International Foundry Forum

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Megatrends in the economy and society around 2030 and more…

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Once upon a time a *town of 100 people* was like

57 Asian
21 Europeans
17 American
8 Africans

30 white
70 other races
30 Christians
70 no

1 just about to be born
1 just about to die

20 with adequate housing

75 live with less than 1€/day
33 don´t have electricity
17 without drinking water

50 are hungry and no one has a computer

1 university degree
70 unable to understand what is written in their own language

6 own 59% of th total wealth

This *town is called world* and is inhabited by 6.272 million people.

And the future of that town, brighter or dimer, depends on three main challenges.

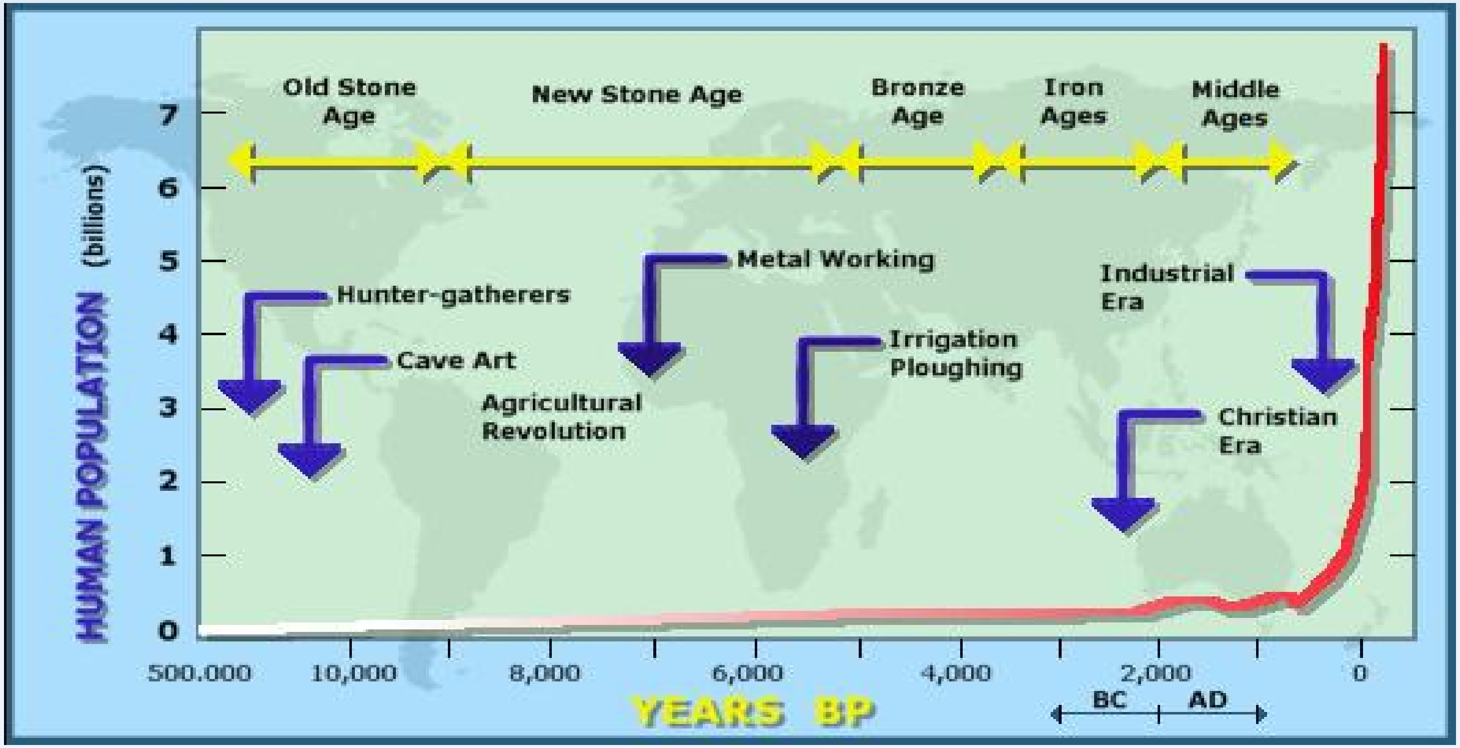
- **The challenge of population**
- **The challenge of economic growth and social cohesion.**
- **The challenge of sustainability**

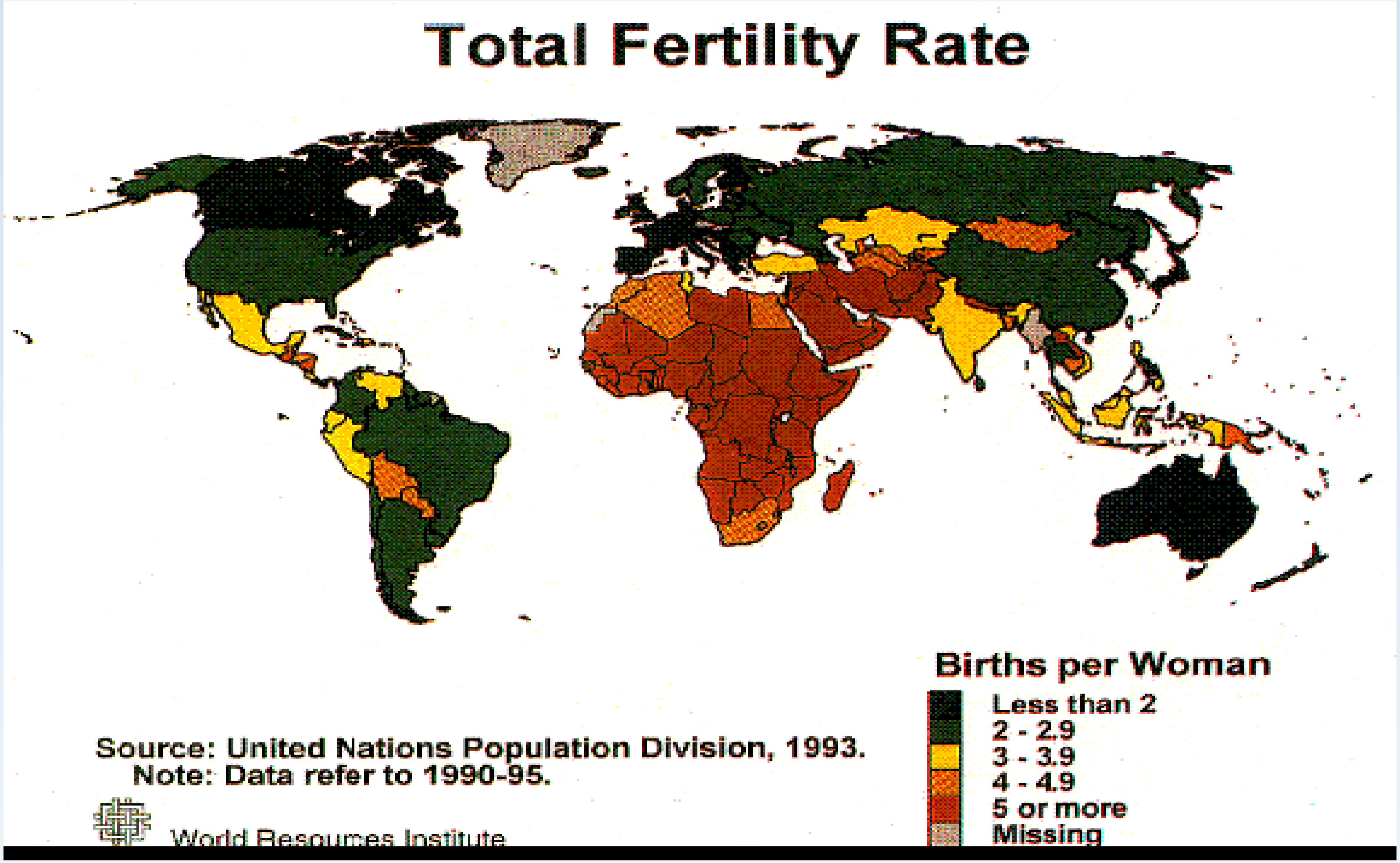
THE CHALLENGE OF POPULATION

Human population follows a J shaped growth- Its nature is such that episodic reductions due to famine or wars don´t affect the inexorable and overpowering upward acceleration in population size.

After 1950, only 40 years to double from 2.5 to 5 billion

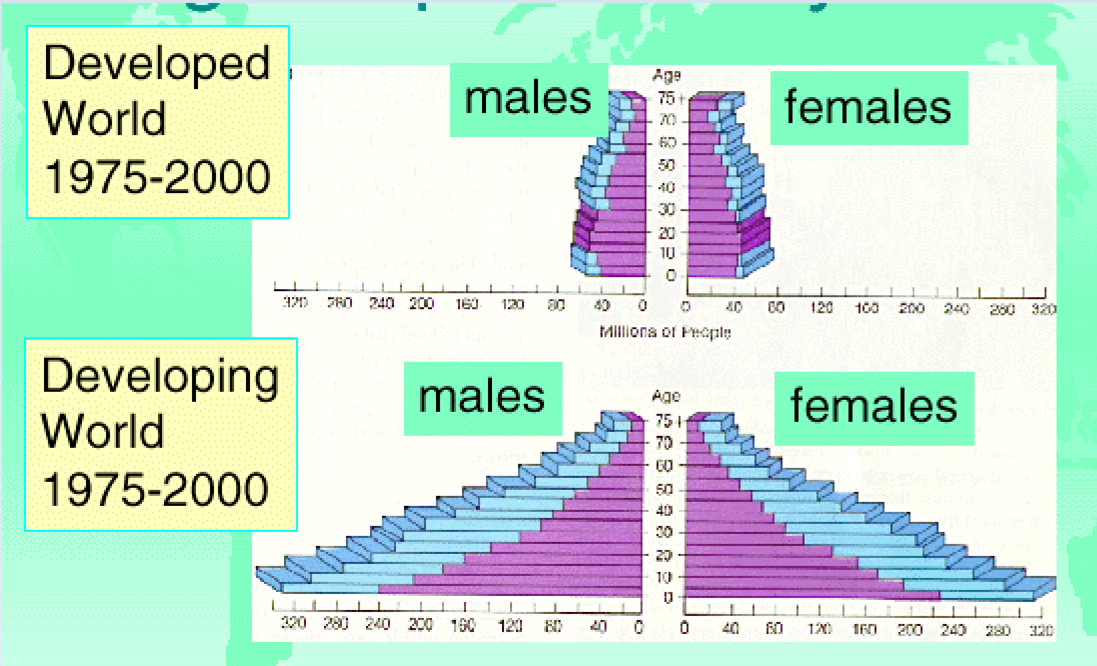
Factors affecting growth: fertility, mortality, initial population and time. Current growth rate is 1.3% per year (90 million per year).



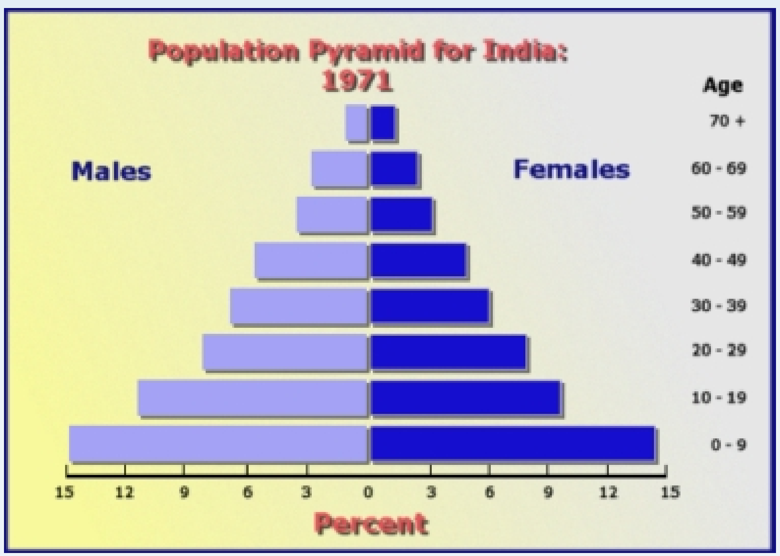


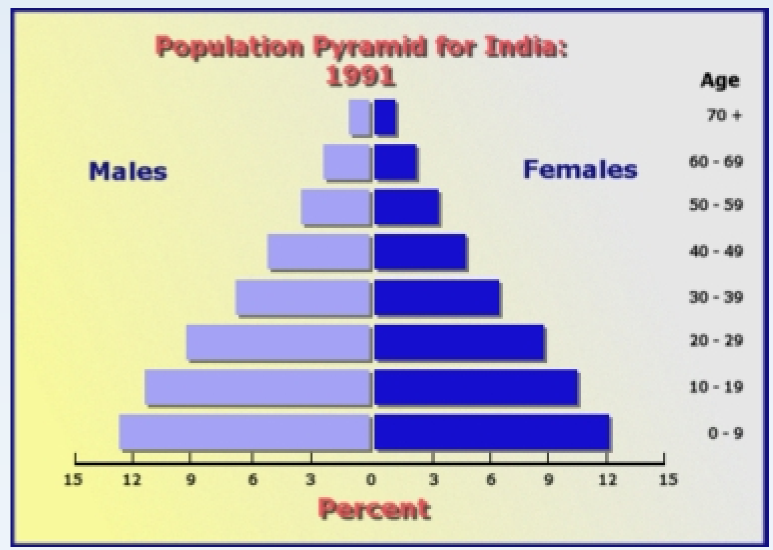
The stabilization of population implies a reduction in fertility globally.

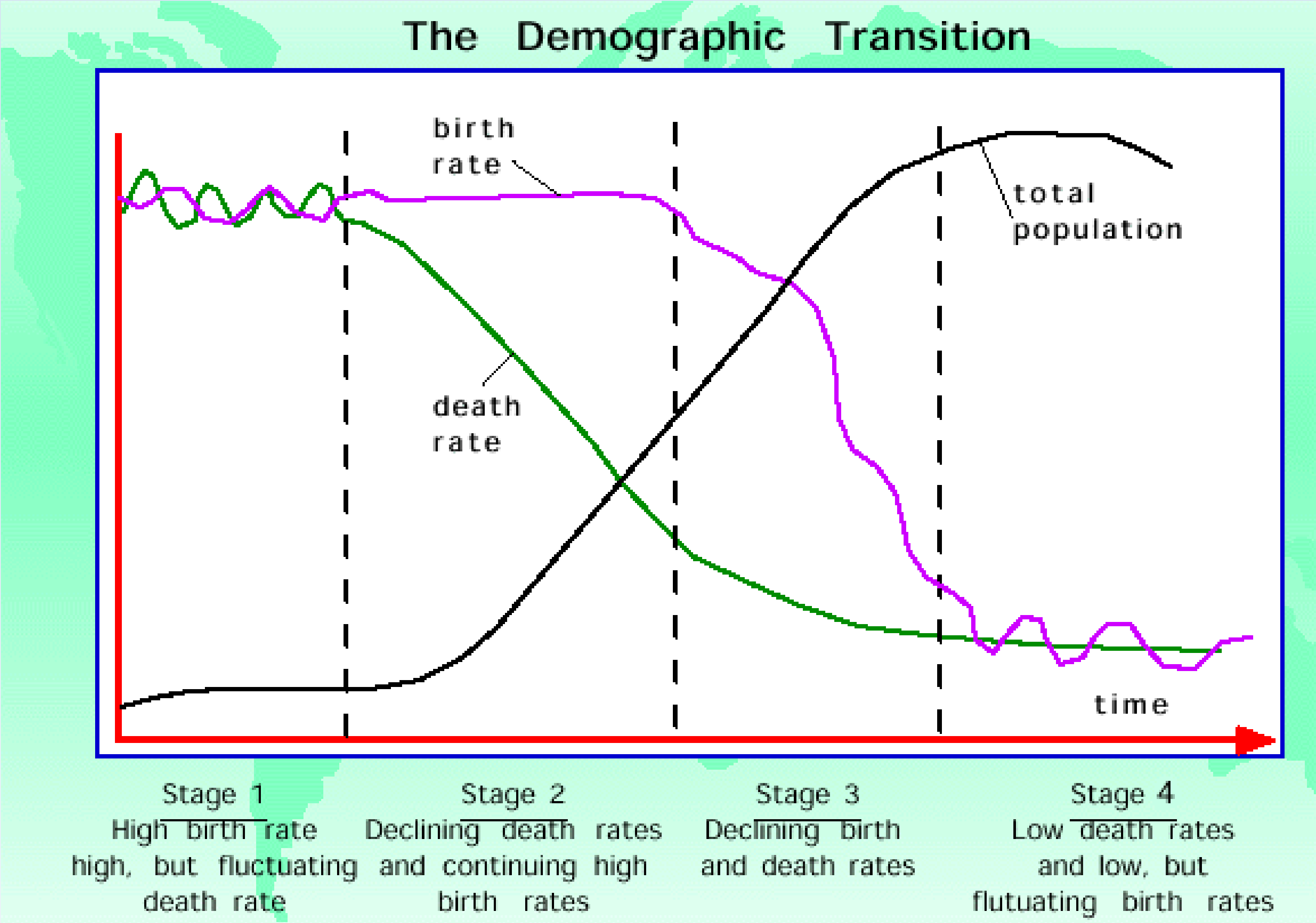
Fertility and level of development clearly linked.



