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Crisis of Global Sustainability

A new book by Routledge

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www.crisisofglobalsustainability.com

UNEP GEO-5


KEEPING TRACK
of our changing environment
12% biodiversity decline globally
+60% women parliamentarians
numbers
+130% plastics production
Ozone depleting substances -93%
21 megacities
13% = renewable energy sources
300 million ha forest area loss
+ 0.4°C in global mean temperature
Globalization
change
energy efficiency
+75% GDP
Ocean Acidity 8.11 - 8.06 pH
36% increase in CO_2 emissions
technology
Population +26%
sustainability
global warming
slum dwellers +171 million
drinking water coverage +13 %
UNEP
From Rio to Rio+20 (1992-2012)

GEO-5 conclusions

Having chronicled the story of how our environment has changed since the first Earth Summit 20 years ago, we have before us now the task of preserving its viability for future Generations. **With limited progress on environmental issues achieved, and few real "success stories" to be told, all components of the environment—land, water, biodiversity, oceans and atmosphere—continue to degrade.**

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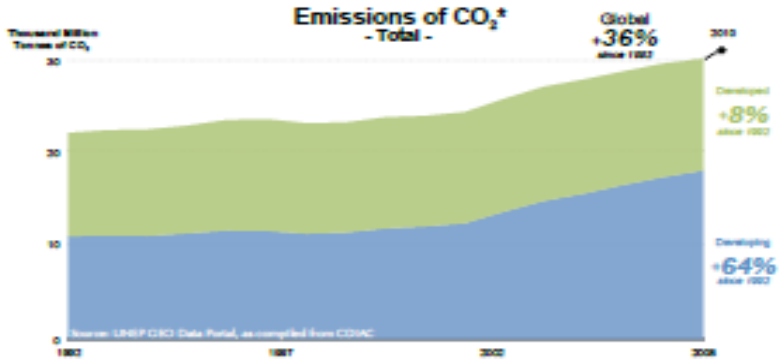
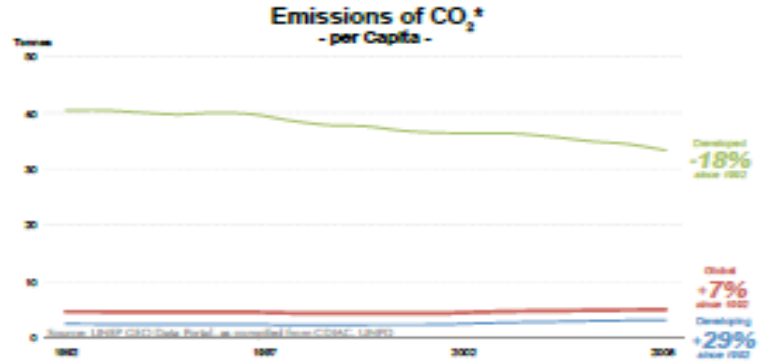
Global CO_2 emissions continue to rise, with 80% emitted by only 19 countries





