Risks and Conflicts of Climate Change and Climate Engineering – Governing Pathways and Path Dependencies

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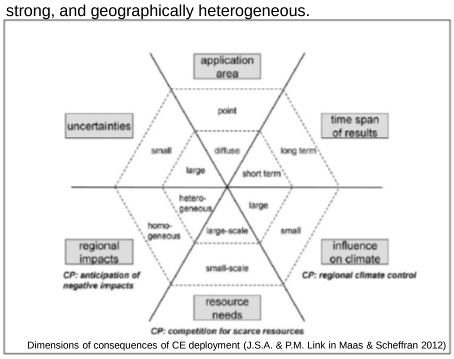
Introduction

Climate Engineering (CE) measures may reduce climate-related conflicts. However, they could also intensify already existing international conflict structures or add new conflict dimensions, in particular if CE impacts are uncertain, quick, strong, and geographically heterogeneous.



Dimensions of consequences of CE deployment (J.S.A. & P.M. Link in Maas & Scheffran 2012)

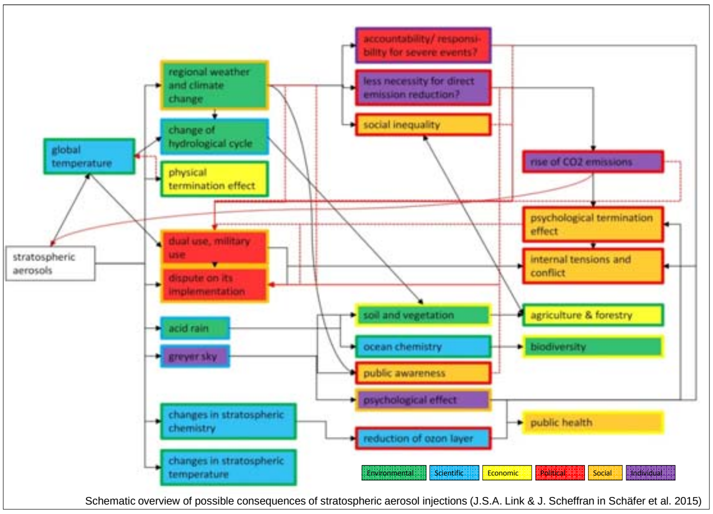
To avoid serious conflicts, regulative mechanisms and anticipative and adaptive governance structures are needed. These can be based on the London Convention, the ENMOD-Convention, the Law of the Sea, and the UNFCCC, or on new initiatives and principles for future regulation (see below) and should involve stakeholders and their perspectives.

Pathways of CE deployment

The deployment of CE measures has a variety of primary and secondary effects. These differ depending on the CE technique. Stratospheric aerosol injections (SAI) may have a positive effect on the climate at the global scale but it could also have a profound impact on the intensity and distribution of regional and local risks. Besides positively affecting the climate system, SAI can have adverse public health impacts and can also increase the potential for social inequality and conflict.

The implementation of bio-energy and carbon capture and storage (BECCS) is considered to be a low-risk CE technique. It can be applied locally and does not require global consensus. However, there are serious local risks that need to be considered. Impacts on human health and lives can occur from substantial CO_2 leakages from storage sites.

Land use conflicts, e.g. through direct competition for agricultural food production, can fuel social inequality.



Schematic overview of possible consequences of stratospheric aerosol injections (J.S.A. Link & J. Scheffran in Schäfer et al. 2015)

Increased food prices, or demands for subsidies for crop production may trigger conflicts at the local or even at the international scale.

Legal instruments

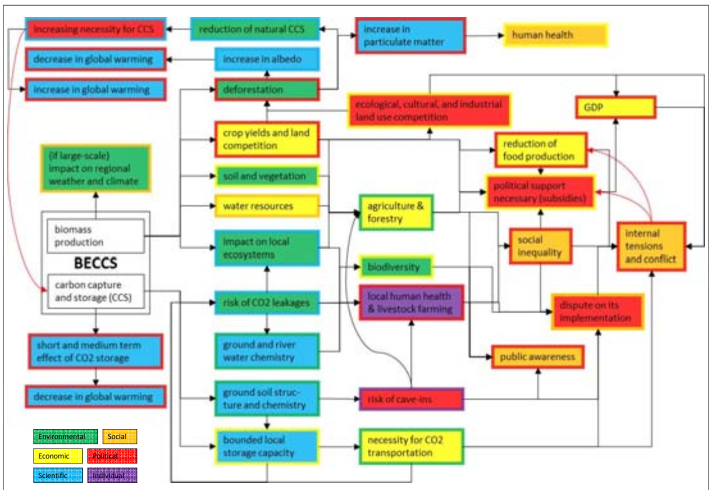
- customary international law
- 1972 Convention on the Prevention of Marine Pollution through Dumping of Wastes & other Matter
- 1978 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD)
- 1982 United Nations Convention on the Law of the Sea
- 1987 Montreal Protocol on Substances that Deplete the Ozone Layer
- 1992 UN Framework Convention on Climate Change (UNFCCC)
- 1997 Kyoto Protocol, Post-Kyoto (CDM, emission trading)

