights to natural resources, especially water. Predicted areas of concern were identified as sub-Saharan Africa, the Caucasus, Central Asia, parts of South and Southeast Asia, Central America and the Andean region. The CIA survey further predicted that states at risk include those with poor governance with high levels of corruption, ethnic, cultural or religious tensions, and porous borders. Other factors assumed to contribute to increasing the risk for war were: poverty linked to unequal access to political power, economic decline, lack of democracy, vicious identity politics in heterogeneous states and the struggle to control economic resources; and the continuing climate of impunity for war criminals.

An update of the 2000 report ‘Global Trends 2015 – Mapping the Global Future’ based on an intensive consultation process with nongovernmental experts around the world, identified the following aspects as critical for the future development:

Box 16-1 The 2020 Global Landscape

The 2020 Global Landscape	
Relative Certainties	Key Uncertainties
Globalization largely irreversible, likely to become less Westernized.	Whether globalization will pull in lagging economies; degree to which Asian countries set new “rules of the game.”
World economy substantially larger.	Extent of gaps between “haves” and “have-nots”; backsliding by fragile democracies; managing or containing financial crises.
Increasing number of global firms facilitate spread of new technologies.	Extent to which connectivity challenges governments.
Rise of Asia and advent of possible new economic middle-weights.	Whether rise of China/India occurs smoothly.
Aging populations in established powers.	Ability of EU and Japan to adapt work forces, welfare systems, and integrate migrant populations; whether EU becomes a superpower.
Energy supplies “in the ground” sufficient to meet global demand.	Political instability in producer countries; supply disruptions.
Growing power of nonstate actors.	Willingness and ability of states and international institutions to accommodate these actors.
Political Islam remains a potent force.	Impact of religiosity on unity of states and potential for conflict; growth of jihadist ideology.
Improved WMD capabilities of some states.	More or fewer nuclear powers; ability of terrorists to acquire biological, chemical, radiological, or nuclear weapons.
Arc of instability spanning Middle East, Asia, Africa.	Precipitating events leading to overthrow of regimes.
Great power conflict escalating into total war unlikely.	Ability to manage flashpoints and competition for resources.
Environmental and ethical issues even more to the fore.	Extent to which new technologies create or resolve ethical dilemmas.
US will remain single most powerful actor economically, technologically, militarily.	Whether other countries will more openly challenge Washington; whether US loses S&T edge.

Source: NIC (2004).

Since the mid-1990s, a rapid growth of the private military industry in the form of Private Military Companies (PMCs) can be observed. Increasingly, military activities are privatised and outsourced, creating a global market for force where private military companies are competing for contracts and market share that have effects on state authority over the use of force. Private firms are gaining a direct say over the use of force, simply because privatisation and outsourcing have made them far more central to its practical use. They are increasingly present on the battle field or in the undertaking of functions which are critical for military operations. They are increasingly in control of the equipment and services necessary for military operations. They sell these on the market to the customers of their choice. They do an increasingly significant part of intelligence gathering and analysis. They back up military operations. They analyse and suggest responses to security threats. If PMCs act on their own – as opposed to being contracted by states, bilateral and multilateral organisations buying in a plethora of services, it is only in weak or failed states in the developing world. This is illustrated by the spectacular operations of PMCs in Sierra Leone, Angola,

Papua New Guinea, Bosnia, Eritrea/Ethiopia or Columbia – where the real issue is the lack of state power and not the development of private markets (Leander, *et al.*, 2006).

Refugees

At the start of 2005, the number of ‘people of concern’ to UNHCR rose to 19.2 million from 17 million the previous year, an increase of 13%, and stands again almost at the same level as in 2002 and 2003. The increase reflected differing patterns of movement among the various groups assisted by UNHCR, including refugees, civilians who have returned home but still need help, persons displaced internally within their own countries, asylum seekers and stateless people. They included 9.2 million refugees (48%), 839,200 asylum seekers (4%), 1.5 million returned refugees (8%), 5.6 million internally displaced persons (29%) and 2 million others of concern (11%) (UNHCR, 2005).

Encouragingly, the number of refugees – people who have fled persecution in their own countries to seek safety in neighbouring states – fell by 4% in 2004 to 9.2 million. This was the lowest total in almost a quarter of a century. A total of 1.5 million refugees went home voluntarily, including 940,500 to Afghanistan and 194,000 to Iraq. These returns were offset somewhat by new refugee displacements totalling 232,100 people, principally in Sudan (UNHCR, 2005).