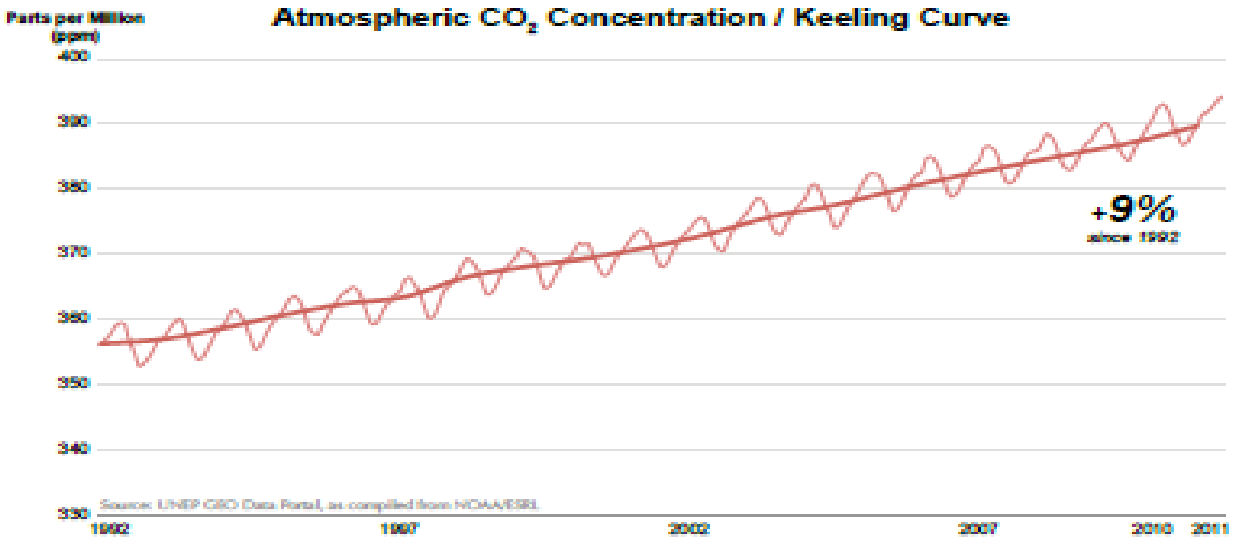
Globally, CO_2 emissions increased by 36% between 1992 and 2008, from around 22 000 million to just over 30 000 million tonnes. With general economic growth, plus developing countries such as Brazil, China and India investing significantly in large development, infrastructural and manufacturing projects, the growth of CO_2 emissions in developing countries over the last few years climbed even more (between 1992 and 2008, a 64% increase of total CO_2 emissions and 29% on a per capita basis).

Latest estimates show that global CO_2 emissions accumulated to 30 600 million tonnes in 2010 (IEA 2011). Large differences exist between regions and countries, with 80% of the global CO_2 emissions being generated by 19 countries—mainly those with high levels of economic development and/or large populations.

Total emissions of CO_2 in developed countries increased by nearly 8%, and although per capita emissions declined steadily by 18%, they are still 10 times higher than those of developing countries. In addition, many developed countries profited from a significant shift of production to developing countries, thus leading to declining domestic emissions, but nevertheless increasing consumption-based emissions (Peters and others 2011).

** from fossil fuels, gas flaring, cement production, as provided through the original source*

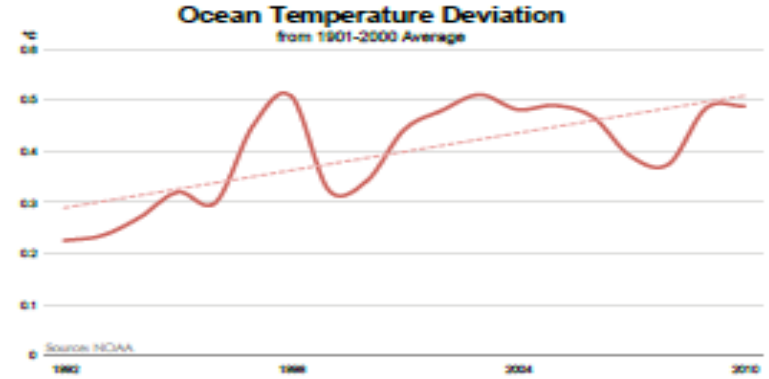
The average amount of CO_2 in the Earth's atmosphere shows a steady rise over the last two decades



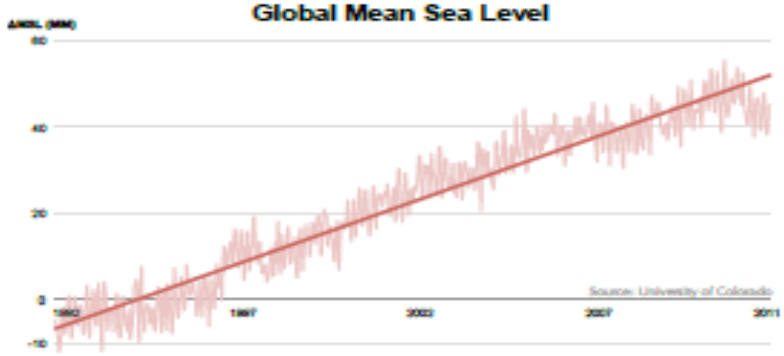
The concentration of carbon dioxide (CO_2) in the Earth's atmosphere has been measured at Mauna Loa, Hawaii since 1958, and at five other stations subsequently. It shows a steady mean increase from 357 ppmv (parts per million by volume) in 1992 to 389 ppmv in 2011. Seasonal variations of about 5 ppmv each year correspond to seasonal changes in uptake of CO_2 by the world's land vegetation, influenced by the greater vegetation extent and mass in the Northern hemisphere.