The pyramids show that population control is a challenging task for which both persistence and patience will be needed.

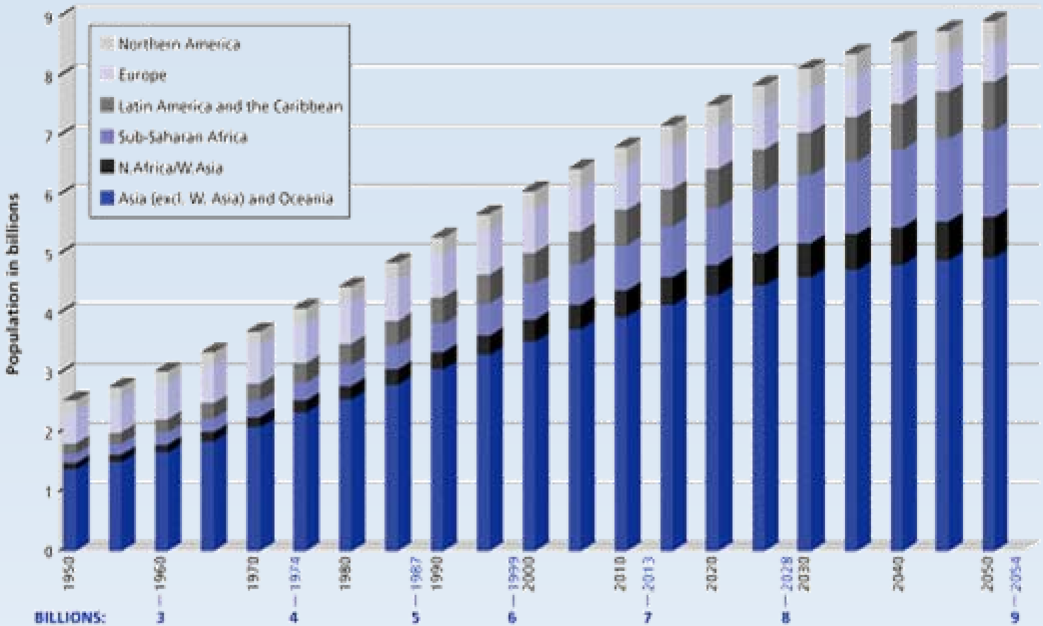




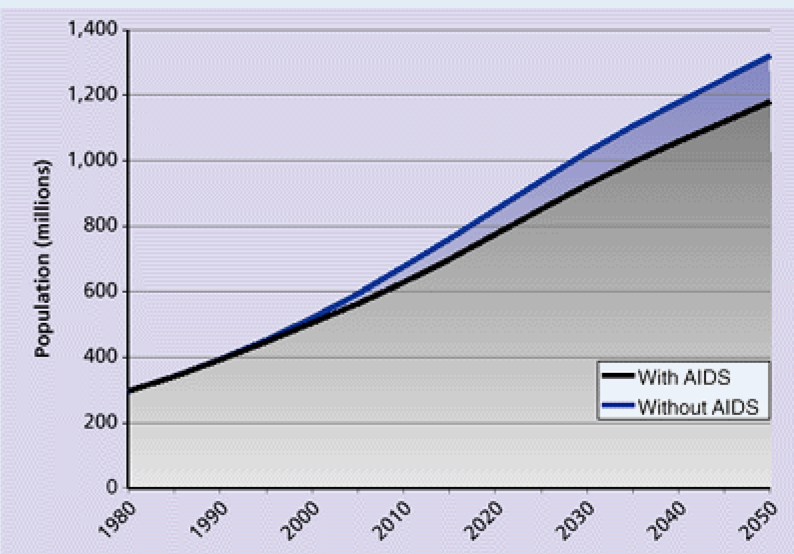


A decline in both death and birth rates is referred to as a complete demographic transition.

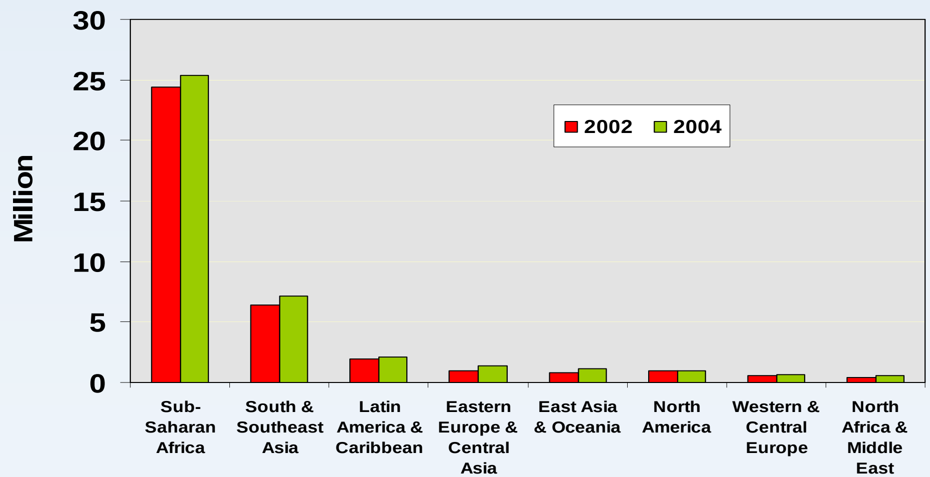
Most current and future growth is taking place in developing countries which have experienced only a partial demographic transition.



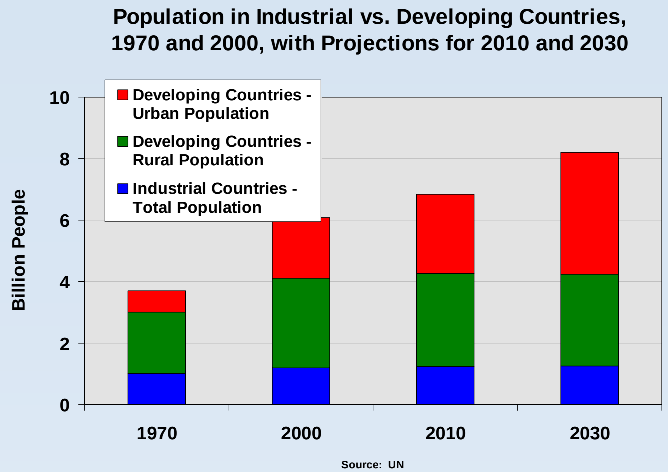
In 1996 the projection for human population was 9.4 billion. Now it has been revised. Global fertility rates have declined more rapidly than expected as health care and reproductive health have improved faster than anticipated. But one third of the reduction in the projection is due to increasing mortality rates in the sub-saharan Africa and India. The most important factor is AIDS.



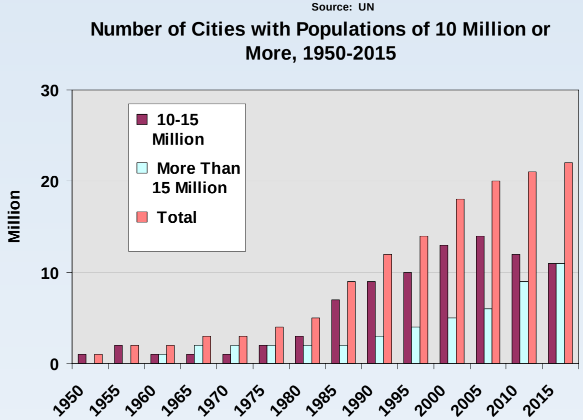
People Living With HIV, by Region, 2002 and 2004



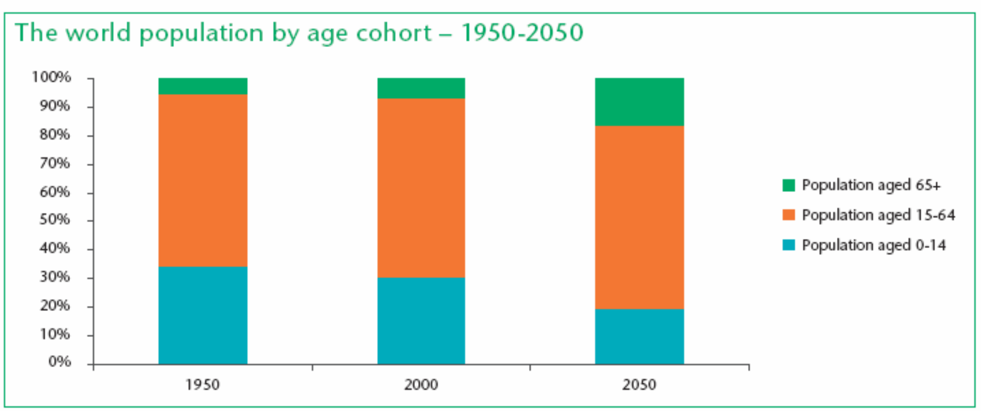
Source: UNAIDS



By 2030 will be much more urban and much less rural. And 90% of world population will live in today´s developing countries.



The number of cities with 10 million or more inhabitants is increasing rapidly and most in the developing regions. In 1960 only New York and tokyo had more than 10 million people. By 2015, 22 megacities will be in less-developed regions. More than 10% of the world´s population will live in these cities.



Source: UN Population Division, *World Population Prospects: The 2008 Revision*, 2008

We can expect much older societies what will put pressure on health expenditures and pensions.

Is there a carrying capacity for humans?

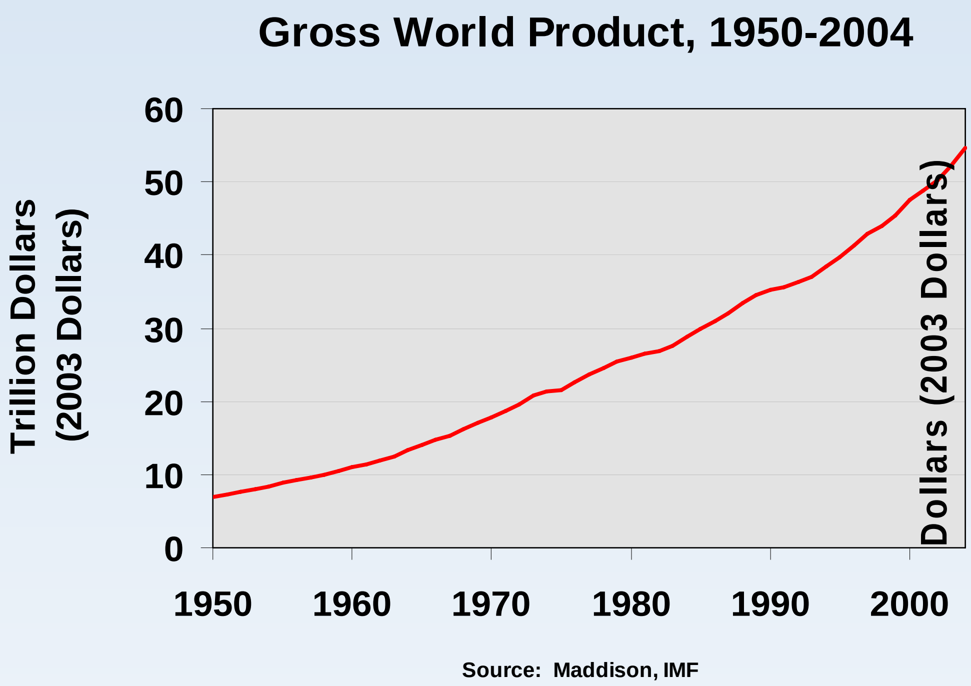
Experience with other species tells us that resource limitation and or habitat degradation will force the human population curves to approach and upper limit or asymptote.

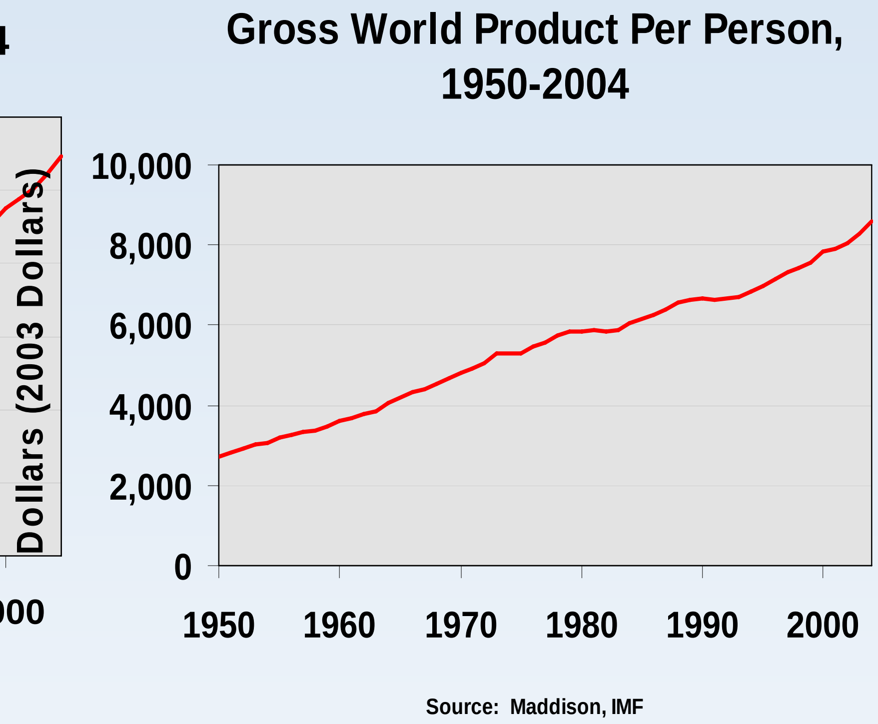
The estimates for that carrying capacity lack scientific consensus, most serious estimates lie in the range of 10-20 billion people.

There are no easy answers to the questions of "how many people can the earth support? combined with "at what level of well-being?.

