

Social perceptions of mCDR

*Marine Carbon Dioxide Removal Standing Committee
National Academies of Science, Engineering and Medicine
Meeting 2*

Dr. Christine Merk

September 16, 2025



Protests against marine CDR projects

nature

Published: 05 September 2002

Norway sinks ocean carbon study

Jim Giles

The Guardian

World's biggest geoengineering experiment 'violates' UN rules

Controversial US businessman's iron fertilisation off west coast of Canada contravenes two UN conventions

- What is geoengineering?
- Canadian government 'knew of plans to dump iron into the Pacific'

nature

Iron-dumping ocean experiment sparks controversy

Canadian foundation says its field research could boost fisheries in Chile, but researchers doubt its motives.

Jeff Tollefson

23 May 2017

<https://www.nature.com/news/2009/090109/full/news.2009.13.html>; <https://www.nature.com/news/iron-dumping-ocean-experiment-sparks-controversy-1.22031>; <https://www.theguardian.com/environment/2012/oct/15/pacific-iron-fertilisation-geoengineering>; <https://www.nature.com/articles/419006b>; <https://www.nature.com/articles/417888b>; <https://www.theguardian.com/uk-news/2023/apr/17/protesters-urge-caution-over-st-ives-climate-trial-amid-chemical-plans-for-bay-planetary-technologies>

Published online 14 January 2009 | Nature | doi:10.1038/news.2009.26

News

Ocean fertilization experiment suspended

German science ministry demands environmental assessment before nutrient dumping can begin.

Quirin Schiermeier

The German science ministry has suspended a planned Indo-German ocean fertilization

nature



Protesters urge caution over St Ives climate trial amid chemical plans for bay

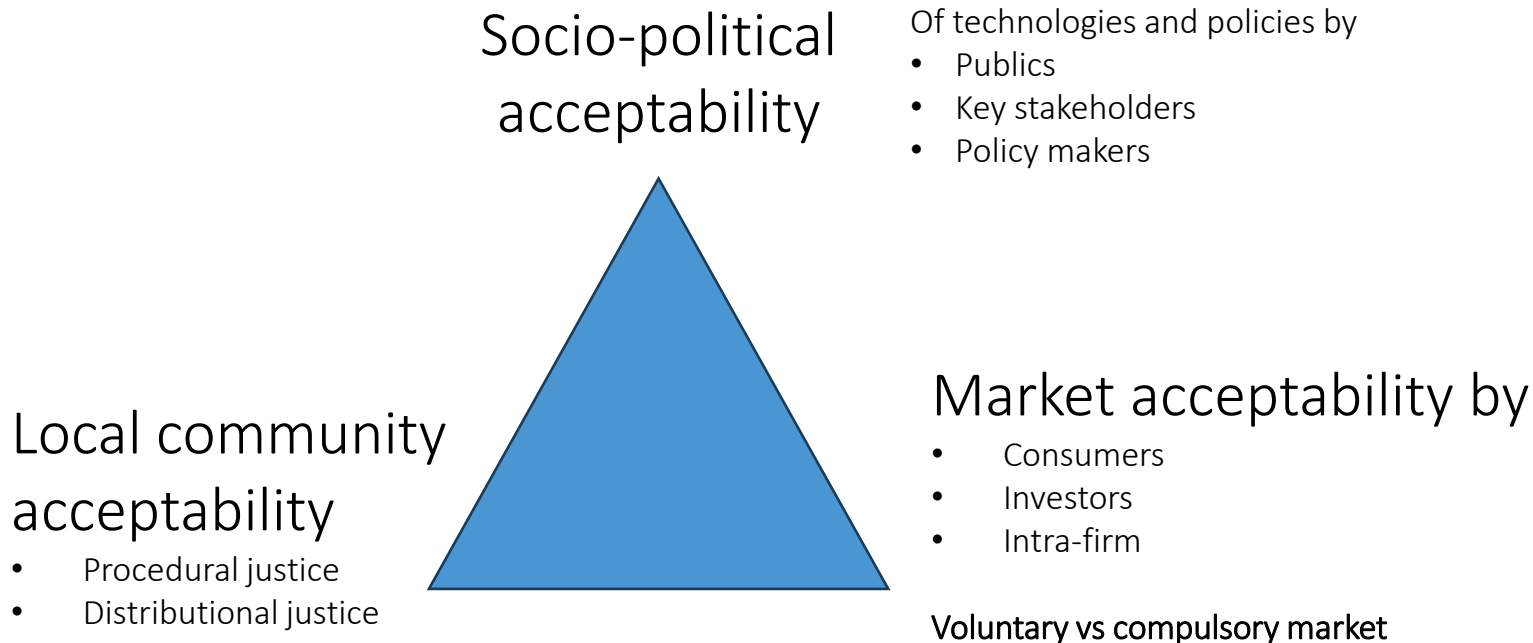
Campaigners worry about scheme's impact on marine ecosystem but Planetary Technologies says concerns misplaced



The Guardian

Hundreds of people gather to voice their concerns over a proposed carbon dioxide removal

Three dimensions of social acceptability



Modified based on Wüstenhagen, Rolf; Wolsink, Maarten; Bürer, Mary Jean (2007): Social acceptance of renewable energy innovation. An introduction to the concept. In: Energy Policy 35 (5), S. 2683-2691. DOI: 10.1016/j.enpol.2006.12.001.