The increase in atmospheric CO_2 is primarily attributed to the combustion of fossil fuel, gas flaring and cement production and has been accelerating in recent years (IPCC 2007).

Oceans are also warming, while sea-level rise continues unabated



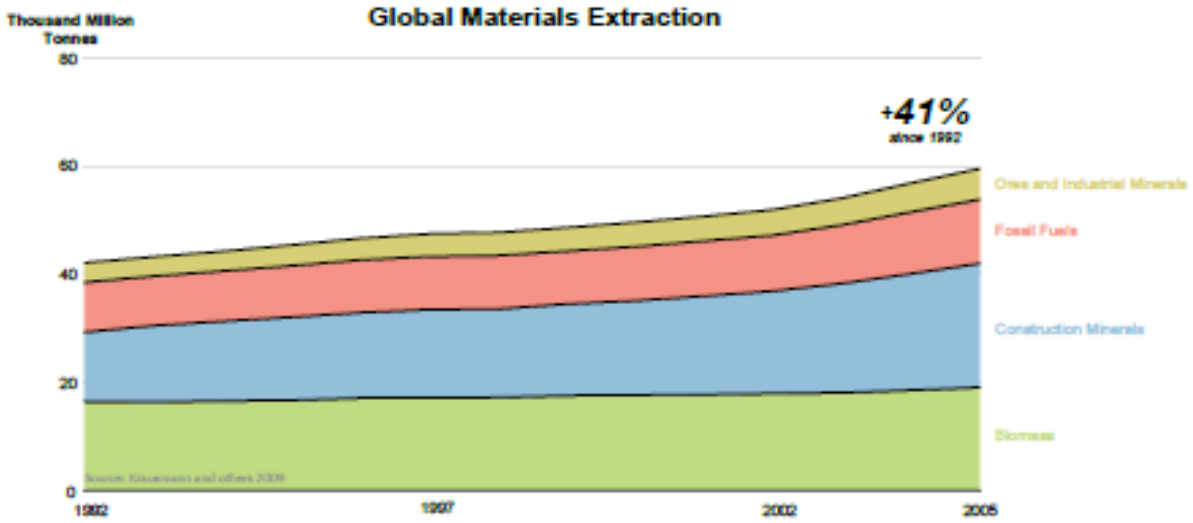
As the global atmospheric temperature increased over the last decades, so also did the average ocean temperature. By comparing the last 20 years to the average of the last century, one can observe a steady warming of ocean waters, increasing from 0.22°C above the long-term average in 1992 to nearly 0.5°C in 2010.



Globally, sea level has been rising at an average rate of about 2.5 mm per year between 1992 and 2011. This is due to rising sea-water temperature and resulting thermal expansion, as well as the melting ice of the Arctic, Antarctic and Greenland ice sheets (Bindoff and others 2007).

Scientific evidence supports the claim that current sea level rise is caused by global warming (Bindoff and others 2007), although different opinions exist about the exact link as well as future projections (Rahmstorf and Vermeer 2011).

As societies grow and become wealthier, demand for basic materials is further increasing



The global use of natural resource materials increased by over 40% between 1992 and 2005, from about 42 to nearly 60 thousand million tonnes. On a per capita basis, the increase was 27%. Among the four major material groups (biomass, fossil fuels, ores and industrial minerals, and construction minerals) there has been a major increase in extraction of construction minerals of almost 80%, followed by ores and industrial minerals (close to 60%). This growth is strongly linked to increasing population numbers and the need for shelter, food and an improved standard of living (UNEP 2011).

International trade in resource materials has also increased. "The total value of world trade in natural resources was US$ 3 700 thousand millions in 2008, or nearly 24 Per Cent of world merchandise trade. This value has increased more than six-fold between 1998 and 2008" (WTO 2011).

