Timothy Carter – Finnish Environment Centre, SYKE, Helsinki, Finland - **Global change Scenarios**

Timothy was first elaborating on the various definitions in use to describe a scenario, of which the most important seem the following: A scenario is

- a coherent, internally consistent and plausible description of a possible future state of the world (IPCC,1994)
- an alternative image of how the future can unfold, not a forecasts nor a prediction.

Scenarios are thought experiments. They are needed by scientists (for impact and adaptive capacity assessment) and by policy makers (to formulate appropriate responses to future changes). They are certainly of use for the wider public too. In Global Change research scenarios help to illustrate global changes, to communicate potential consequences of global change, help in strategic planning, guide emissions control policies and are important for methodological purposes.

There exist two approaches to a scenario design:

1. Prognostic approach: Deriving one or more projections of the future, if...then... - attitude, conventional approach, more top-down, results highly dependent on the initial situation, often on a global scale
2. Diagnostic approach: wider range of projections to conduct sensitivity analyses, Attitude: what changes will be needed to produce a certain result?, bottom-up, more local-rarely global applicable, more present state

The development in a scenario is determined by specific driving forces which (are thought to) influence its outcome. Such drivers can be of natural/ environmental or anthropogenic cause.

Two classes of scenarios are distinguished: - Exploratory (descriptive) scenarios: how the future might look like according to known processes
- Normative (prescriptive) scenarios: target-based

There are normally three types of future scenarios (with under categories) referred to in global change research: the conventional world- (reference...), the barbarization- (fortress world...) and the great transition-scenario.

Lit.: Dessai and Hulme (2003) for the diagram; Gallopin et.al. (1997)

Global scale: example SRES SCENARIOS (2000)

The purpose of the SRES scenarios was the representation of a range of driving forces and respective emissions. Surprise or disaster scenarios were excluded on purpose, and no additional climate policy initiatives were included (as e.g. the UNFCCC). No one scenario should be more likely than another. In the end six integrated assessment models were employed.

The driving forces in the SRES scenarios are population, economy, technology, energy, land use and agriculture. The SRES scenarios can be used to evaluate different CO2 emissions, adaptation and mitigation approaches. Risk and benefit analyses form the centre. The storylines were applied to 3 timescale: 2020, 2050 and 2080.

Lit.: Swart et.al. (2002) about stabilisation assessment of CO2 in the different SRES scenarios
Cubasch et.al. (2001); Parry et.al. (2004); Vellinga and Wood, (2002) about the collapse of the THC; Higgins and Vellinga (2004) about extreme level rise; Nicholls et.al. (2005); Tol et.al. (2005)

Regional scale: Millenium Ecosystem Assessment scenarios

The MA scenarios are regarded more regional because they focus on the ecosystem resilience.

Requirements of scenarios applied on regional scales:

- relevant set of climate and non-climate changes; internally consistent, mutually consistent, and physical plausible; appropriate tune horizon, sufficient spatial and temporal resolution; uncertainty evaluation; consider changes in variability and mean condition

Regional scale: ATEAM scenarios – Vulnerability maps for different sectors of European ecosystems

ATEAM used the SRES scenarios on a regional scale

Lit.: Rounsevell et.al. (2005); CIESIN (2002) about another regional vs. national-scale example also based on the SRES scenarios; Jylhä et.al. (2004); Johansson et.al. (2004); Carter et.al. (2004)

Discussion:

- Which approach might be the better: top-down or bottom-up? A bit of both, probably.
- The relationship between regional and global scenarios is still a point of concern, keyword: downscaling
- The interpretation and quantification of storylines is of crucial importance.
- It was discussed to what extent scenarios have regional relevance, keyword: uncertainties, uncertainty cascade
- Probabilistic representations are useful for expressing impacts in terms of risk. Scenarios are not predictions but shall illuminate uncertainties.

One of the reasons the future is unpredictable is because we can influence it.
(RIK LEEMANS)

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