State of research on public perceptions of mCDR

- Mostly on terrestrial CDR
- Recent **rise in publications on OAE** (<10 studies)
- Geographical focus on **Global North**
- Except for Blue Carbon Ecosystems (~45 studies)

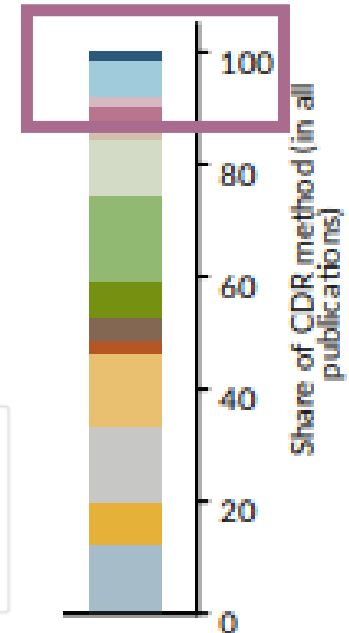
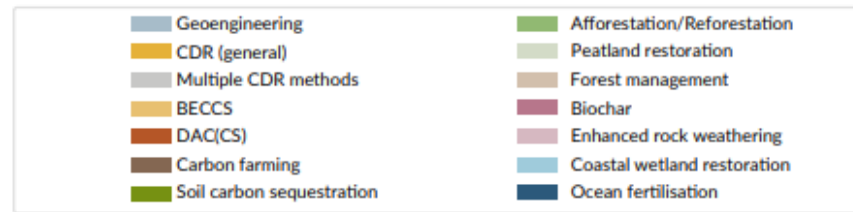


Figure 6.1 Overview of the public perceptions literature on carbon dioxide removal (CDR) from the systematic map. Publications by CDR method and year (top), study location by region (right). Carbon farming here refers to a cluster of CDR methods that can be applied in agriculture such as soil carbon sequestration, biochar and agroforestry. BECCS = bioenergy with carbon capture and storage; DAC(CS) = direct air capture (with or without carbon storage) Smith, S. M. et al. (2024). <https://www.stateofcdr.org>, doi:10.17605/OSF.IO/QN6FV

- Respondents prefer **cutting emissions**
- **Land-based** methods perceived more positively than ocean-based
- **Blue carbon management strongly preferred** over alkalinity enhancement, ocean fertilization, upwelling, and sinking macroalgae
- CDR methods **evaluated by associations** to existing experiences and events (aquaculture, marine pollution, freshwater liming, mining, fertilization)
- Participants are concerned about controllability, feasibility at scale, and environmental side-effects

Andersen et al. (2024)

Results on deliberation on the socio-political level

- **Deliberation reduces uncertainty** but does not change perceptions significantly
- Limited interest in participating in public consultations

Andersen et al. (2024), Kuhn et al. (2025)

Future research needs

1. Exploring perceptions of new, **more realistic deployment scenarios** (e.g. Coastal Enhanced Weathering, sinking Sargassum, or wastewater treatment)
2. Shift toward local acceptability with research on **open-ended engagement processes**
3. Stronger integration of governance research with societal acceptability research to assess **political feasibility**

Prospects and Challenges of
Investigating Ocean-Based
Negative Emission Technologies