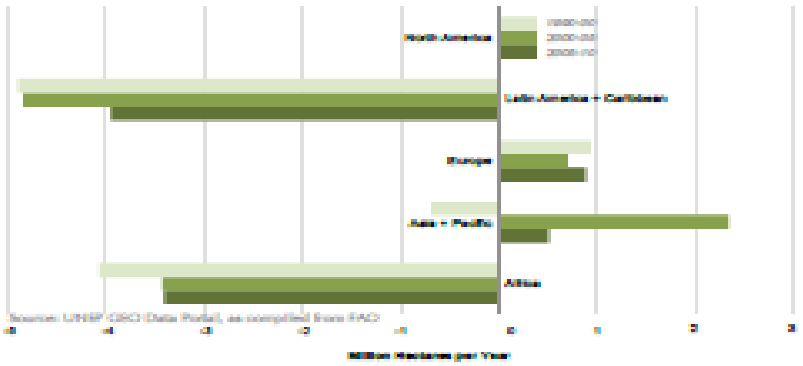
Forest area has decreased by 300 million ha since 1990, or an area larger than Argentina

Forests currently cover around 30% of the Earth's land mass. Although the rate of deforestation is slowing down, large areas of primary forest and other naturally regenerated forests are declining, especially in South America and Africa, while forested areas in Europe and Asia are stable or increasing due to large-scale afforestation programmes. Around 13 million hectares of forest were converted to other uses or lost through natural causes each year between 2000 and 2010, compared to 16 million hectares per year during the preceding decade (FAO 2010). This results not only in biodiversity loss, but also contributes 12-15% to global warming by releasing CO_2 into the atmosphere and hampering further CO_2 storage (van der Werf and others 2009, UCSUSA 2011). "Millions of hectares of tropical forest are cleared every year to make way for agriculture, pastures and other non-forest uses, or are degraded by unsustainable or illegal logging and other poor land-use practices" (ITTO 2011).

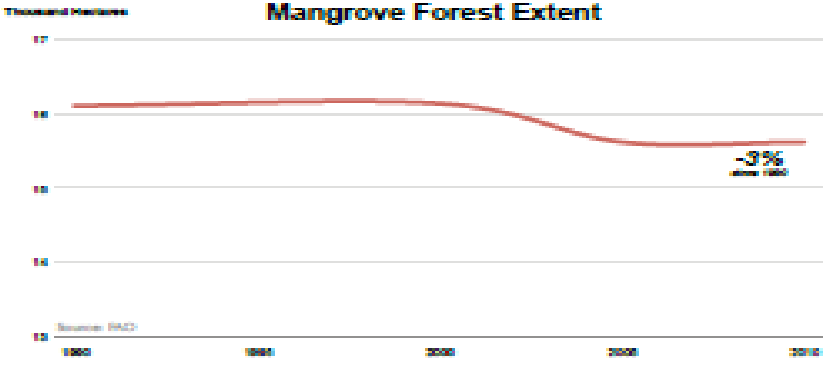
Also in decline since several decades ago are mangrove forests—important from social, economic and biological points of view. For example, "mangrove forests act as extremely effective carbon sinks, able to absorb [nearly 100] tonnes of carbon per hectare, or more than three times the absorptive capacity of non-mangrove forests" (UNDP 2011b).

Between 1990 and 2010, 3% of mangrove extent was lost, mostly as a result of coastal development and conversions to agriculture and aquaculture (rice fields, shrimp farms). Using high-resolution satellite imagery, the extent of mangroves in 2000 was even found to be 13% less (blue point on the graph) than country statistics show (Giri and others 2010).