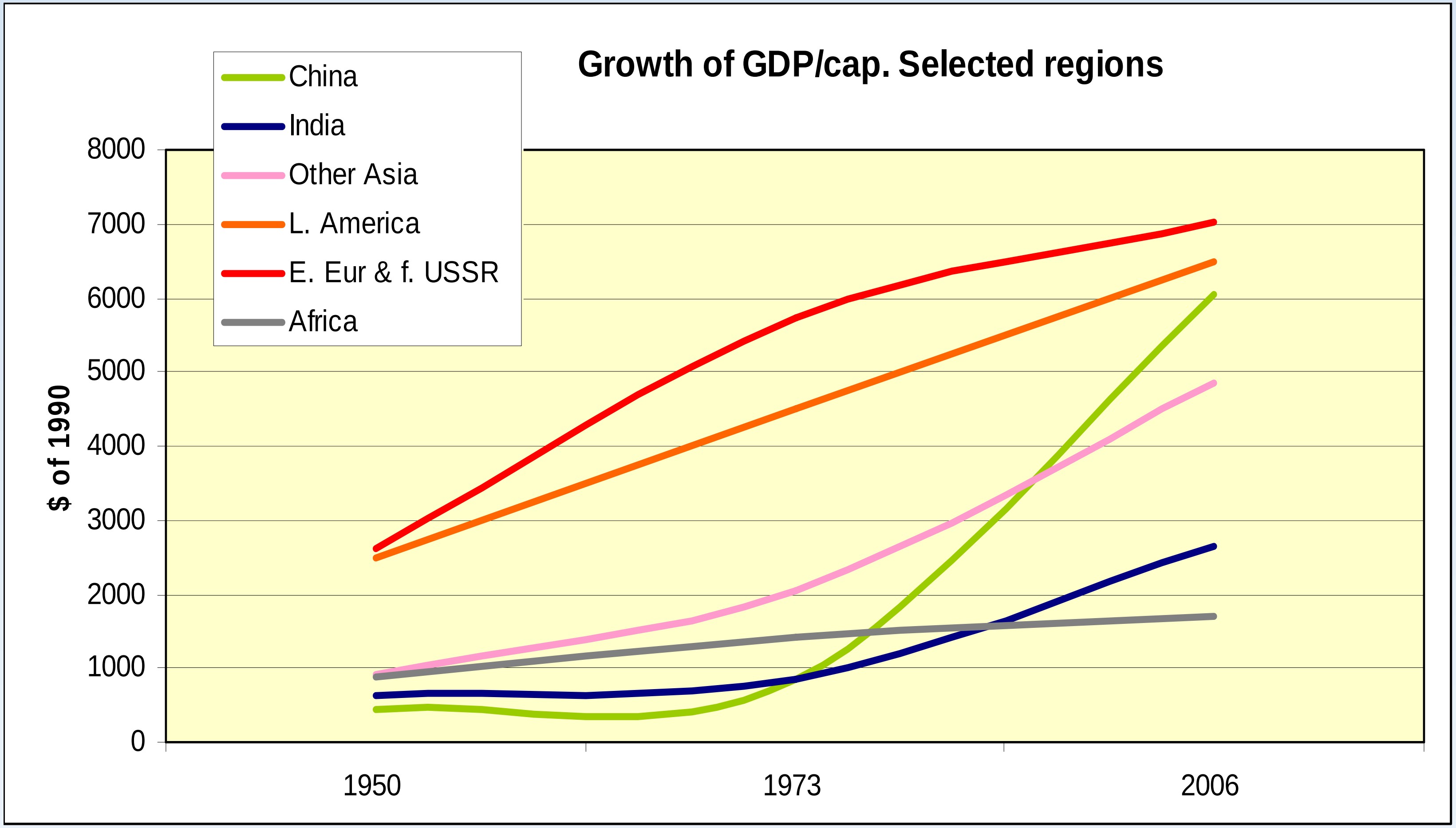
I will leave this challenge with three possible and non-exclusive solutions: a) *make a bigger pie*: increase productive capacities through technology and innovation; b) *put fewer forks on the table*: reduce numbers and expectations of people through such measures as family planning and vegetarian diets and c) *teach better manners*: change the terms of people´s interactions through improved planning and government to enhance social justice.

THE CHALLENGE OF ECONOMIC GROWTH AND SOCIAL COHESION

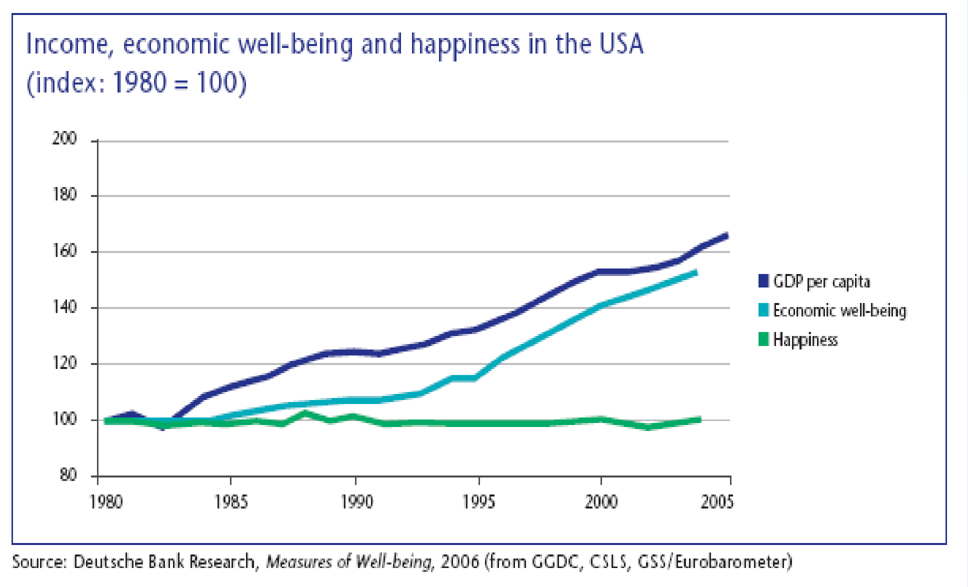


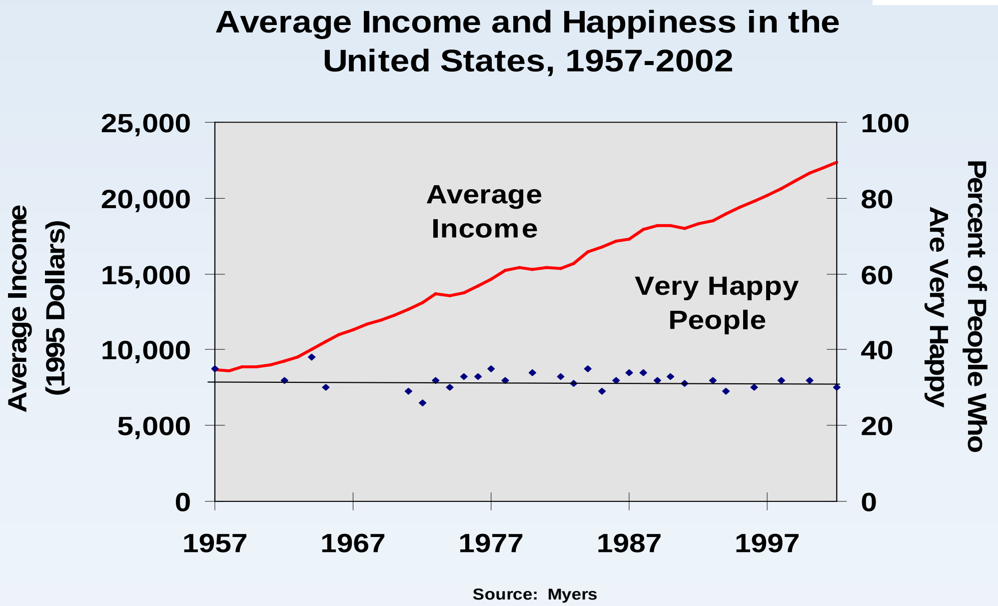


The economic growth has been phenomenal in the last 60 years. GWP has multiplied by 8.8 times and GWP/capita by 3.5.



But not equally everywhere





And it has not made us happier

Two main characteristics define today´s economy: globalization and the digital revolution

Is globalization a new stage in mankind´s history?.

A sign of a new economic phenomenon?

Markets and companies traspassing national frontiers?

Globalization is the economic interdependence of countries due to the diffusion of technology, the increase of exchange of goods and services and the international flows of capital.

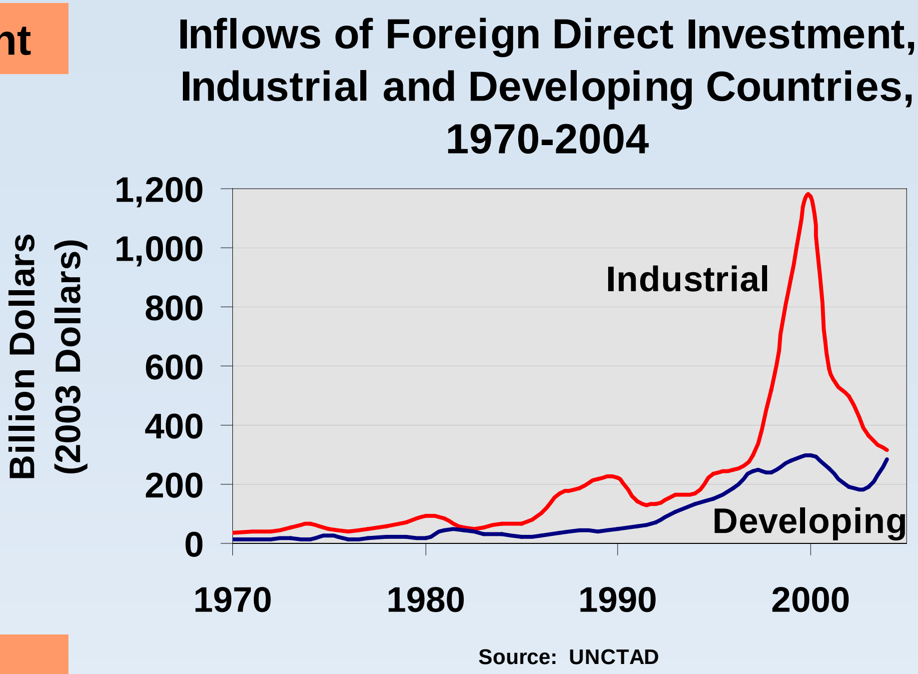
Globalization did not start today but yesterday with similarities and differences.

- **First wave of globalization: 1870 – 1914**
- *Reduction of transport costs (railroads)*
- *Reduction custom duties*
- *Migration towards North America and Australia.*
- *10% of population migrated:from Europe to USA, from China and India to South Asia and other parts of the world.*
- *Wages increased in both migration countries*
- *Income duplicated its growth: from 0,5 to 1,3%.*
- *Exports increased from 4 to 8% of world income.*

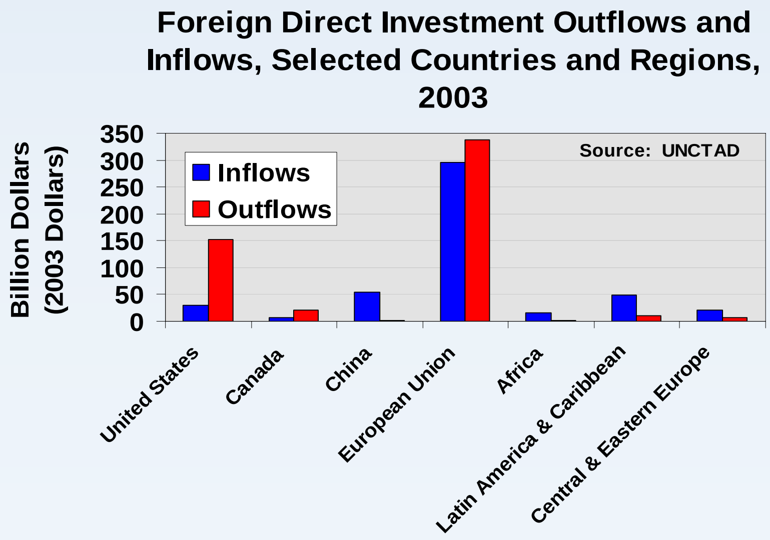
- **Second wave of globalization: 1945 – 1980 and …**
  - *Reduction of custom duties for manufactures*
  - *Reduction of transport costs*
  - *Further reduction of costs for economies of scales.*
  - *Bigger profits for developed countries.*
  - *Poor countries do not benefit (custom duties for agriculture are not reduced, thus their income grow.*
  - *Inequality increases among countries*

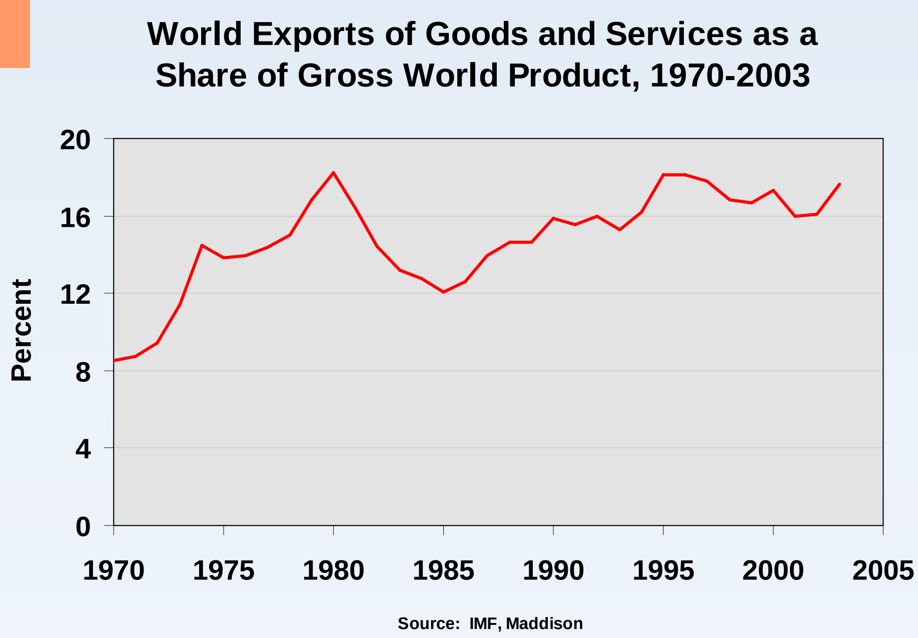
The key to the current period is the cost of communication and access to information and knowledge.

Yes, more trade and more foreign investment



But unequal and not so much in relative terms





Globalization is more trade and more trade is more growth

X/GDP	1890	1913	1960	1990
World	6	9	8	13
USA	5,6	6	3	8
United Kd.	27	29	15	21
Italy	10	14	10	16
Exports		**1913**	**1973**	**1994**
Agriculture		64	54	25
Manufactures		36	45	75
% of X of manufactures		**1913**	**1973**	**1994**
Developed		95	84	72
Developing		5	7	25
Foreign Investment/GDP world		**1913**	**1960**	**1995**
		17,5	6,4	57

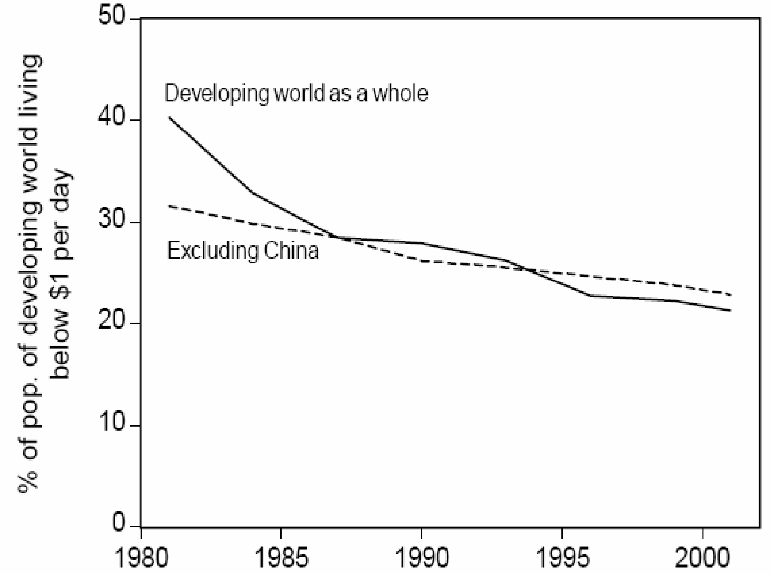
The world is more integrated in trade and finances after World War II, due to lower transport and communication costs and to lower barriers from public policies. This is not new nor complete. One hundred years ago, globalization was stronger and still there is a lot of road to cover. For USA the ratio trade/production should grow 6 times so that USA will trade with the world as it does inside the country.

More growth has been accompanied with more inequality between people though less global poverty.

Poverty is less but not everywhere. And the reduction is not equal either.

