

Assessing Environmental Risks of Marine Carbon Dioxide Removal (mCDR)

Notes from the DOSI-led Ocean Decade Dialogue at UNFCCC COP28 in Dubai

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Attendees:

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Goal: Discussing the environmental risks of mCDR and how the topic can be addressed going forward. How can we limit the impact of emissions in an environmentally safe way?

Summary: In this expert Dialogue at UNFCCC COP28, participants discussed how to evaluate and account for the environmental risks of marine carbon dioxide removal (mCDR). Participants also shared their thoughts on how the scientific and academic community should engage with the topic as industry forges ahead. All recognized that mCDR methods are unproven and carry some element of risk. Some participants argued that, to ensure the methods chosen are as safe and effective as possible, academics and scientific institutions need to participate in their development and testing or risk being left behind by industry. Some believed that the environmental and human risks of mCDR must be weighed against the already-damaging effects of climate change, the failure of other measures to cope with rising atmospheric CO₂, and the cost of inaction. Others argued that mCDR techniques risk damaging the ocean's existing ability to store carbon and may not effectively sequester carbon themselves, making at-scale mCDR a currently unacceptable risk compared to better-understood options like emissions reduction.

Each of the bullet points below is an opinion shared by one of the Dialogue participants during the discussion. Notes are paraphrased and may not exactly represent the speaker's views.

Note: Due to the sensitive nature of the topic, names were not connected to individual statements during note-taking to allow for free discussion.

- We need to understand the capacity of different mCDR solutions, which will take decisions about testing that will be made with limited information. We must be able to manage known unknowns. Inaction is not a climate strategy.
 - Others expressed discomfort with this, arguing that a protocol for ocean observation is needed before testing can reasonably move forward.

- Any major manipulation of the ocean will have an environmental impact. Causing change is the point of an effective intervention. That does not necessarily make said action a bad idea. Solving climate change will require an altered environment, and the cost of inaction (ongoing changes in the environment due to climate change) is severe.

- To understand potential impacts, we should be carefully planning Monitoring, Reporting and Verification (MRV) so that they include an ecological/environmental aspect (eMRV.)
 - Ocean Visions' Road Maps include environmental assessments.

- We can't study potential impacts effectively with just models. Fieldwork is needed to inform models.

- It will be important to consider how variations on specific mCDR techniques may have different impacts.

- Question: How can science inform industry when industrial projects are already pushing ahead? Ocean Visions is already publishing data from field trials.
- Question: The location of an intervention will have a huge impact. Is anyone working on that? The gap between national and international policy is also important.

- Modeling open systems is extremely hard. Research in enclosed systems is important.

- Some companies are already precommissioning EIAs. Companies are planning to deploy, test, and adapt these technologies at scale.
 - This is dangerous, but it's also why moving ahead with testing is important for scientists. Early, smaller tests are important to help us learn about the good and the bad before companies leap too far ahead. We have choices in uncertainty, and moving ahead with research is a better option than waiting around while companies expand to full scale. If we want a voice, experts need to participate.
 - Testing in national waters may help nations have control of the process.
 - Can national regulations be trusted to be good enough?
 - Do we need better, more transparent EIA processes?
 - Perhaps there should be an integrated collection of EIA to help. Currently, EIA can be hard to access as national bathymetry is often confidential.

- Time series will be an important tool.
 - Changing baselines make experimental confidence difficult, which is the hardest part, but we will be able to project some things.

- It's unclear to what extent models can replace observations.

- Academics risk becoming irrelevant if they step back from studying this, as the work will go ahead with or without them.

- Companies will move ahead with mCDR if it is profitable, whether or not their project actually affects the climate.

- Enormous current and future impacts of climate change in places like India make any options for removing CO₂, even risky ones, more appealing.
 - Some participants disagree, arguing that the ocean provides key carbon-storage services for free already. It isn't just a question of balancing mCDR carbon removal benefits and its environmental or human risks: mCDR interventions could fail to remove carbon effectively while also damaging the ocean's natural ability to store carbon. That is currently an unacceptable risk.

 - Those supporting this view argue that the energy put toward supporting risky options like mCDR would be better committed to clearer solutions, especially reducing CO₂ emissions at the source.

- The official position of NASEM is that field trials of mCDR are needed.

- Question: is there any analogue with geological storage of carbon?

- Question: How can we create best practices for a highly variable system like mCDR, especially with funding concerns?

- Companies are already selling credits and offsets. The industry may be set to grow rapidly in a similar way to other offset markets in years past.

- Question: Will the private sector follow the science/scientists?
 - They will most likely have to work with their regulatory authority.
 - International pressure and negotiations can play a role in encouraging good governance.

- Scientists must be honest brokers of information in this debate, not advocates
- Some currently unreleased assessments have shown that, even with land-based carbon sequestration and anticipated emissions cuts, mCDR that works as intended will be necessary to achieve global temperature goals.