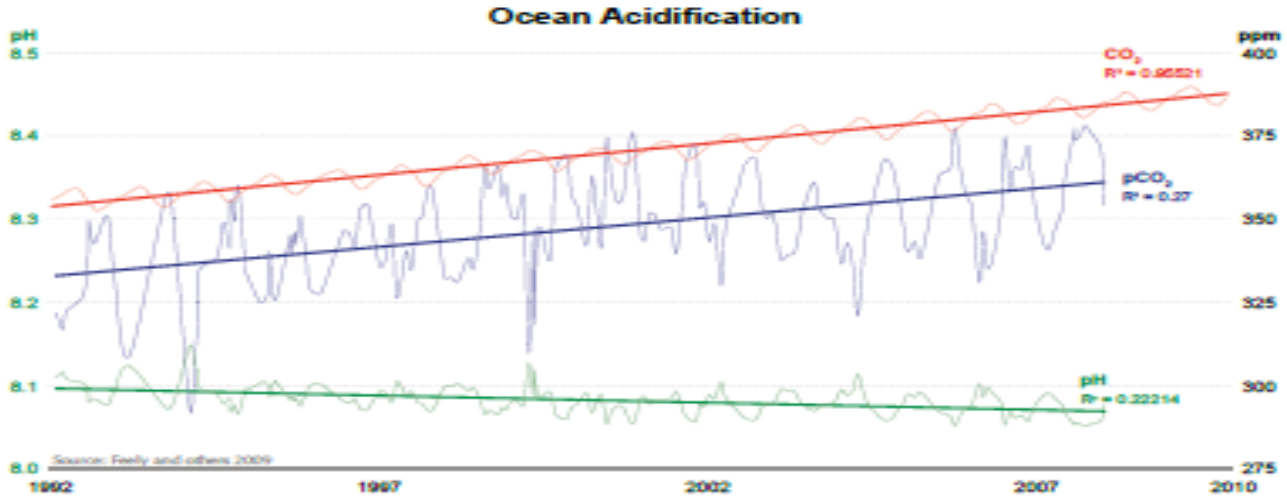
Forest Net Change



Mangrove Forest Extent



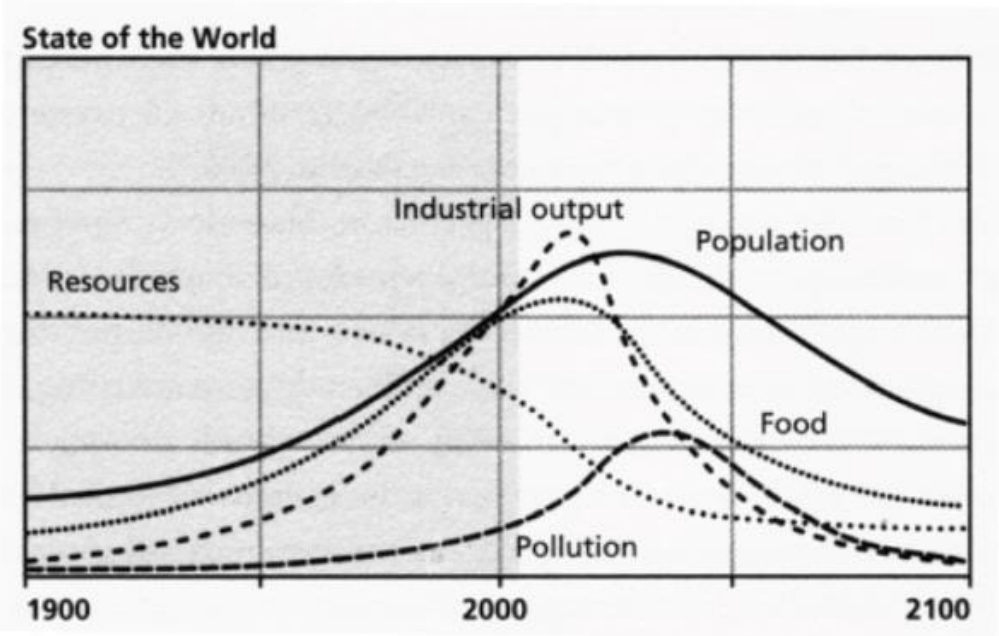
Oceans are becoming more acidic, with negative implications for corals and other marine life



Increasing carbon dioxide (CO_2) concentrations in the air alter the chemistry of the ocean's surface, causing it to become more acidic (measured by the logarithmic pH) (Caldeira and Wickelt 2003). The ocean's pH declined from 8.11 in 1992 to 8.06 in 2007 (Feely and others 2009). There is a "growing concern that the process called ocean acidification could have significant consequences on marine organisms which may alter species composition, disrupt marine food webs and ecosystems and potentially damage fishing, tourism and other human activities connected to the seas" (UNEP 2010b). Coral reefs are currently experiencing higher ocean temperatures and acidity than at any other time in at least the last 400 000 years. If this trend continues, all coral reefs will likely be threatened by mid-century, with 75 Per Cent facing high to critical threat levels (WRI 2011).