	1981	1984	1987	1990	1993	1996	1999	2001
Asia	56.65	38.77	28.04	29.54	24.89	15.91	15.30	14.33
Eastern Europe	0.79	0.61	0.44	0.54	3.74	4.39	6.25	3.40
LatinAmerica	10.33	12.46	11.59	11.90	12.20	9.39	9.72	9.47
M. East- North Africa	5.07	3.83	3.17	2.32	1.81	2.29	2.65	2.36
South Asia	51.51	46.77	45.04	41.26	40.06	39.93	32.76	31.89
SubSaharan Africa	41.61	46.27	46.86	44.51	44.05	46.07	45.74	46.41

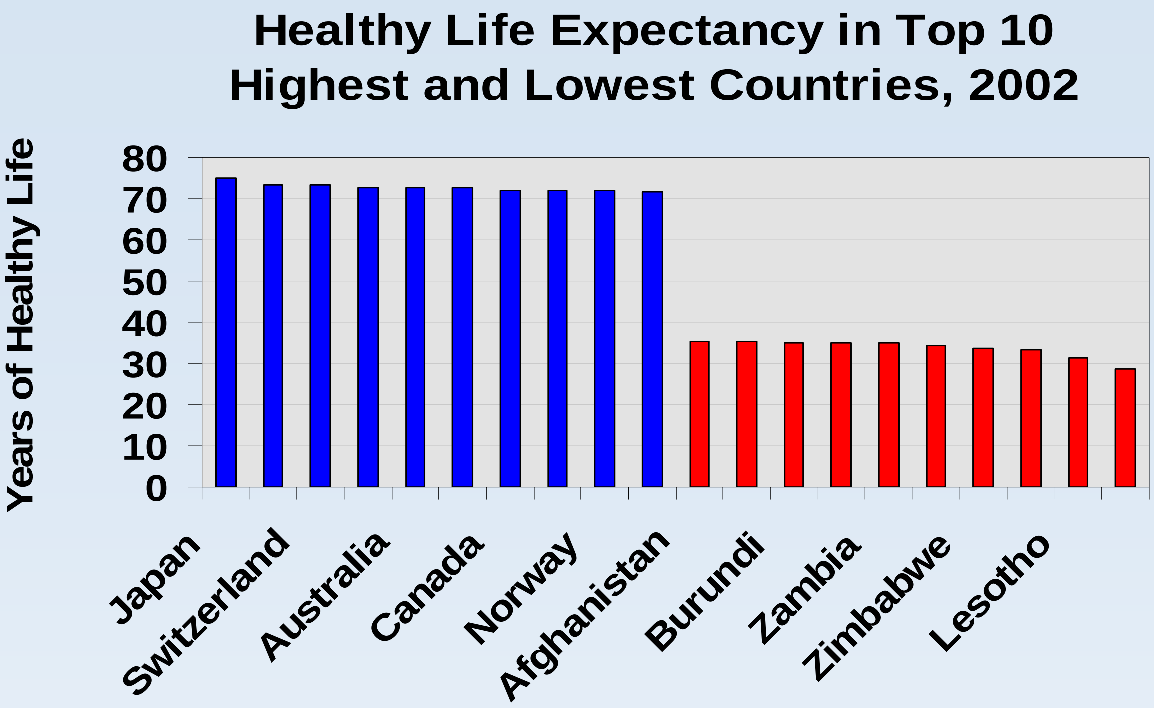
Poverty in developing countries 1980-2002



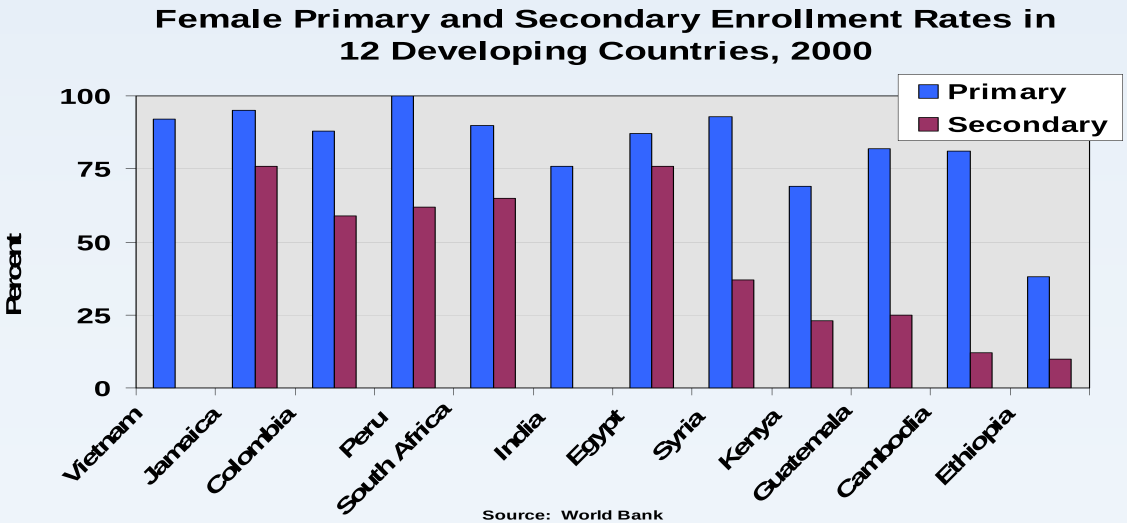
Note: The figure gives the percentage of the population of low and middle-income countries estimated to living households with consumption or income per person less than $32.74 per month at 1993 Purchasing Power Parity.
Source: Data from Chen and Ravallion (2004b).

In the 90s, extreme poverty has been reduced in most of Asia, much less in Latin America, very little in the North of Africa and the Middle East. It increased in Eastern Europe and then diminished.But in the subsaharan Africa the situation is worst and more population are now under extreme poverty (less than 1 dollar per day)

And poverty translates into less life expectancy and poor health and education

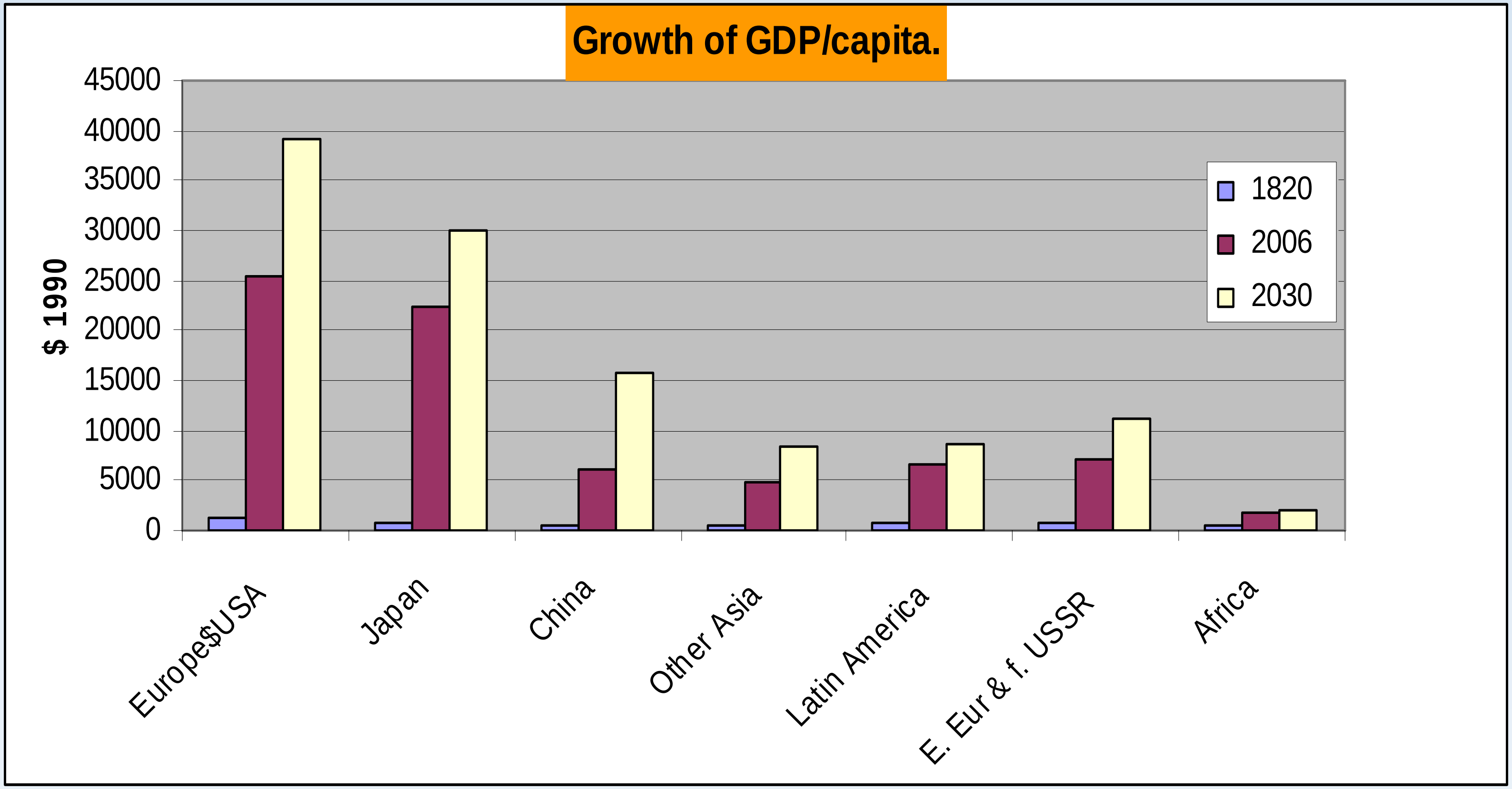


Source: WHO



Source: World Bank

The economic growth in perspective and in the future



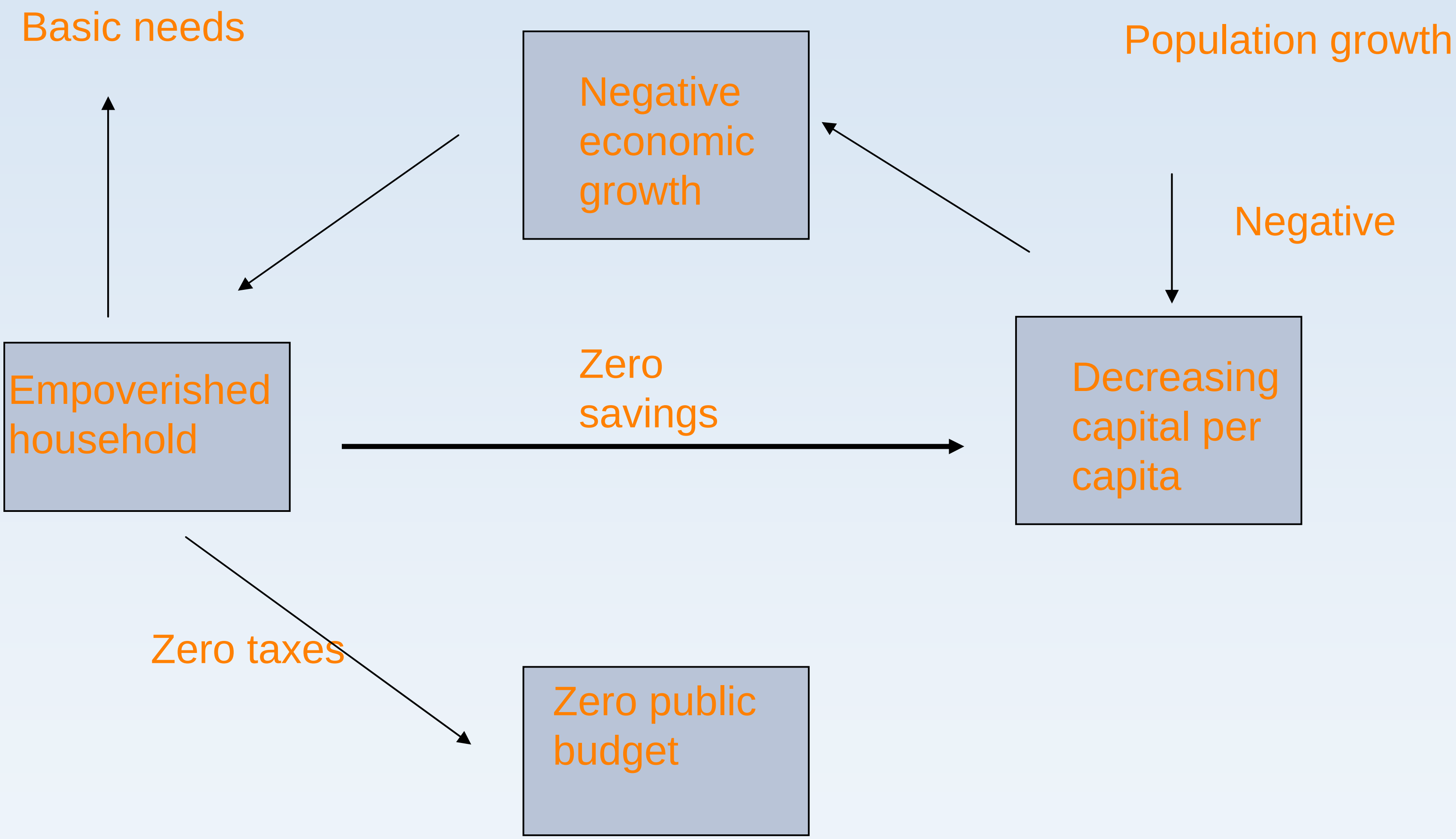
All regions were poor in 1820

All regions had economic growth

The actual rich regions grew much more

The key fact in modern times is not the transfer of income from one region to another but global growth of world income at different speeds in different regions

Poverty ´s trap: the non- accumulation of capital.



Poor countries don´t have

Human capital: health,nurturing and capacities for each person to be productive.

Entrepreneurial capital: machines, instalations, transport for agriculture, manufactures and services.

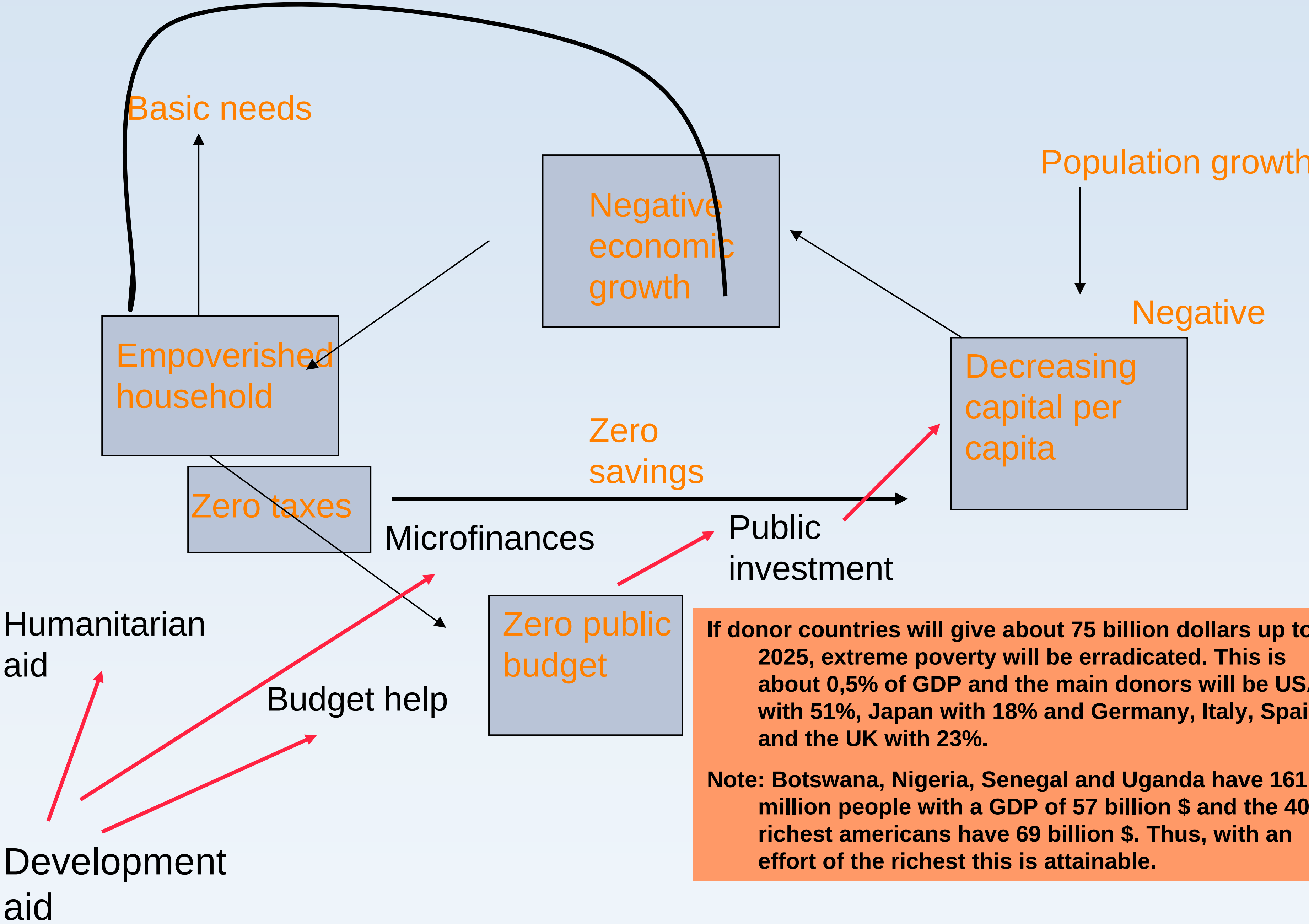
Infraestructure: roads, energy, water, airports, ports and communication systems. Key aspects por business productivity.

