

## 8.9.2007 WOLFGANG CRAMER

### *TITLE OF THE TALK: One way to value diversity - the Millennium Ecosystem Assessment*

The lecture consisted of 2 major parts:

- A. Scientific assessment of risks for global ecosystem function
- B. Implementation by the Millennium Ecosystem Assessment and some findings

#### **A. Scientific assessment of risks for global ecosystem function**

- Concern for possible damage (early observations of damage or recognizing risk for future) – is aimed to investigate future trends (e.g. effects of species diversity, deforestation, effects of flood) and recognize extreme events.
- Assembling knowledge about system behaviours – before we start doing scientific assessment, we have to assemble existing knowledge (e.g. consider interacting scales in biosphere dynamics from molecules, cells levels to biosphere level).
- Identification of multiple forcing – identification of drivers of ecosystems functioning and external forcing affecting organisms and ecosystems (e.g. solar radiation, climate, atmospheric CO<sub>2</sub>, deposition of pollutants, land management etc.).
- (Intelligent) extrapolation of trends – mental process of understanding models for ecosystem assessment or experts judgements (e.g. biogeochemical models of nutrient, energy and water flows, Net Ecosystem productivity and biosphere carbon balance, etc.)
  - Models (statistical, mechanical) – some models are used for policy support (e.g. Intergovernmental Panel on Climate Change - IPCC)
  - Scenarios for expected trends in forcing
- Interpretation: valuation and assessment – More comprehensive assessment requires a broader framework, more elaborated concept and specific of consideration of ecosystems role for people.

#### **B. Implementation by the Millennium Ecosystem Assessment and some findings**

Goal of the MA is to create a mechanism for increasing the amount, quality and credibility of ecosystems for human well-being by policy, on the basis of scientific research results.

MA is considered to be largest assessment of the health of Earth's ecosystems, because it was prepared by 1360 experts from 95 countries, and reviewed by 80-person independent board of review editors and other review comments from 850 experts and governments. MA was called for by UN Secretary General in 2000 and finally was authorized by governments through 4 conventions (Biodiversity, Climate, Desertification, Wetlands). Partnership of UN agencies, conventions, business, non-governmental organizations with a multi-stakeholder board of directors was accomplished.

Fundamental concept of the MA is based on assessment of **ecosystem services**. Ecosystem services are the benefits people obtain from ecosystem. The capacity of ecosystems to provide services is determined by many human-induced factors that cause changes in an ecosystem.

The MA has classified ecosystem services into four categories:

- Supporting services – services necessary for the production (nutrient cycling, soil formation, primary production).
- Provisioning services – products obtained from ecosystems (food, freshwater, wood and fibre, fuel).
- Regulating services – benefits obtained from regulation of ecosystem services (climate regulation, flood regulation, water purification).

- Cultural services – nonmaterial benefits obtained from ecosystems (spiritual and religious, recreation and ecotourism, aesthetic, educational, sense of place, cultural heritage).

As consequences of ecosystem changes for Human Well-being are important constituents of human well-being and intensity of connection between them.

Important constituents of human well-being are:

- Security - personal safety, secure resource etc.
- Basic material for good life - adequate likelihood, sufficient nutrients food, shelter, etc.
- Health - strength, feeling well, access to clean air and water
- Good social relations – social cohesion, mutual respect
- Freedom of choice and action – opportunity to be able to achieve what an individual values doing and being.

The main MA reports 4 important tasks: (1) “Conditions and trends”, (2) “Scenarios”, (3) Responses and (4) Sub-Global (All of the above, at regional, national, local scale).

“**Conditions and trends**” summarises all available knowledge about current condition and historical trends of ecosystems and their services, as well as the consequences of changes in ecosystems for human well-being.

“**Scenarios**” consider possible future development of the provision of all ecosystem services. Scenarios are not predictions, but they are plausible futures in primary drivers, what will be the consequences for ecosystems, their services, and human well-being. Both quantitative models and qualitative analysis were used in scenario development.

4 main scenarios:

*Global Orchestration* Globally connected society that focuses on global trade and economic liberalization 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.

*Order from Strength* Regionalized and fragmented world, concerned with security and protection, emphasizing primarily regional markets, paying little attention to public goods, and taking a reactive approach to ecosystem problems.

*Adapting Mosaic* 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.

*TechnoGarden* 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.

Driving forces: economy, demography, technology, social and institutional development

Gains in ecosystem services: food production, intensified trade-off, freshwater services, etc.

### **Finding**

- 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.
- The changes that have been 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.
- The challenge of reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met under some scenarios that the MA considered but these involve significant changes in policies, institutions and practices, which 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.

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