The increase in oceanic CO_2 concentrations (pCO_2 in the graph), measured off the coast of Hawaii, is consistent with the atmospheric increase measured at Mauna Loa, Hawaii, within the statistical limits of the measurements (Feely and others 2009).

Limits to Growth 1972
- base case "business-as-usual"



Source; The Club of Rome 1972

30 years of history is almost exactly in line with the 1972 estimates.

The inflexion point is near, the evidence of its impending arrival increases daily, yet no action has been taken to address the consequences.

How long do we continue to sit as rabbits in the headlights?

Limits to Growth

- the key messages in 1972

- The human ecological footprint grew rapidly from 1900-1972
- It cannot continue to grow at historical rates
- It is possible, even likely, that the human ecological footprint will overshoot the carrying capacity of Planet Earth (*it happened in 1986)*
- Once sustainable limits have been exceeded, contraction is unavoidable
- Overshoot can be avoided through forward-looking global policy
- It is important to act as soon as possible, that is in 1975 (*nothing happened)*

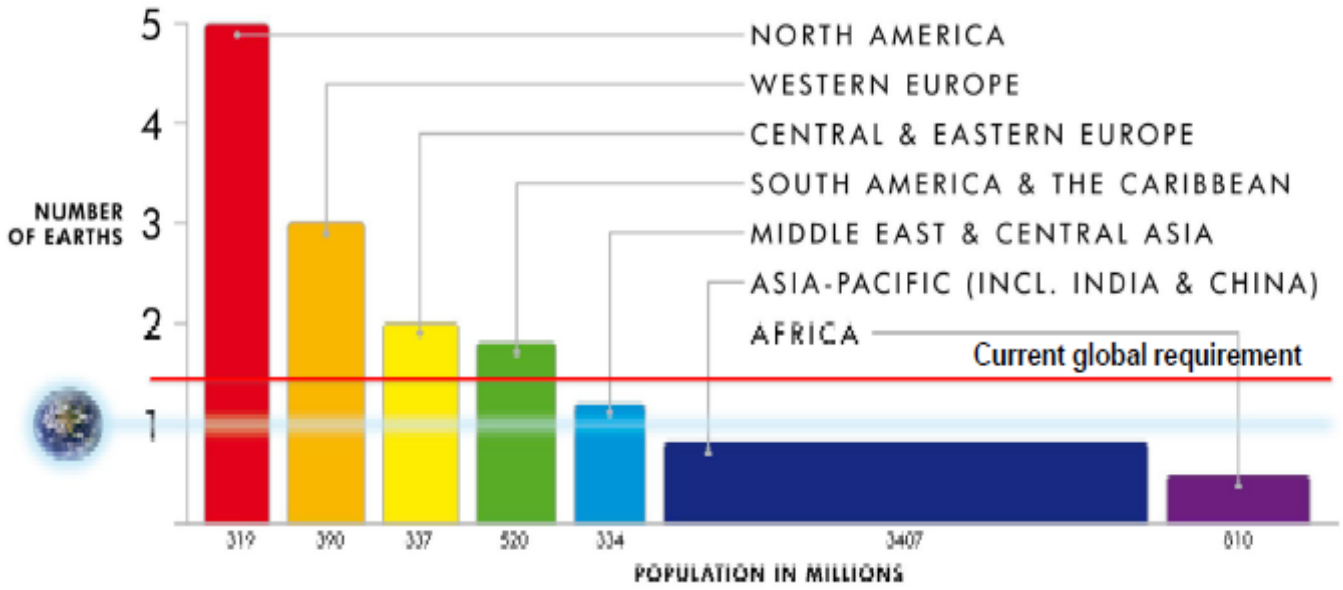
The Fundamental Scientific Message:

"Global Society is likely to overshoot – and then be forced to decline or collapse – because of significant reaction delays in the global economy. These are the unavoidable lags in the perceptions and localisations of global limits, the significant institutional delays involved in (democratic) decision-making, and the biophysical lags between implementation of remedial action and the improvement of the ecosystem"

Source: "What was the message of the Limits to Growth?, Jorgen Randers, April 2010

Humanity today

- needs 1.5 planets to survive



Source: Global Footprint Network

Drexhage - Murphy: problems of global sustainability

- Implementation of the concept has not succeeded as many of **the consensus-driven UN summits after Brundtland Commission have resulted in broad documents, policies and goals offering something for everything but avoiding concrete action.** The concept remains to be amorphous, to be clearly defined, and thus hardly implemented.