Natural capital: fertile and productive soil, biodiversity and efficent eco-systems.

Institutional capital: commercial laws, legal system, government services and police for a prosper division of labor.

Knowledge: the scientific and technological know-how to increase productivity and promote natural and physical capital.

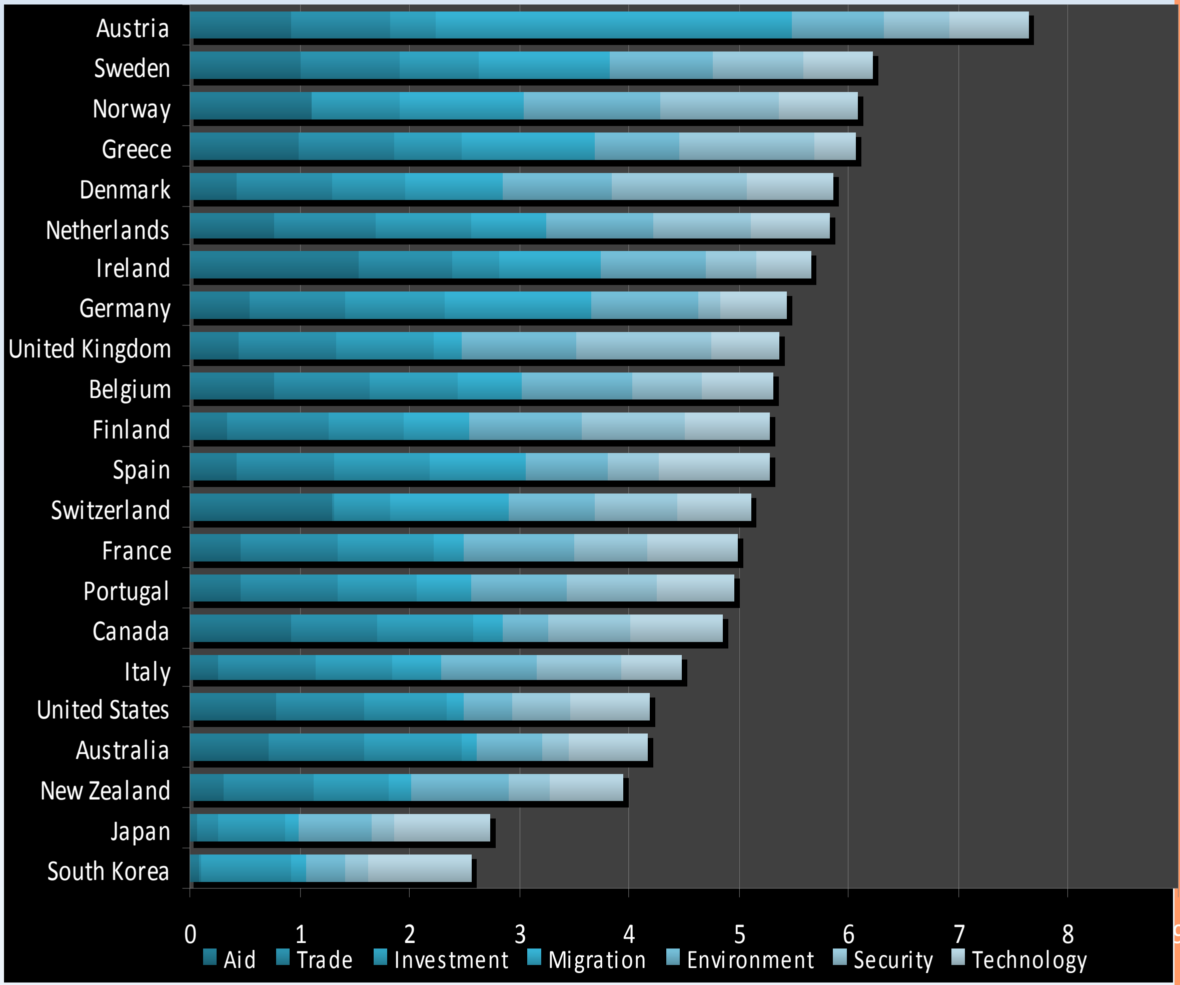
The role of development aid



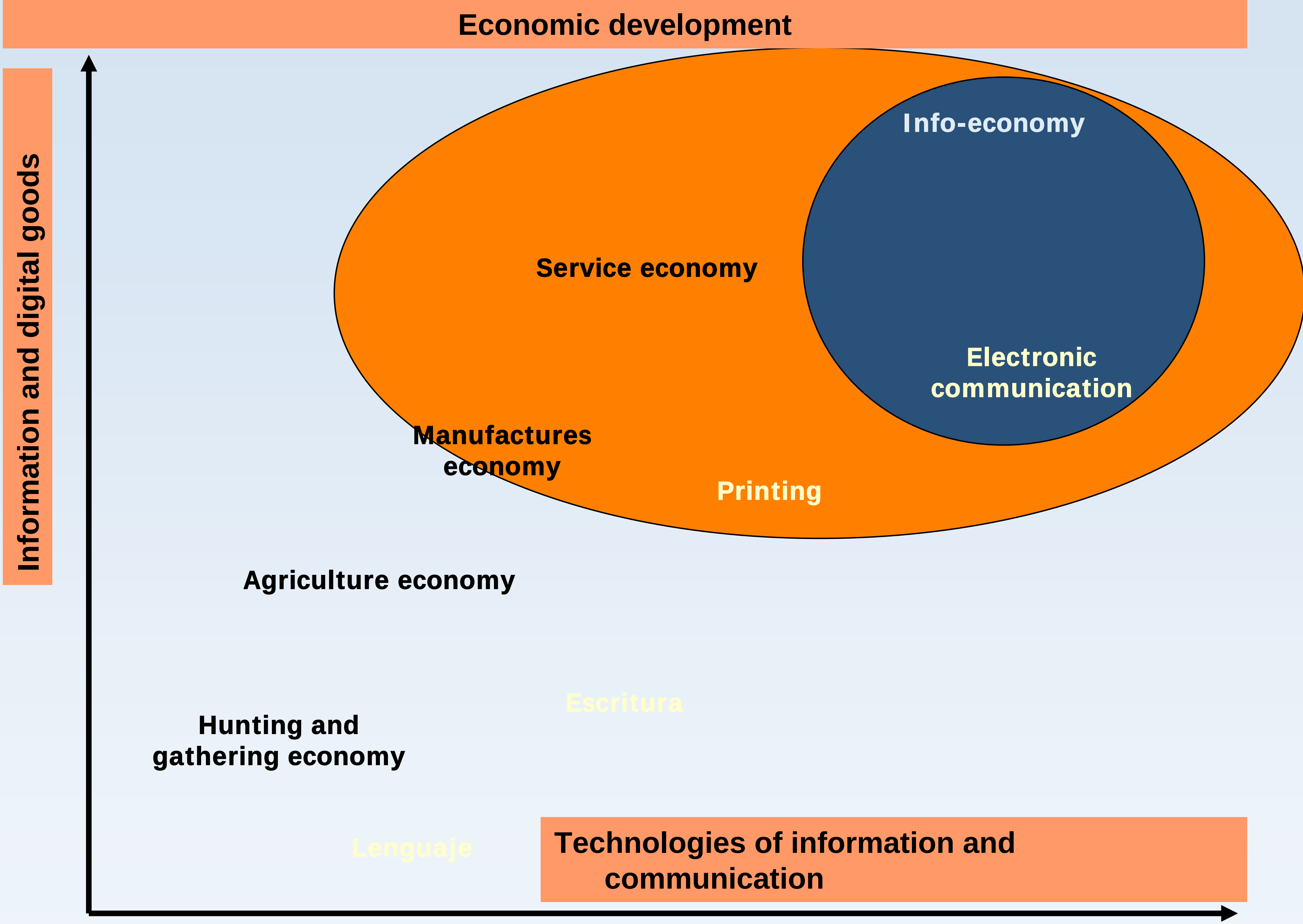
If donor countries will give about 75 billion dollars up to 2025, extreme poverty will be erradicated. This is about 0,5% of GDP and the main donors will be USA with 51%, Japan with 18% and Germany, Italy, Spain and the UK with 23%.

Note: Botswana, Nigeria, Senegal and Uganda have 161 million people with a GDP of 57 billion $ and the 400 richest americans have 69 billion $. Thus, with an effort of the richest this is attainable.

But traditional aid is not enough and sometimes is wrong. The Commitment to Development Index



1. **Rich countries policies matter.**
2. **Aid is important but trade, migration, investment, security and technology policies are clearly relevant**
3. **Aid is about more than money: the design ofthe aid programs as important as the quantity.**
4. **Coherence matters: the index penalizes countries that give with one hand but take away with the other.**
5. **Partnerships are powerful**
6. **No one is perfect. All countries score below average in at least one area and most in three.**


Economic development
Information and digital goods
Info-economy
Service economy
Electronic communication
Manufactures economy
Printing
Agriculture economy
Escritura
Hunting and gathering economy
Lenguaje
Technologies of information and communication

Information and knowledge in today´s economy

Production can be understood as:

Strenght (human and machinery)+information=needs satisfaction

Yesterday

S+I=goods and services

Today

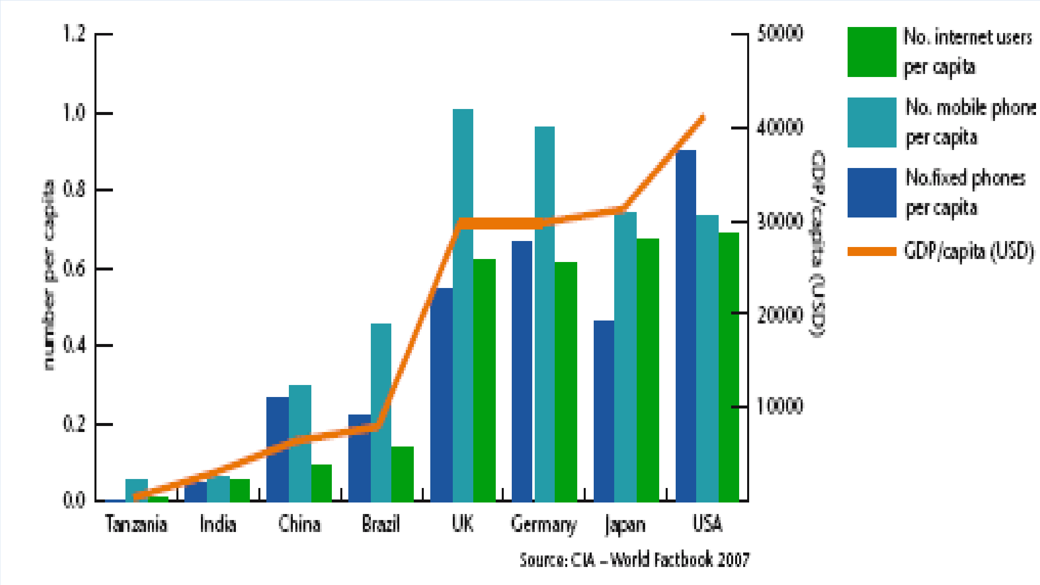
S(I,K)+I(I,K)+K(I,K)=physical goods and services that contain much more information and knowledge than before and digital goods and services. Also all factors of production contain much more information and knowledge than before.

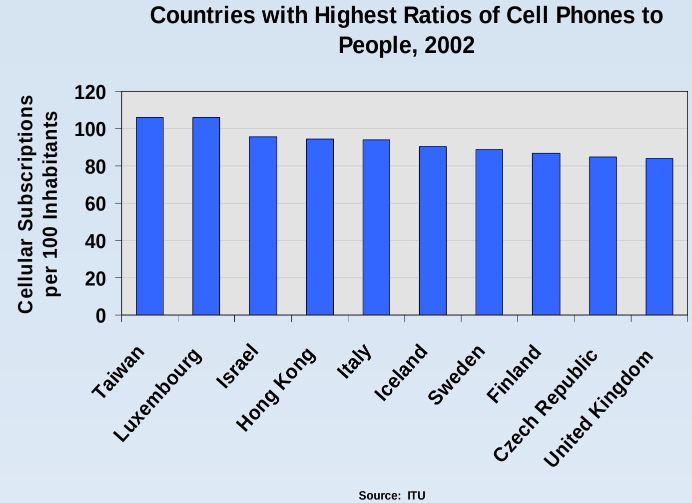
USA output one hundred years ago weighted the same in tones as today but its economic value is now 20 times larger. Thus, the I and the K have more value now.

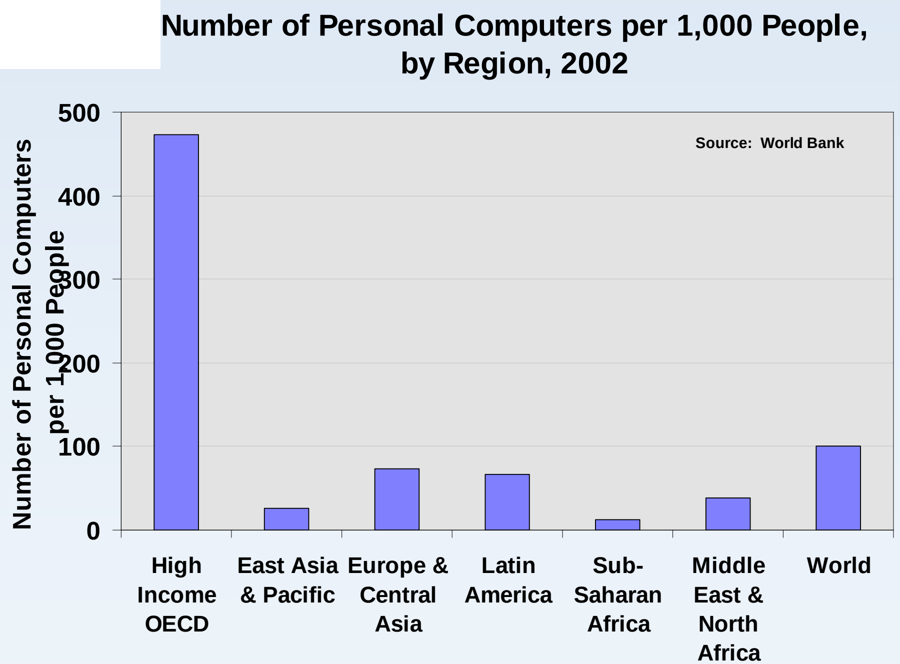
Knowledge is non-codifiable information. It costs a lot to be produced but very little to be reproduced. It is heterogeneous, relational and it matters the setting where it is produced.