The largest number of refugees is found in Asia (6.8 million) and in Africa (4.8 million) (see Table 16-3) (UNHCR 2005).

Table 16-3 Persons of concern to UNHCR

Region	Total of concern			
	1 Jan 2002	1 Jan 2003	1. Jan 2004	1 Jan 2005
Asia	8,820,700	9,378,900	6,112,500	6,899,600
Africa	4,152,300	4,593,200	4,285,100	4,861,400
Europe	4,855,400	4,403,900	4,242,800	4,429,900
North America	1,086,800	1,061,200	978,100	853,300
Latin America and Caribbean	765,400	1,050,300	1,316,400	2,070,800
Oceania	81,300	69,200	74,400	82,400
Total	19,761,900	20,556,700	17,009,300	19,197,40

Source: UNHCR (2003, 2005).

In 1997 the number of ‘people of concern’ to the UNHCR was 19.7 million (see Table 16-4). This increased to a peak of 21.8 million in 2002 and 20.6 million in 2002. These numbers decreased considerably in 2003 to 17 million but thereafter increased again to 19.2 million. With 2.1 million, the Afghan are the largest officially recognised refugee group supported by UNHCR, followed by Sudanese (0.75 million), and refugees from Burundi and the Democratic Republic of Congo (0.5 million each) (UNHCR, 2005).

Table 16-4 Annual totals of persons of concern to UNHCR

Year (end)	1997	1998	1999	2000	2001	2002	2003	2004
millions	19.7	19.8	20.5	21.8	19.8	20.6	17.0	19.2

Source: UNHCR (2005).

There were large increases in the number of internally displaced persons (IDPs) – civilians uprooted by violence, natural disasters or destitution, who remain within their own countries – and among stateless persons.

The International Displacement Monitoring Centre estimated the number of internally displaced people at the end 2005 at 23.7 million people in over 50 countries. With 12.1 million IDPs in 20 countries, Africa is the worst affected continent. The IDMC also estimated that women and children make up 70 to 80% of all IDPs. The largest IDP population with approximately 5.4 million people is in the Sudan, followed by Colombia (3.7 million), Uganda (2 million), DRC (1.7 million) and Iraq (1.3 million) (IDMC, 2006)

Of growing concerns are 'environmental refugees', people who have to escape the effects of environmental degradation, and who mostly remain within their own country. The predicted 50 million 'environmental refugees' (by 2010) are not yet recognised by any global convention, unlike victims of political upheaval or violence, who have access, through governments and international organisations, to such assistance as financial grants, food, tools, shelter and education and health facilities. According to UNU-EHS the number of people forced to move by environment-related conditions already approximate, and may soon dwarf, the number of officially recognised 'persons of concern' calculated at 19.2 million at the end of 2004 (UNHCR, 2005). Victims of sudden and highly-publicised catastrophes such as the 2004 Asian Tsunami or the 2005 US Hurricane Katrina benefit from the mobilisation of private and public funds. Of much greater concern, however, are the millions of people uprooted by gradual environmental change and degradation, who receive little support to cope and adapt and who are not recognised as refugees with the benefits that follow (UNU-EHS, 2005). A further unaccounted group of refugees includes trafficked people. The 2004 global survey of human trafficking by the US State Department, found that between 600,000 and 800,000 people are trafficked across borders worldwide every year (US State Department, 2005).

Since 9/11, 2001, immigration controls have become stricter. In the US, foreign nationals from 25 designated countries (mainly Islamic) are required to register with immigration authorities. Maintaining generous refugee policies in the light of terrorist threats is a challenge for all countries. Some countries simply refuse migrants or send them to other countries for processing. Other countries impose strict visa requirements and slow processing of claims to discourage 'bogus' asylum seekers.

As the nature of conflict has changed over the years, with the rise in internal conflict, so the number of internally displaced people has risen, providing the second largest group for UNHCR to deal with. As international migratory opportunities decline, the number of these internally displaced people is likely to rise, as is the number of returnees (UNHCR 2003).

The main countries of permanent resettlement are USA, Canada and Australia, whilst in Europe the largest number of asylum seekers were in France, U.K., Germany and Switzerland. The largest number of claims were filed by nationals from the Russian federation, Serbia and Montenegro, and China (UNHCR 2005).

Future predictions are difficult as they depend on the changing conflict situation. However, as travel and communication have become easier there has been a dramatic increase in the number of people seeking asylum in developed countries. The number of official asylum seekers in 2004 fell to its lowest level in 16 years. Whether this is a result of toughening legislation in developed countries or a result of different migration strategies is difficult to say (UNHCR, 2005).

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