Insights from the
OceanNETs Project



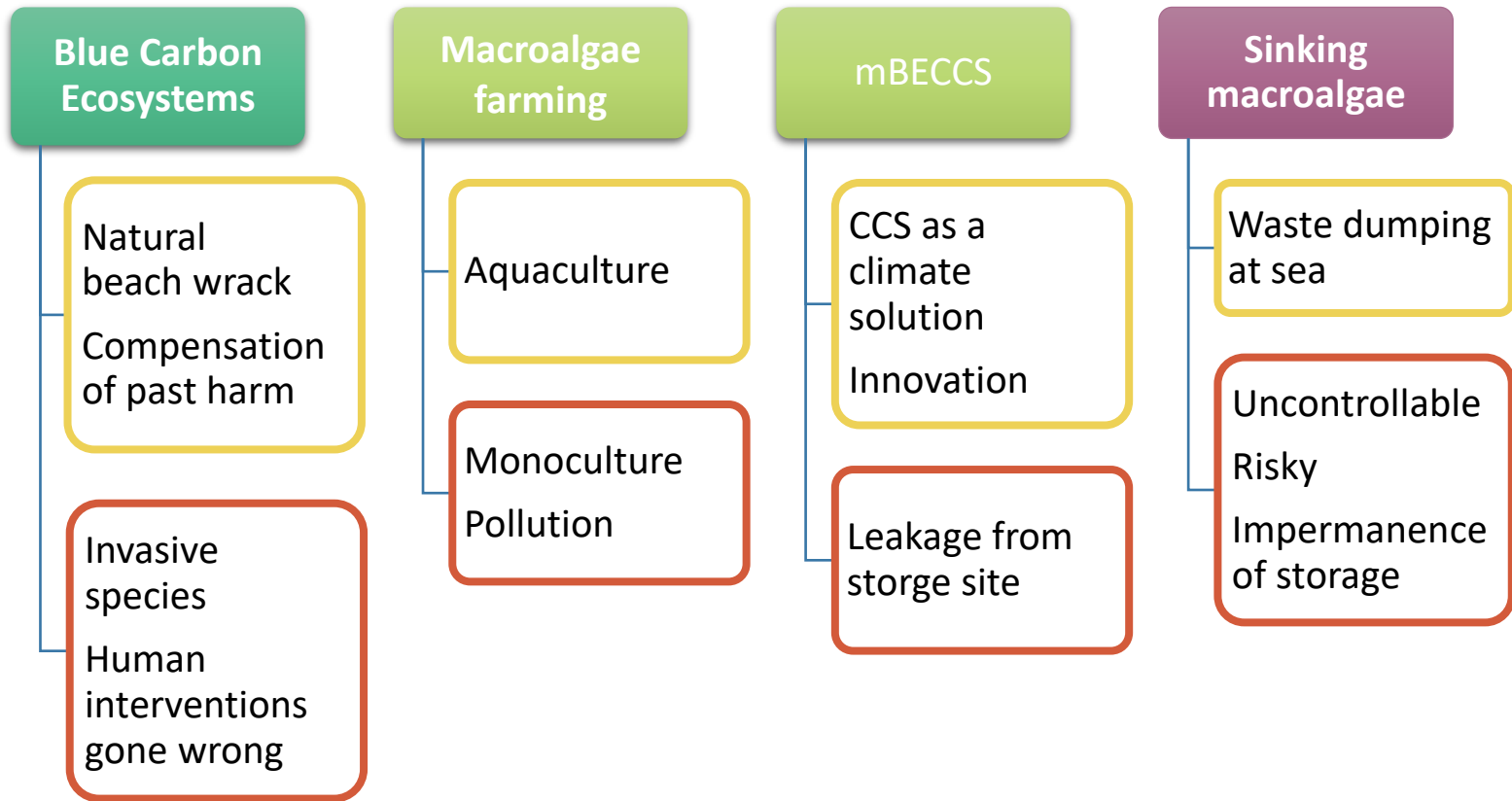
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869357



This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101081362



SEA O₂-CDR has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869357



Andersen et al. (2024)

Ocean fertilization

Marine pollution

Feasibility
Controllability

Artificial upwelling

Offshore wind
energy

Feasibility
Scalability

OAE

Marine pollution
Freshwater liming

Additionality
Mining
Energy footprint
Controllability
Risky & costly
not environmentally
friendly or feasible

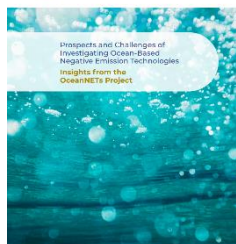


Table 1, OceanNets Synthesis Report

Key results – would be nice but probably too much

Deliberative survey (D3.4)

- Deliberation **reduces uncertainty** but does not change perceptions significantly
- **Land-based** methods perceived more positively than ocean-based
- Dominant narratives: technology leadership vs. fragility of nature

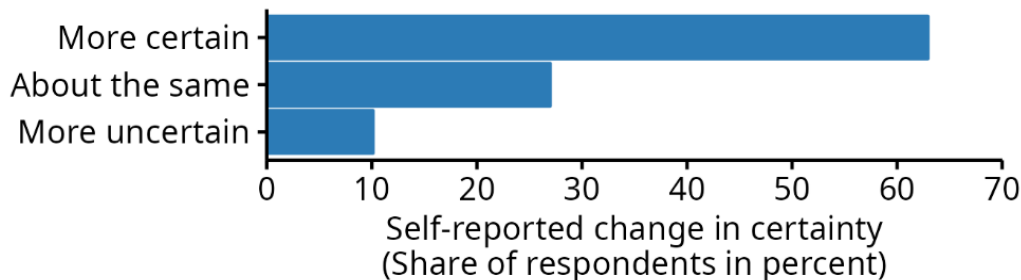


Figure 5: Do you feel more certain or more uncertain about your views on different methods of removing CO₂ from the air after you participated in the deliberation? D3.4