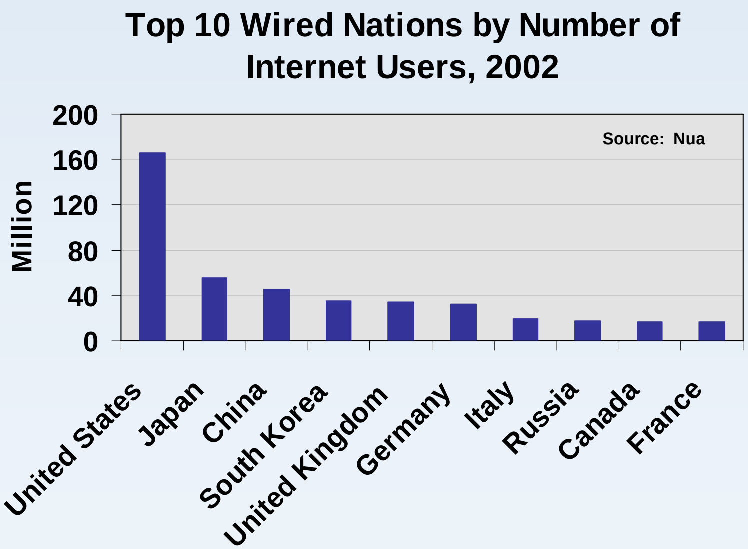
From mass production in goods and in information towards much more personalization of goods, information and knowledge. From homogeneous products and services towards a whole range of differentiated products and services.(1990:80.000 brands per year now more than 200.000; products in supermarkets form 13000 to more than 40000 today. Advertising of 2000 new products in 1970 today mre than 60.000 advertised new products per year).This means much more of imperfect markets and imperfect competition.

This makes innovation at the heart of the system. Innovation is simply knowledge applied to the production of new goods and services.









But accesibility to the digital economy is not equal for all and we not only have income and education and help inequalities but a digital divide.

The economy and the population by 2030 by region

	Population in millions		GDP in billion constant		GDP per capita	
	2006	2030	2006	2030	2006	2030
Western Europe	397	400	8473	12556	21332	31389
USA	298	364	9266	16662	31049	45774
Other W. Offshoots	57	67	1388	2414	24168	36025
West	**753**	**831**	**19127**	**31632**	**25399**	**39065**
China	1311	1458	7928	22983	6048	15763
India	1095	1421	2888	10074	2637	7089
Japan	127	116	2864	3488	22471	30072
Other Asia	1329	1795	6450	14884	4855	8292
Latin America	562	702	3644	6074	6485	8648
E. Eur & f. USSR	409	402	2870	4508	7023	11214
Africa	911	1449	1557	2937	1710	2027
Rest	**5744**	**7343**	**28202**	**64948**	**4910**	**8845**
World	**6497**	**8175**	**47329**	**96580**	**7285**	**11814**
Interregional Spread					18,2:1	22,6:1
West-Rest Spread					5,2:1	4,4:1

	Share of World Population		Share of World GDP		Growth of GDP	Growth of GDP/cap
	2006	2030	2006	2030		
Western Europe	6	5	18	13	1,9	1,9
USA	5	4	20	17	3,2	1,9
Other W. Offshoots	1	1	3	2	3,0	2,0
West	**12**	**10**	**40**	**33**	**2,6**	**2,2**
China	20	18	17	24	7,6	6,4
India	17	17	6	10	10,0	6,8
Japan	2	1	6	4	0,9	1,4
Other Asia	20	22	14	15	5,2	2,8
Latin America	9	9	8	6	2,7	1,3
E. Eur & f. USSR	6	5	6	5	2,3	2,4
Africa	14	18	3	3	3,5	0,7
Rest	**88**	**90**	**60**	**67**	**5,2**	**3,2**
World	**100**	**100**	**100**	**100**	**4,2**	**2,5**

The challenge for economic growth and social cohesion will still be to alleviate poverty worldwide.

According to the most sound estimates world gdp will keep growing and producing more wealth everywhere but richer countries will still be the richest.

Income per capita will grow in developing regions but not sufficiently to catch up so that poverty in most regions of developing countries will still be an issue of utmost relevance.

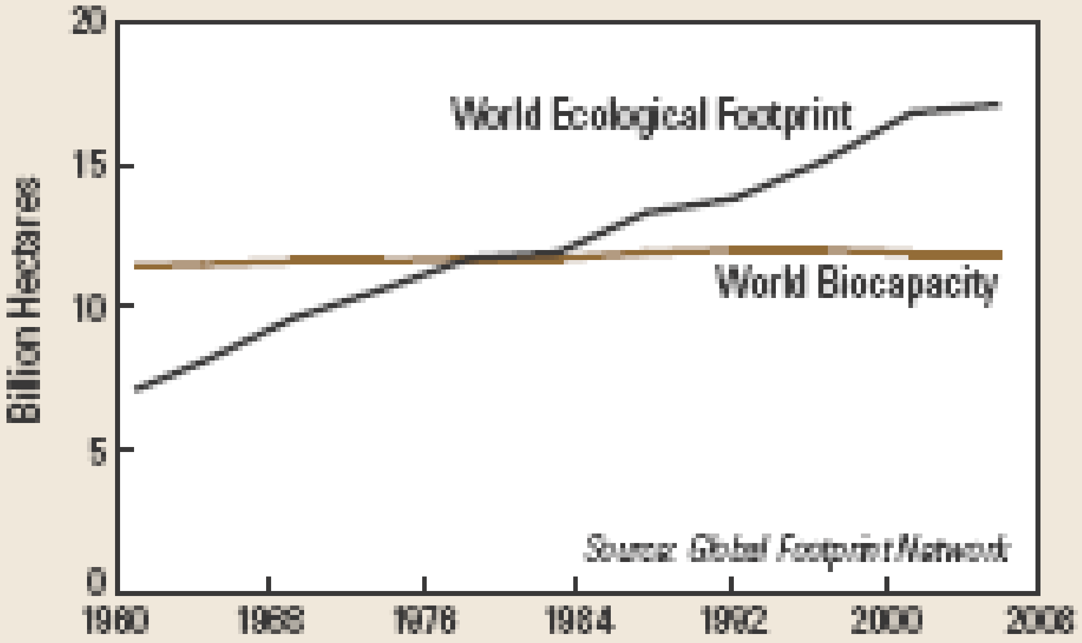
Our economy produces more interconnected people but also amplifies the differences through the digital divide.

But economic growth has to be more equitable but also more sustainable

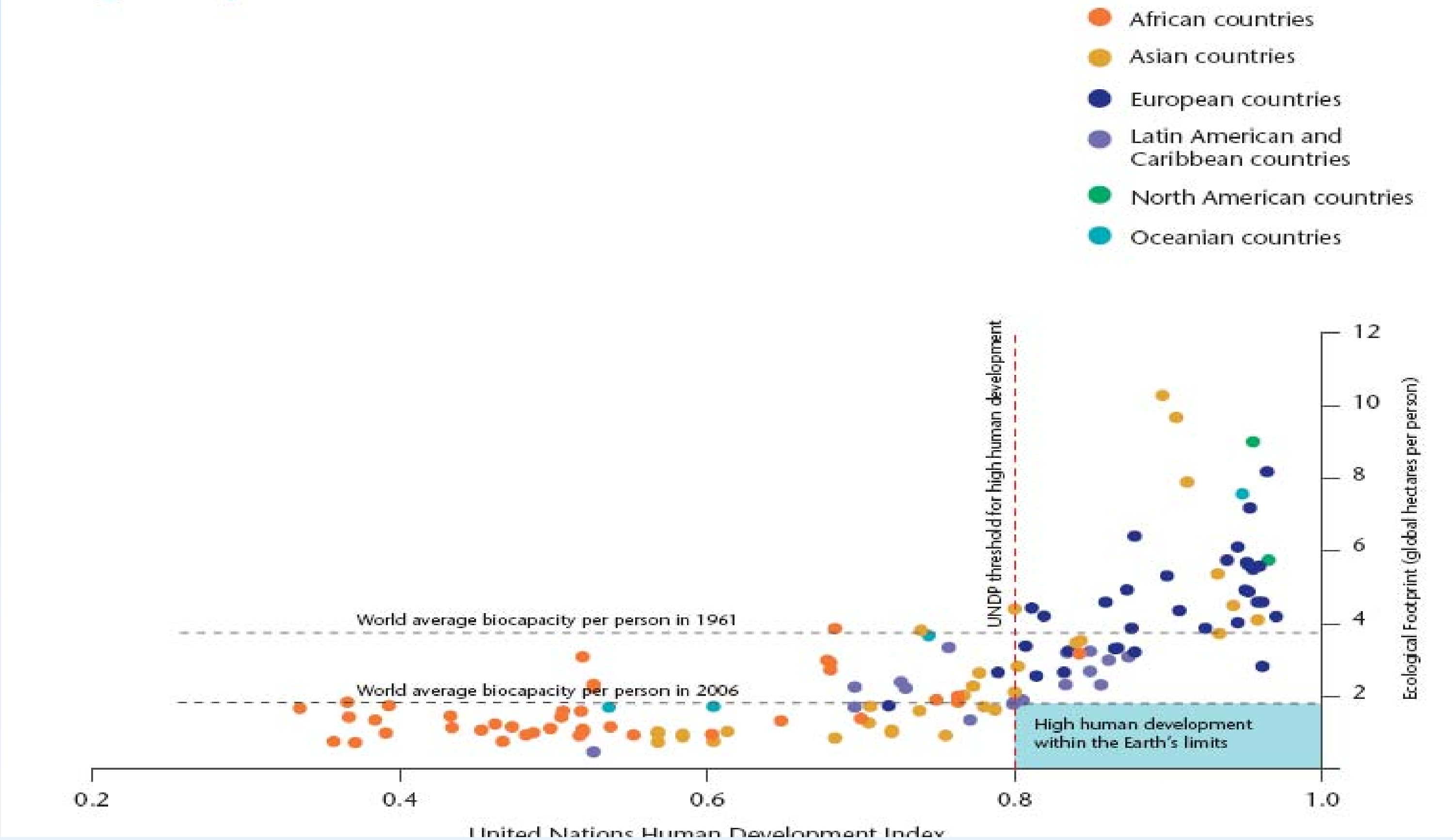
THE CHALLENGE OF SUSTAINABILITY

From growth to development that "meets the needs of the present without compromising the ability of future generations to meet their own needs"

Figure 3. World Ecological Footprint and Biocapacity, 1961–2006



Box 1.1: Meeting the dual goals of sustainability – High human development and low ecological impact



The chart sums up the challenge of sustainable development: meeting human demands within the ecological limits of the planet. It is a snapshot showing how different countries perform according to the United Nations Development Programme's (UNDP) HumanDevelopment Index (HDI) and Global Footprint Network's Ecological Footprint. In countries to the left of the vertical line marking a score of less than 0.8 on the HDI, a high level of development, as defined by UNDP, has not been attained. Countries above the horizontal dotted line and to the right of the vertical line have achieved a high level of development but place more demand on nature than could be sustained if everyone in the world lived this way.

In order to move toward a sustainable future the world will need to address all dimensions of this chart – the concepts of success and progress, the biocapacity available per person, as well as helping countries either improve their levels of development or reduce their ecological impact (several countries face both challenges).

THE ENVIRONMENT

	[Green Light]	[Yellow Light]	[Red Light]
Climate change		• Declining GHG emissions per unit of GDP	• Global GHG emissions • Increasing evidence of an already changing climate
Biodiversity & renewable natural resources	• Forested area in OECD countries	• Forest management • Protected areas	• Ecosystem quality • Species loss • Invasive alien species • Tropical forests • Illegal logging • Ecosystem fragmentation
Water	• Point-source water pollution in OECD countries (industry, municipalities)	• Surface water quality and wastewater treatment	• Water scarcity • Groundwater quality • Agricultural water use & pollution
Air quality	• OECD country SO_2 & NOx emissions	• PM & ground-level ozone • Road transport emissions	• Urban air quality
Waste & hazardous chemicals	• Waste management in OECD countries • OECD country emissions of CFCs	• Municipal waste generation • Developing country emissions of CFCs	• Hazardous waste management and transportation • Waste management in developing countries • Chemicals in the environment and in products

To do nothing

Figure 4. Sources of losses in mean species abundance to 2030

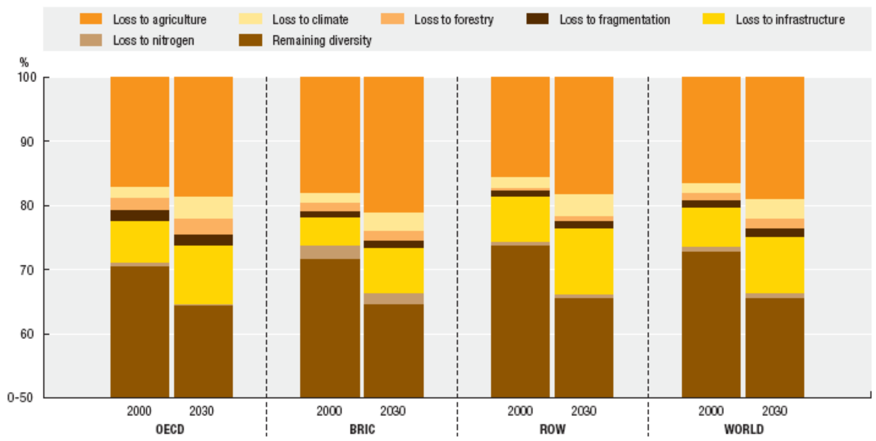
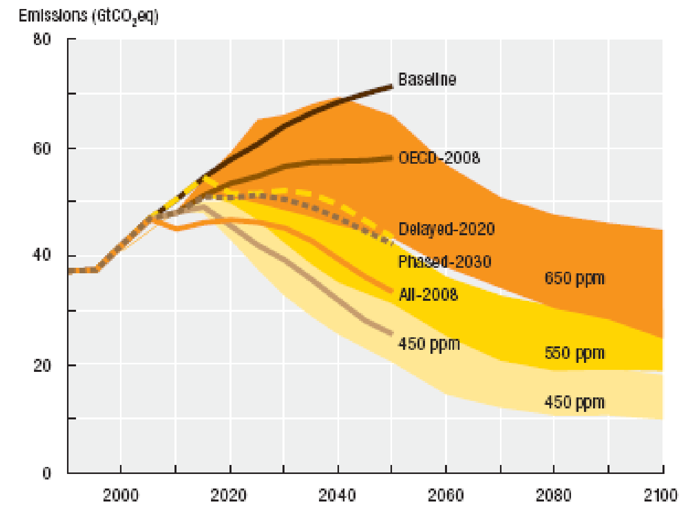


Figure 2. Global GHG emission pathways: Baseline and mitigation cases to 2050 compared to 2100 stabilisation pathways



Note: OECD 2008 = all OECD countries apply a GHG tax of USD 25 per tonne of CO_2-eq; Delayed 2020 = all countries apply the tax, starting only in 2020; Phased 2030 = OECD countries apply the tax in 2008, BRIC in 2020 and Rest of the World (ROW) in 2030; All 2008 = all countries apply the tax, starting in 2008; 450ppm = scenario to stabilize GHG concentrations in the atmosphere at 450 ppm CO_2-eq; For all USD 25 tax cases, the tax is escalating by about 2% per year after the initial year of introduction.