Initiatives for regulation

- Supplement international conventions with specific provisions on geoengineering?
- New, standardized, broad regulation on geoengineering?
- Regulation at research or field scale or at level of geoengineering implementation
- Political debates towards national research strategies & regulation requirements
- Moratoria on geoengineering activities

Principles for future regulation

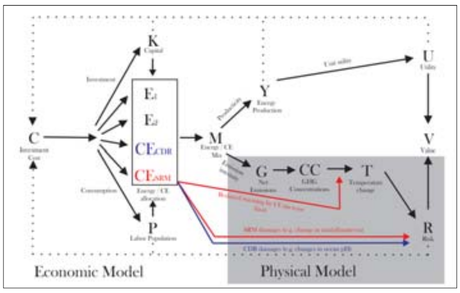
- Oxford Principles 2009:
  - o regulation of geoengineering as a public good,
  - o public participation in the decision process,
  - o disclosure of research results,
  - o independent impact assessments,
  - o implementation only after completion of governance process
- Asilomar Conference 2010: research on CE should
  - o benefit humanity and the environment,
  - o be open and cooperative,
  - o permit an independent technical assessment,
  - o define limits of accountability
  - o involve the public during the complete process.



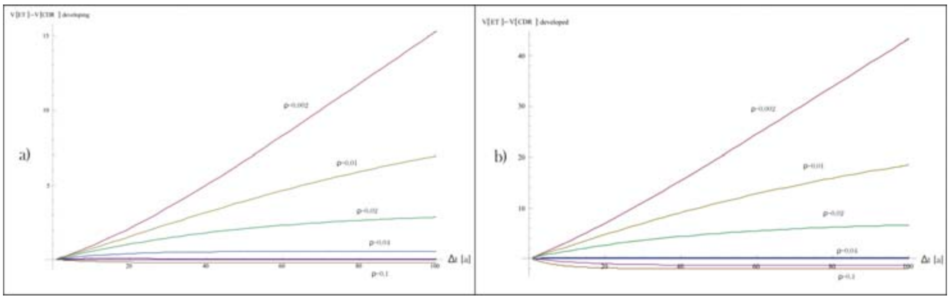
Schematic overview of possible consequences the deployment of bioenergy with carbon capture and storage (J.S.A. Link & J. Scheffran in Schäfer et al., 2015)

Modeling proposed CE measures

Using a simple Integrated Adaptive Management Model, the threshold between deployment of SAI and BECCS and mitigation can be assessed. Results indicate that decision makers prefer the implementation of BECCS with decreasing time horizons and increasing discount rates. Furthermore, the value added for an energy transition compared to BECCS implementation is higher in industrialized countries than in developing countries, depending on discount rates. However, there are generally only little structural differences in the functional forms of the preference curves.



Structure of the Integrated Adaptive Management Model (Borchert, 2014, based on Scheffran, 2008)



Preference curves of BECCS for developing countries (a) and developed countries (b) for different discount rates (adapted from Borchert, 2014)

References:
Borchert L (2014) *Integrated Assessment and Adaptive Management of Climate Engineering*, Master's Thesis, School of Integrated Climate System Sciences, University of Hamburg.
Maas A, Scheffran J (2012) Climate Conflicts 2.0? Climate Engineering as Challenge for International Peace and Security, *Security and Peace*, 30 (4): 193-200.
Schäfer S, Stelzer H, Born W, Low S, Lawrence M (2015) Removing Greenhouse Gases from the Atmosphere and Reflecting Sunlight away from Earth, Final report of the FP7 CSA project EuTRACE (European Transdisciplinary Assessment of Climate Engineering), Potsdam: IASS.
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