Drexhage - Murphy: problems of global sustainability

- For 20 years the international community is still struggling with the development of institutions to implement sustainable development. On the other hand, the **institutions and policies already established have been weak and actions tend to emphasis symptoms of environmental degradation and not the underlining sources of problem.** The sources are found in governmental and corporate fiscal, tax, budget, trade, energy, agriculture and other polices and in the values underlining them. Governments have not taken down the silos between departments to find complex, integrated answers.

Drexhage - Murphy: problems of global sustainability

- The **concept has not been able to compete with neoliberal economic paradigm, Washington consensus, and the globalization paradigm**. **These paradigms have advocated** fiscal and monetary soundness, openness to trade and investment, financial liberation, privatization, deregulation and assuring property rights and, in general terms, **sustaining the prospects for economic growth rather than the health of the ecosystems.**

Drexhage - Murphy: problems of global sustainability

Developed countries have not met their commitments to developing countries which has generating an atmosphere of **distrust** and both groups have also had competing agendas associated with sustainable development concept.

Climate change negotiations

- After Durban in December 2011:
- The Economist: “Agreement’s terms – assuming they are acted upon – are unlikely to be sufficient to prevent a global temperature rise of more that 2 degrees of Celsius. They might easily allow a 4 degrees rise.”

Temperature Rise
- what does it mean ?

- 1°C
  - Destruction of Arctic ecosystem, possibly triggering tipping point
  - More frequent, intense heatwaves, extreme fire events, storms
  - Ongoing drought – for example Australia, sub-Saharan Africa, western USA
  - Swift retreat of mountain glaciers – Himalayas, Andes, Rockies, Europe etc.
  - Drying of Eastern Amazon, regular droughts, fires & large carbon emissions
  - Fresh water eliminated from 1/3 of global land surface by 2100
  - Low-lying states & coral reefs facing extinction due to bleaching
  - Accelerating coastal erosion
- 2°C
  - Large feedback loops triggered in oceans, ice-sheets, permafrost, forests & soils
  - Possible disintegration of Greenland & West Antarctic ice-sheets, leading to 5-10 metre sea level rise
  - Extinction of 15-40% of plant & animal species
  - Dangerous ocean acidification
  - Increasing methane release
  - Widespread drought & desertification – Africa, Australia, Mediterranean Europe, western USA
- 3°C
  - Northern hemisphere free of glaciers & ice-sheets – several more metres of sea level rise
  - Semi-permanent El Nino conditions
  - Extensive melting of permafrost with large-scale carbon dioxide and methane release
  - Possible tipping point for ocean-bed frozen methane deposits, leading to severe temperature escalation
  - Amazon turns to savannah grassland
  - Increased extreme weather events

Paul Gilding, former head of Greenpeace:

"When I attended the Earth Summit+5 review in New York in 1997, a special UN General Assembly meeting, world leaders got up one after other and gave speeches on how appalling it was that so little progress has been made in the five years since the 1992 Rio Earth Summit. It was a strange thing to witness, as the most powerful people in the world gathered but then behaved as if they were observers of the process and had little power to influence it. Five years later in 2002, the whole process occurred in Johannesburg at the Earth Summit 2002."

Conclusions on intergovernmental action

- **High-level attendance**: at worse this "political stage show" could be seen as **a symbolic replacement of real action for a collective excuse of not achieving much of anything really serious in international negotiations**.
- **Strongly-defended national interests have continued to dominate the bargaining universe**. The persistent mindset of fighting for perceived national interests, or for the interests of particular coalitions of states, has lead to **"common denominator approach" in negotiations guaranteeing weak agreements and commitments as well as their implementation.**

Conclusions on intergovernmental action

- Collectively speaking, the priority of states both in the domestic policy and in the positions they have taken in global negotiations has been to **safeguard their own perceived economic interests as dictated 1) by the neoliberal economic paradigm in the developed countries as well 2) a sustainable development paradigm in the developing countries.**
- In practice **both paradigms have striven for the necessity of guaranteeing maximum economic growth**. The combined effect of the paradigms of both North and South has so far always **overshadowed the "ecological paradigm", namely the necessity on agreeing on desirable targets to respect environmental limits and arranging funding for their implementation.**

Conclusions on intergovernmental action

- **Targets and commitments are important and indeed backed by science---most states recognize---but agreeing on them or carrying them out have to be postponed as they are deemed to be too expensive**, at least at the moment.
- True, **some symbolic and some substantive achievements could be reported. But they have not improved but marginally the physical and human environment**.
- Would the Rio plus 20 change the above patterns?