Figure 6. Premature deaths from urban ozone exposure for 2000 and 2030

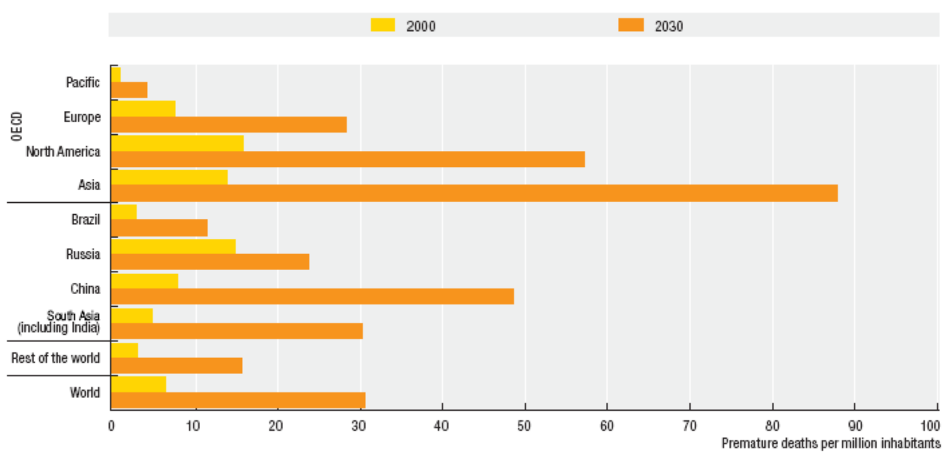
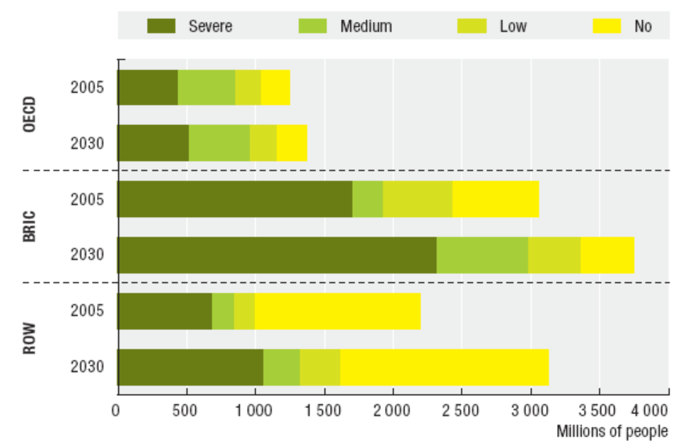


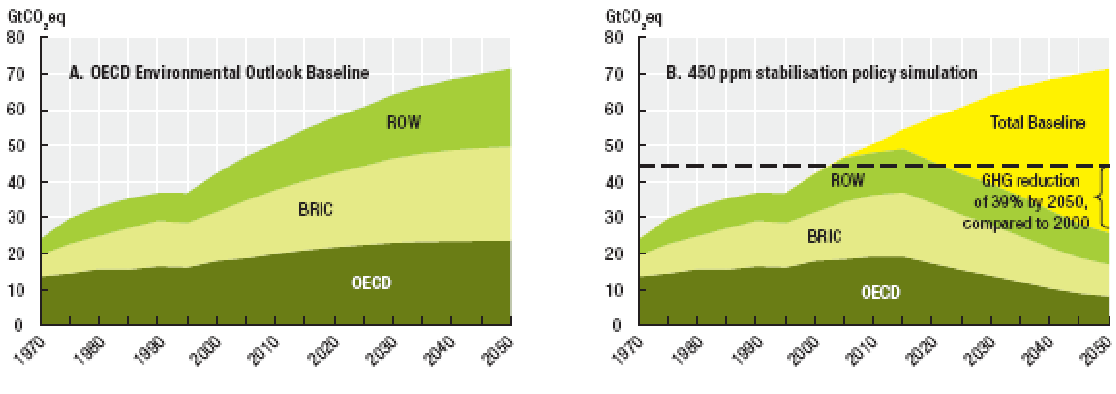
Figure 5. People living in areas of water stress, by level of stress, 2005 and 2030

(millions of people)



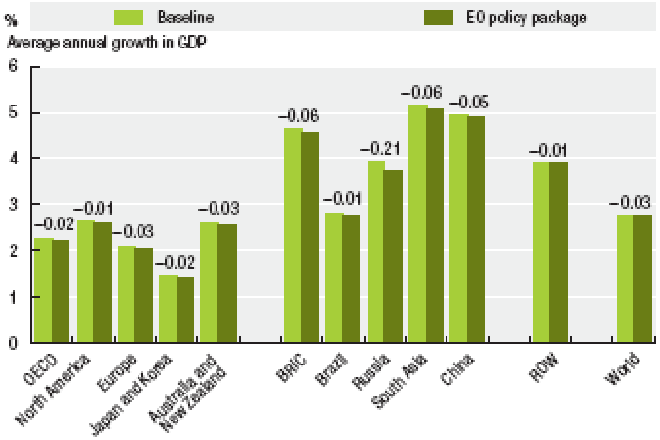
The costs of policies and the objectives

Figure 3. Total greenhouse gas emissions (by region), 1970 2050



Note: BRIC = Brazil, Russia, India, China. ROW = Rest of world.

Figure 1. Average annual GDP growth, 2005-2030

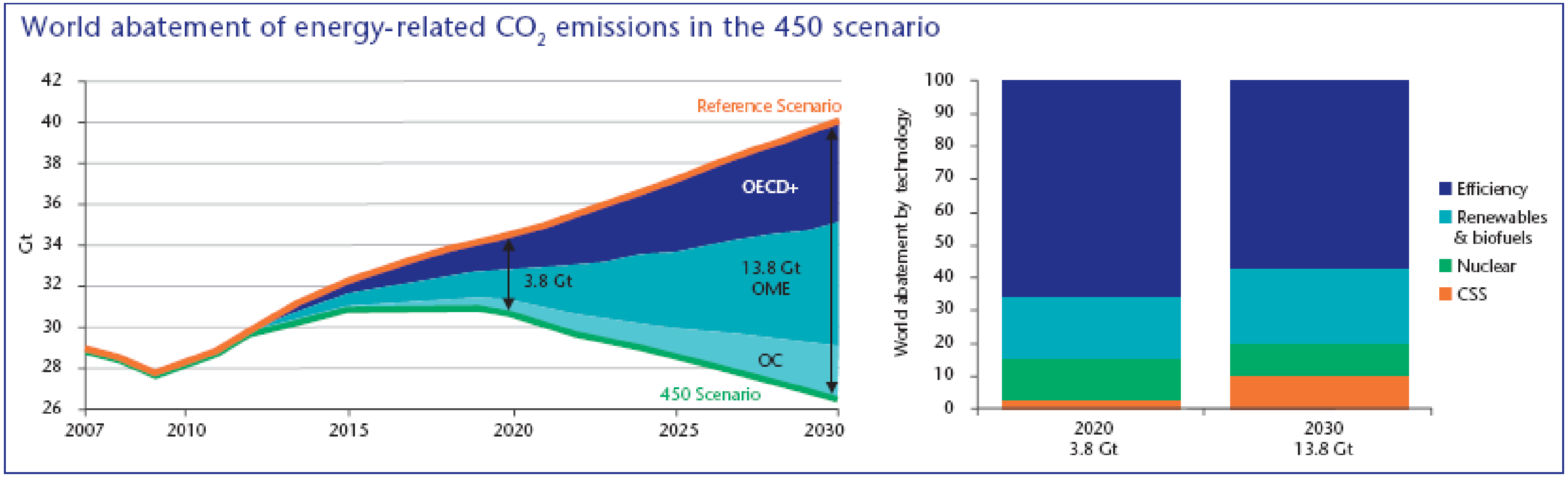


POLICIES

Use a mix of complementary policies to tackle the most challenging and complex environmental problems, with a strong emphasis on market-based instruments, such as taxes and tradable permits, in order to reduce the costs of action.

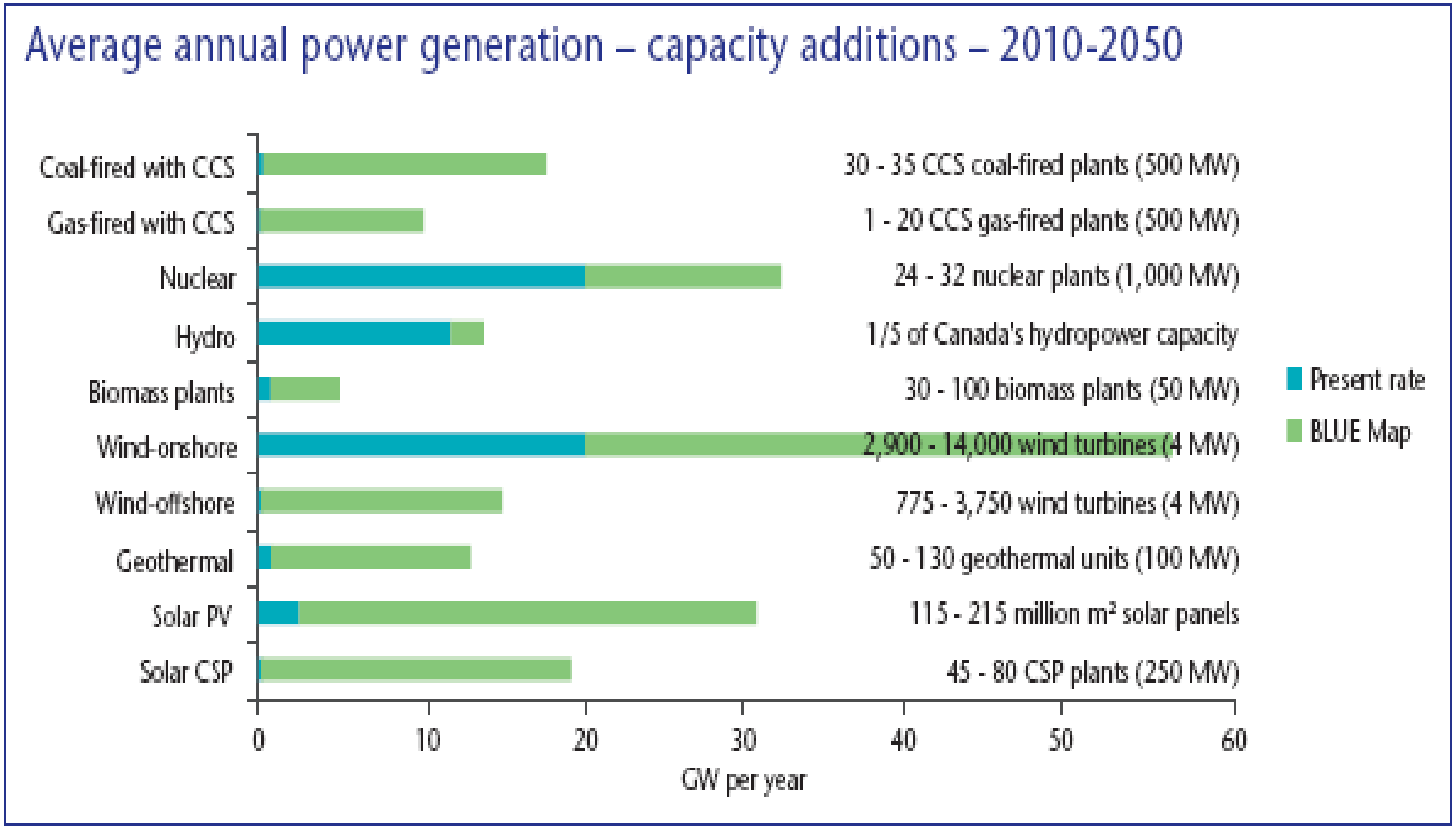
- *Prioritise action in the key sectors driving environmental degradation: energy, transport, agriculture and fisheries. Environmental ministers cannot do this alone. Environmental concerns need to be integrated into all policy-making by relevant ministries including finance, economy and trade, and reflected in all production and consumption decisions.*
- *Ensure that globalisation can lead to more efficient use of resources and the development and dissemination of eco-innovation. Business and industries need to play a lead role, but governments must provide clear and consistent long-term policy frameworks to encourage eco-innovation and to safeguard environmental and social goals.*
- *Improve partnerships between OECD and non-OECD countries to address global environmental challenges. Brazil, Russia, India, Indonesia, China and South Africa (BRIICS) in particular are key partners given their growing influence in the world economy and increasing share of global environmental pressures. Further environmental co-operation between OECD and non-OECD countries can help spread knowledge and technological best practices.*
- *Strengthen international environmental governance to better tackle trans-boundary and global environmental challenges.*
- *Strengthen attention to the environment in development co-operation programmes, and promote more coherent policies.*

ENERGY IN 2030



Source: International Energy Agency, *World Energy Outlook 2009*, 2009 © OECD/IEA 2009

Global energy demand has increased, but secure and low-carbon energy is widely available and used efficiently. Global emissions from the energy and power sector have been reduced to 14 Gt of CO2 per year, roughly an 80% reduction from business-as usual projections. The energy sector's environmental footprint has been cut. The energy mix comprises around 50% renewables and about 25% each for nuclear and fossil fuels equipped with carbon capture and storage (CCS) from 2030 onwards (see figure 3.8). The power grid has real-time adaptive, often cross-continental, capabilities to handle intermittent output from renewable power sources. Production and demand-side energy efficiency play vital roles, brought about by increased conversion efficiencies, greater conservation and supporting social systems and infrastructure.



Source: International Energy Agency, *Energy Technology Perspectives 2008*, © OECD/IEA 2008

For that mix the additional capacities of the different types of power generators will be substantial in some cases.

POLICIES

International consensus on the effective management of greenhouse gas emissions

Global price for carbon complemented by a mix of policy measures: public funding for RD&D in promising technologies, regulation, international cooperation and legislation to establish continentalscale grids and competitive electric markets, as well as more tax measures to encourage private sector research and mechanisms for effective technology transfer.

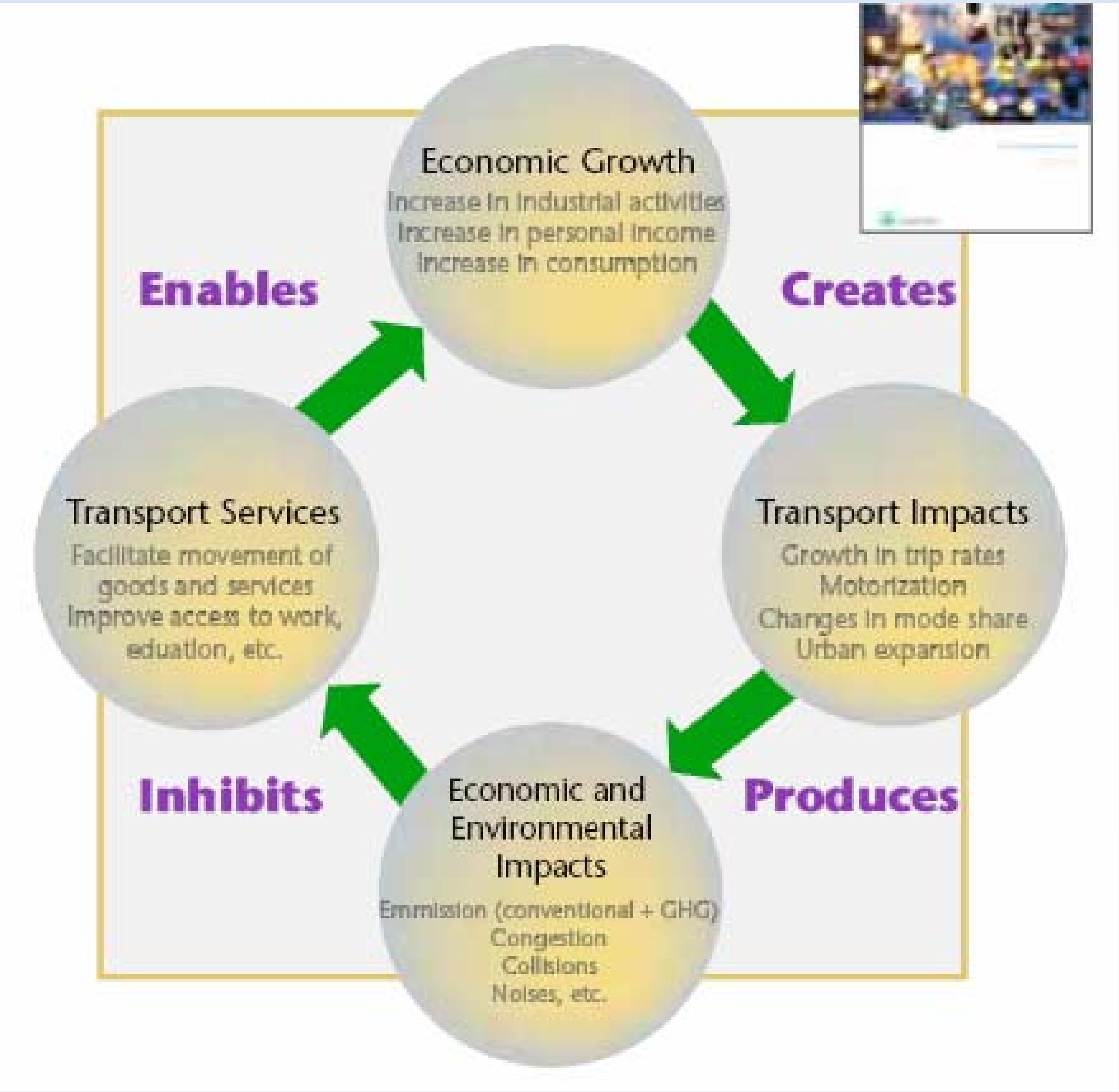
Effective policies to lower the costs of renewable electricity production and improve the efficiency of other forms of production