Allison Macfarlane, chair of BAS' Science and Security Board :

- After **the Doomsday Clock** was moved in January 2012 back one minute, now 5 minutes to midnight – from nuclear holocaust to environmental holocaust:
- "The global community may be near a point of no return in efforts to prevent catastrophe from changes in Earth's atmosphere. The International Energy Agency projects that, **unless societies begin building alternatives to carbon-emitting energy technologies over the next five years, the world is doomed to a warmer climate, harsher weather, droughts, famine, water scarcity, rising sea levels, loss of island nations, and increasing ocean acidification."**
- "Since fossil-fuel burning power plants and infrastructure built in 2012-2020 will produce energy—and emissions—for 40 to 50 years, **the actions taken in the next few years will set us on a path that will be impossible to redirect.** Even if policy leaders decide in the future to reduce reliance on carbon-emitting technologies, it will be too late."

Solutions – Randers & Gilding:

- Cut deforestation and logging by 50 percent;
- Close 1000 dirty goal power plans within 5 years;
- Erect a wind turbine and solar plan in every town;
- Create huge wind and solar farms in suitable deserts;
- Ration use of dirty cars to cut transportation emissions by 50 percent;
- Strand half of the world's aircraft;
- Introduce carbon tax of US$ 100 per ton of CO2.
- A dozen of other measures

Organizational solution by Randers & Gilding

- **Create a "Climate War Command" controlled by those countries participating in the war. [more or less present G-20]** Combine expertise and the lessons of institutions like the IMF (for professional advice on macroeconomics), IPCC (for advice on climate issues) and various multinational-military commands. **The Climate War Command would have a variety of powers** including the authority to ensure that funds are distributed according to a harmonized global strategy, and to impose equivalent tariffs on imports from countries that don't agree to the tax.

A new organizational solution, part I

- I think we need a peace strategy, not a war strategy to “save the world”
- Once the severity of the global crisis is accepted worldwide**, a second review conference of the UN Charter should be called for** to start a democratic and inclusive process to understand all aspects the crisis and to seek organizational innovations and processes to solve it.

A new organizational solution, part II

- to be fully prepared for a massive global crisis, the world needs a new kind of institution. It could be best described as **a network of regional and local centers as well as a global coordination unit** to be established close to the UN in New York.
- Together the regional and local centers and their coordination unit, a global center, could be called a **Global Crisis Network** (or a Network for short). Its main task would be the coordination of local and regional initiatives with global policies and catalyzing necessary action.
- While the Network should be based on regional and local centers and their own networks – whether physical or virtual---**its New York coordination center should also act as a crisis center, an operations room and a think tank, all at the same time** --- a very ambitious but still manageable project if there is enough political will and resources to institute the proposed structure.

Conclusions

- **- the globe is soon hitting its limits,** or has done already so, as the policies of governments and corporations have not changed much over the last decades
- - **early warning was given already some 40 years ago** e.g. in the “The Limits to Growth” study presented to the Club of Rome and recent scholarly articles have reassessed that its projections were largely accurate
- - some scholars are pessimistic, like James Lovelock, that no major policy change will come - and some are hopeful like Paul Gilding but in his view **we need a Pearl Harbor moment,** an event of the magnitude of Hitler's invasion to Poland to really awaken the humanity to the severity of the crisis

Conclusions

- - I believe **the youth – the real victims of future crises - and using the social media will be the key ;** "Occupy the Wall Street" movement changed the presidential debate in the US in a matter of weeks – things can really change quickly

- - **Occupy the Wall Street and similar social movements should in my view refocus their ideology to the survival of the human race**

- -**Initiating green projects** at the grass root level is also essential as well as **networking throughout the world**

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- Fur further information see blog of the book:

- www.crisisofglobalsustainability.com