Incentives and information measures to drive demand-side energy-efficiency gains

Sufficient and secure demonstration, deployment and acceptance of promising technologies, such as CCS and nuclear

Greater focus on demand-side efficiency and the behavior changes that go with it

THE CHALLENGE OF MAKING MOBILITY SUSTAINABLE



THE TRANSPORT DIVIDE

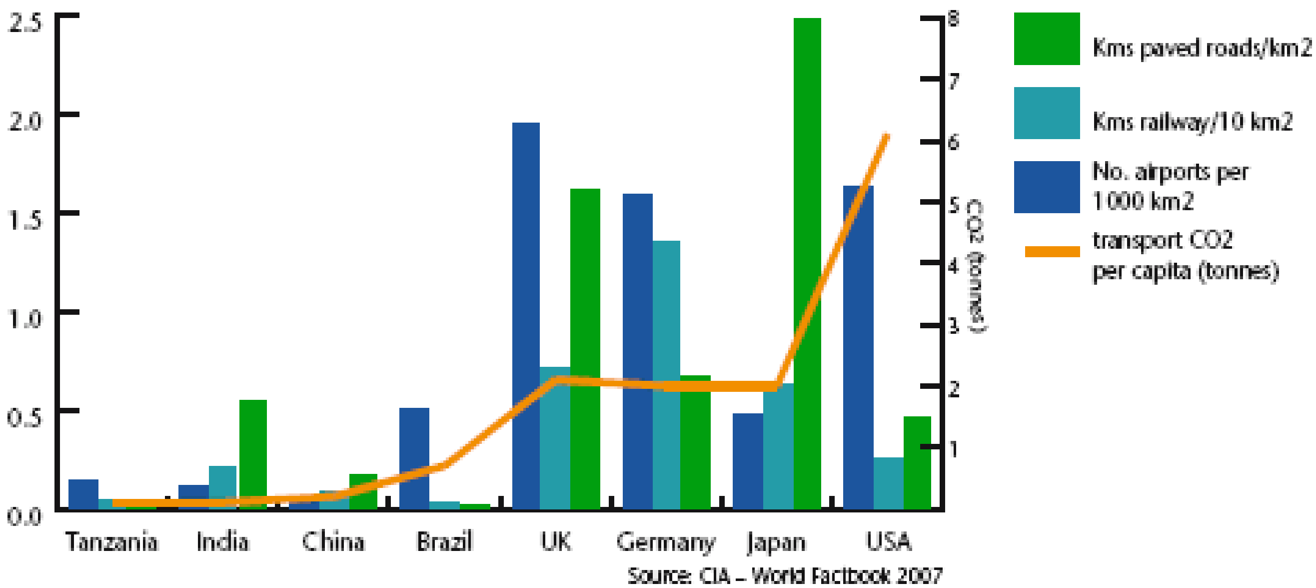
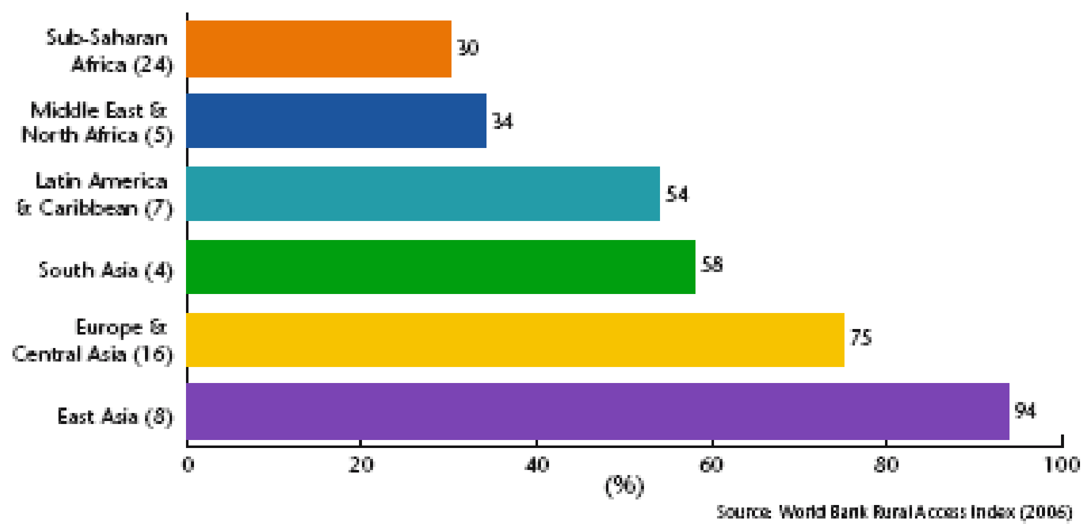


Figure 17. Percentage of people within 30 minutes walk of an all weather road (no. of countries included)



MOBILITY FOR DEVELOPMENT 2030

Access to mobility is available to all, increasing social and economic activities. Transport volume more than doubles in passenger and tonne kilometers, but is tempered by information and communication technologies (ICT). Holistic mobility management involving all key actors lowers the number of transport deaths to close to zero, and negative environmental impacts are substantially reduced. In line with IEA scenarios, CO_2 emissions are reduced by some 30-40%. Vehicle efficiency improves; advanced technologies such as electric vehicles and highly fuel-efficient aircraft based on light materials, superior aerodynamics and engine efficiencies are deployed. Depending on the technological potential in passenger and freight transport, the GHG intensity of light-duty vehicles is reduced by 80% through downsizing, lighter weight, more efficient drivetrains, and low-carbon fuels. Other modes – road freight, aviation and shipping – decrease their intensity by at least 50%. Alternative fuels – sustainable biofuels, hydrogen and electricity produced from low-carbon sources – reduce transport-related CO_2 emissions. NOx and particulate emissions from vehicles are almost eliminated. Policies speed up research, development and deployment of these technologies. Close cooperation among decision-makers, planners and industries improves transportation infrastructure. Intelligent transportation systems (ITS) enhance the efficiency, speed and reliability of public and private transport, and increase the comfort and acceptance of co-modality. People's desire for eco-efficiency and the availability of real-time information enable them to choose well among transport modes and use their vehicles efficiently.

POLICIES

Infrastructure investments keep up with growing demand for passenger and freight transport

Integrated urban planning, especially in fast-growing cities

ITS connects vehicles to each other and to infrastructure

Development and deployment of efficient internal combustion vehicles improve new-vehicle carbon intensity up to 30-40%, enabled by better policies and fuels

Policy-makers and industry partner to speed up research into and deployment of alternative drivetrains and advanced biofuels

Vehicle users adopt more efficient driving behavior, stimulated through information campaigns

International standards for sustainable biofuels are adopted, and monitoring systems installed

Biofuels for aviation are tested and used

Integrated rail networks spread • Improved energy efficiency in shipping is achieved through holistic approaches to transport chain performance

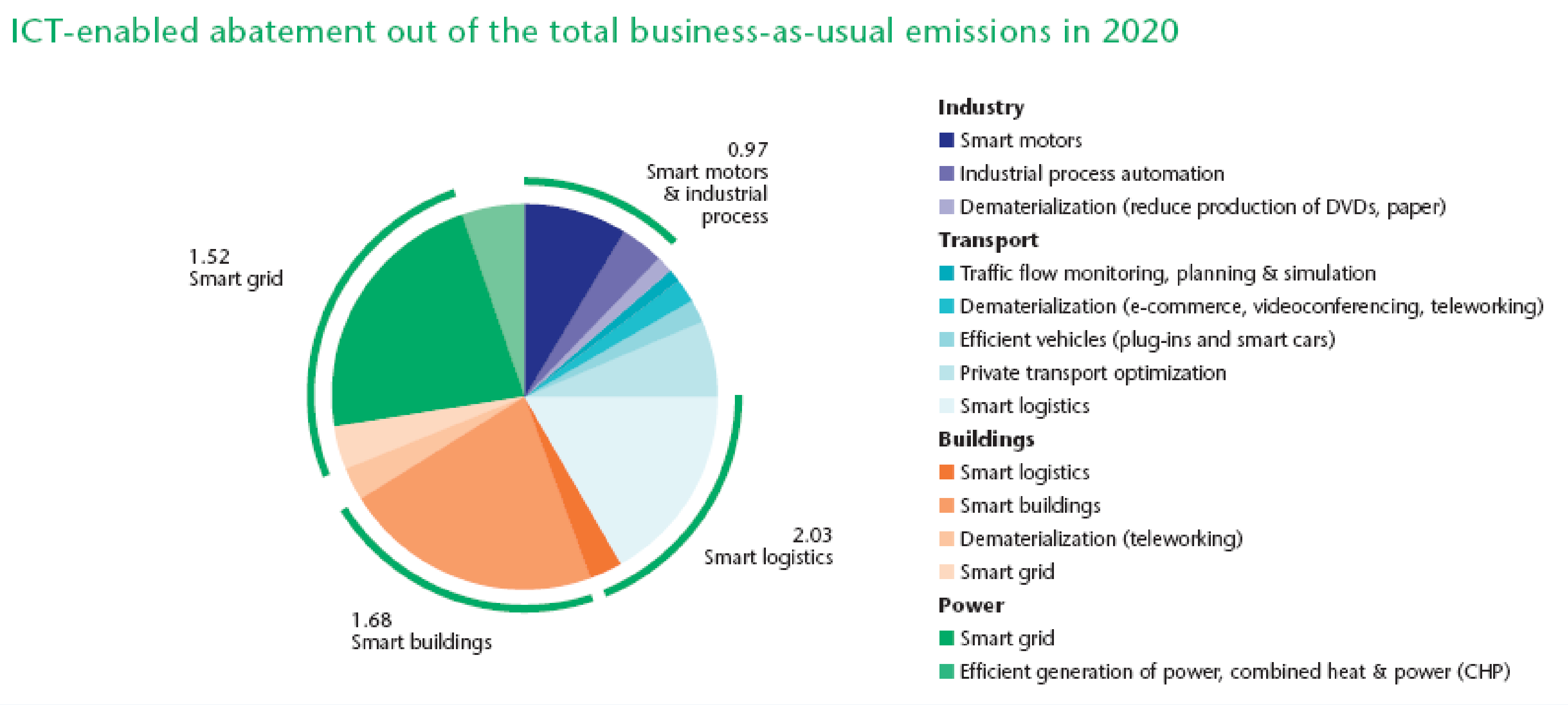
BUSINESS OPPORTUNITIES FOR A SUSTAINABLE DEVELOPMENT

Table 3.1: Illustrative estimates of the global order of magnitude of potential additional sustainability related business opportunities in key sectors in 2050

Sectors	Annual value in 2050 (US$ trillion at constant 2008 prices: mid-points with ranges shown in brackets)	% of projected world GDP in 2050
Energy	2.0 (1.0-3.0)	1.0 (0.5-1.5)
Forestry	0.2 (0.1-0.3)	0.1 (0.05-0.15)
Agriculture and food	1.2 (0.6-1.8)	0.6 (0.3-0.9)
Water	0.2 (0.1-0.3)	0.1 (0.05-0.15)
Metals	0.5 (0.2-0.7)	0.2 (0.1-0.3)
Total: Natural resources	**4.1 (2.0-6.1)**	**2.0 (1.0-3.0)**
Health and education	2.1 (0.8-3.5)	1.0 (0.5-1.5)
Total	**6.2 (2.8-9.6)**	**3.0 (1.5-4.5)**

Source: PwC estimates drawing on data from IEA, OECD and the World Bank

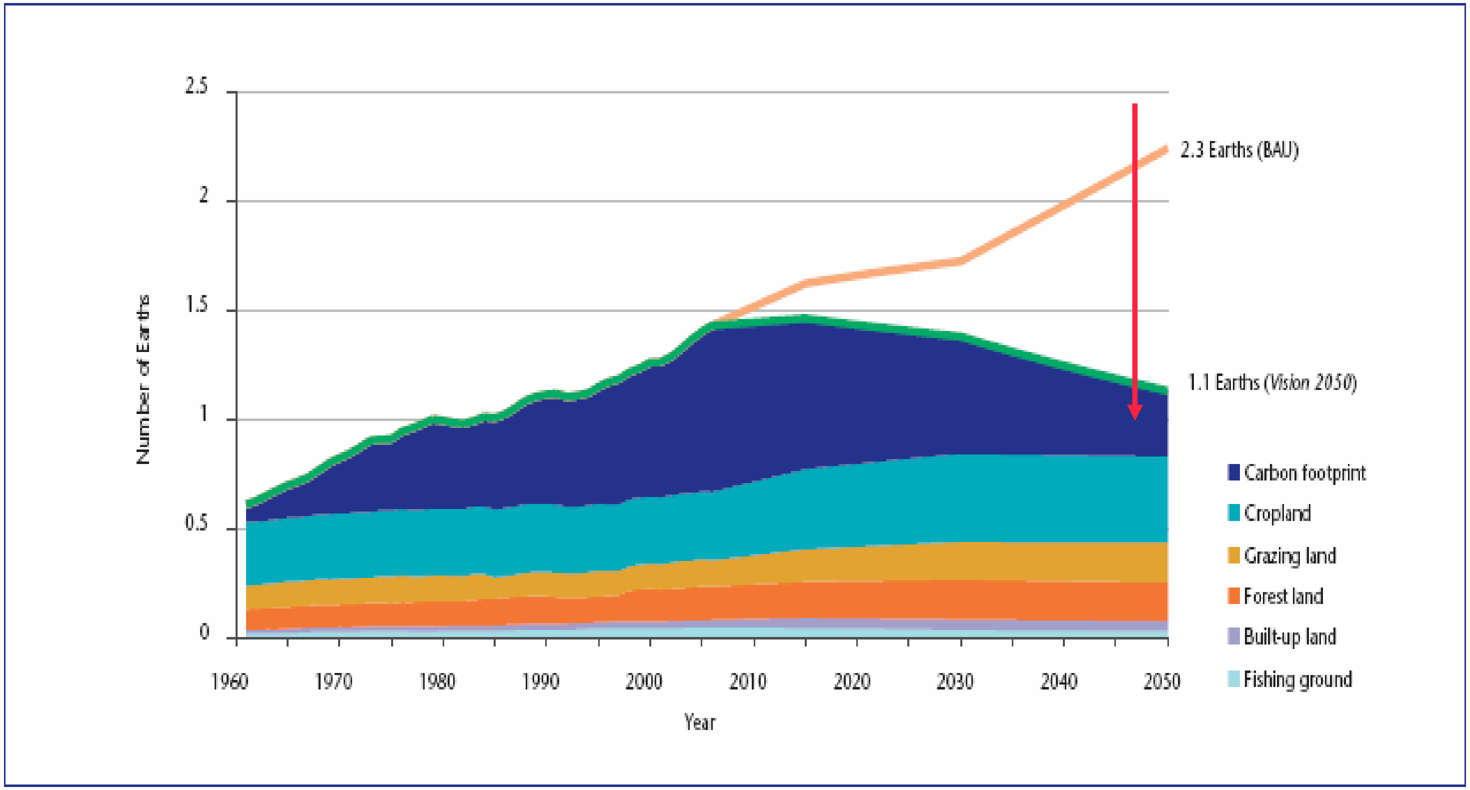
AND ALSO FOR ICT



The final objective/challenge of sustainability

To reduce the ecological footprint from 2.3 earths to the sustainable figure of 1.1 earths

Figure 3.12: *Vision 2050* ecological footprint against business-as-usual – How many Earths do we use?



Source: Global Footprint Network and WBCSD *Vision 2050*, 2010

The future , for us individuals, will be:

More populated, elderly and urban

More connected

More mobile

More decentralized

More personalized

Economics will be more biological, more environmental and more technological

But, if possible, the future should be:

More sustainable in

- ***agriculture, forests, energy and power, buildings, materials and mobility***

More equitable in

- ***income***
- ***capabilities and most of all***
- ***quality of life (to start, more peaceful)***

Longer and sustainable lifes but for happier lifes and

Thank you for your attention