

Protect coastal and marine biodiversity from geoengineering



Photo: Hiswaty Hafid, Indonesia

Oceans and coastal areas are increasingly pitched as tools to fight global warming. This narrow focus on climate helps promote a technological approach to increasing the ocean's capacity to absorb CO₂ with a view to selling the carbon credits generated commercially.

However, this approach ignores the complexity and fragility of these ecosystems, especially their key role as source and support for vital food chains for plants, animals and humans, and their intrinsic relationship to traditional livelihoods that maintain and increase biodiversity.

Spurred by this new concept of "blue carbon", the emergence of voluntary carbon markets and the potential approval of formal markets at UNFCCC, dozens of new geoengineering projects and experiments are being pushed in marine areas around the globe, mainly by private actors.¹ However, all are experimental and speculative in nature, and none are proven to have any real effect on climate change.

Proposals include reviving ocean fertilization techniques (under the guise of new names); spreading synthetic reflective beads over Arctic

areas; brightening marine clouds; establishing mega plantations of algae monocultures; sinking huge amounts of minerals to change ocean chemistry; and sinking large volumes of organic material and biomass into the seas to supposedly absorb carbon. All these and other geoengineering proposals introduce a wide spectrum of new threats to marine ecosystems, their biodiversity and dependent livelihoods. Several of these proposals also carry serious risks to animal and human health.

There are key global policies aimed at preventing the deployment of such hazardous technologies. For instance, because of its many potential risks, the CBD and the London Convention/London Protocol (LC/LP), which regulate the dumping of wastes and other matter at sea, have been calling for extreme precaution in relation to ocean fertilization since 2008. In the same year, the CBD went further and established a *de facto* moratorium on ocean fertilization.² In 2010, CBD called for no deployment of any geoengineering proposals that would have impacts on biodiversity (dec X/33 (w), recalled in dec XI/20 and dec XIII14).³

1 CBD decisions on climate-related geoengineering are compiled at <https://www.cbd.int/climate/geoengineering>

2 CBD decision IX/16, as recalled in decision X/29 <https://bit.ly/4b7zP2q>

3 CBD decisions on climate-related geoengineering are compiled at <https://www.cbd.int/climate/geoengineering>

With so many new private sector proposals threatening to increase pressure on marine and coastal biodiversity under the “blue carbon” banner, CBD urgently needs to recall and ensure the implementation of its precautionary decisions on geoengineering, to protect coastal and marine biodiversity, as well as the rights of Indigenous peoples and the rights of coastal and marine communities and their livelihoods.

In view of the surge of marine geoengineering projects and experiments, the London Convention / London Protocol have recently resumed their work on this issue. CBD should recognize this ongoing work of the LC/LP and ask the COP to consider its results.

Background: CBD decisions on geoengineering

In 2008, by consensus of all Parties, CBD took a groundbreaking decision on ocean fertilization. Decision IX/16 C (4) stated that the COP of CBD: “ (...) requests Parties and urges other Governments, in accordance with the precautionary approach, to ensure that ocean fertilization activities do not take place until there is an adequate scientific basis on which to justify such activities, including assessing associated risks, and a global, transparent and effective control and regulatory mechanism is in place for these activities; with the exception of small scale scientific research studies within coastal waters. Such studies should only be authorized if justified by the need to gather specific scientific data, and should also be subject to a thorough prior assessment of the potential impacts of the research studies on the marine environment, and be strictly controlled, and not be used for generating and selling carbon offsets or any other commercial purposes.”

In 2010, CBD took decision X/33 8 (w), which called for a moratorium on the deployment of all geoengineering activities until a set of conditions are met, including that a transparent multilateral global governance mechanism is in place, that no transboundary harm would occur, and that there is an adequate scientific basis to justify these proposals, taking into account the risk geoengineering activities pose to biodiversity and related social and cultural impacts.⁴ The decision made an exception for small-scale scientific

research studies in controlled settings for the purposes of gathering scientific data but only after a thorough prior assessment of the potential impacts on the environment.

None of the conditions expressed in these CBD decisions on climate-related geoengineering are yet in place. These precautionary calls from CBD are as important as ever and are becoming even more relevant in light of the growing number of risky marine and solar geoengineering proposals and attempted / ongoing field experiments that threaten marine and coastal biodiversity, the environment, and the rights, territories and livelihoods of Indigenous Peoples and local communities.

Current developments in marine geoengineering

London Convention / London Protocol call for precaution

In 2023, the Parties to the London Convention and Protocol (LC/LP), announced their intention to regulate four additional geoengineering techniques that have potential impacts on oceans (ocean alkalinity enhancement, algae/biomass cultivation and sinking; marine cloud brightening and reflective particles or other materials to increase albedo in the marine environment). Two of these techniques are aimed at carbon removal (alkalinity enhancement and biomass cultivation/sinking), and two are aimed at increasing albedo for solar radiation modification (marine cloud brightening and reflective particles).

The LC/LP scientific bodies are currently analyzing the potential impacts of these technologies. In October 2023, the 45th meeting of the governing parties of the London Convention and the 18th meeting of the parties of the London Protocol issued a cautionary statement about these four technologies.

⁴ CBD Decision X/33 <https://www.cbd.int/climate/geoengineering>

They stated that each of these geoengineering technologies has the “**potential for deleterious effects that are widespread, long-lasting or severe**” and that “**there is considerable uncertainty regarding their effects on the marine environment, human health and other uses of the ocean.**”⁵

The regulation of these technologies could follow the rules decided by LC/LP in 2013 for ocean fertilization, which amounts to a ban, except for its use for strictly defined legitimate scientific research.

UNFCCC: the threat of new carbon markets

UNFCCC, the Supervisory Body of the mechanism for Article 6.4, which is tasked with developing the rules to govern a new carbon market regime under the Paris Agreement, has received proposals to include large-scale land and marine-based geoengineering technologies – such as large-scale bioenergy with carbon capture and storage (BECCS), direct air capture (DAC), ocean fertilization and ocean alkalization – as sources of carbon credits or offsets. If these technologies were approved as sources of carbon credits, this would trigger a commercial race to develop these risky proposals.⁶

Scientists and African governments call for a stop to solar geoengineering

A group of over 500 scientists from 61 countries has issued a call demanding an “International Non-Use Solar Geoengineering Agreement” stating: “Solar geoengineering deployment at planetary scale cannot be fairly and effectively governed in the current system of international



institutions. It also poses an unacceptable risk if ever implemented as part of future climate policy. A strong political message from governments, the United Nations and civil society is urgently needed.”⁷

Many governments already agree: The 19th meeting of the African Ministerial Conference on the Environment (AMCEN) also called for a solar geoengineering non-use governance mechanism.⁸ In addition, at the recent meeting of UNEA 6, February 2024 in Nairobi, the African Group, supported by Colombia and other Global South countries, again insisted on the need for such an agreement.⁹

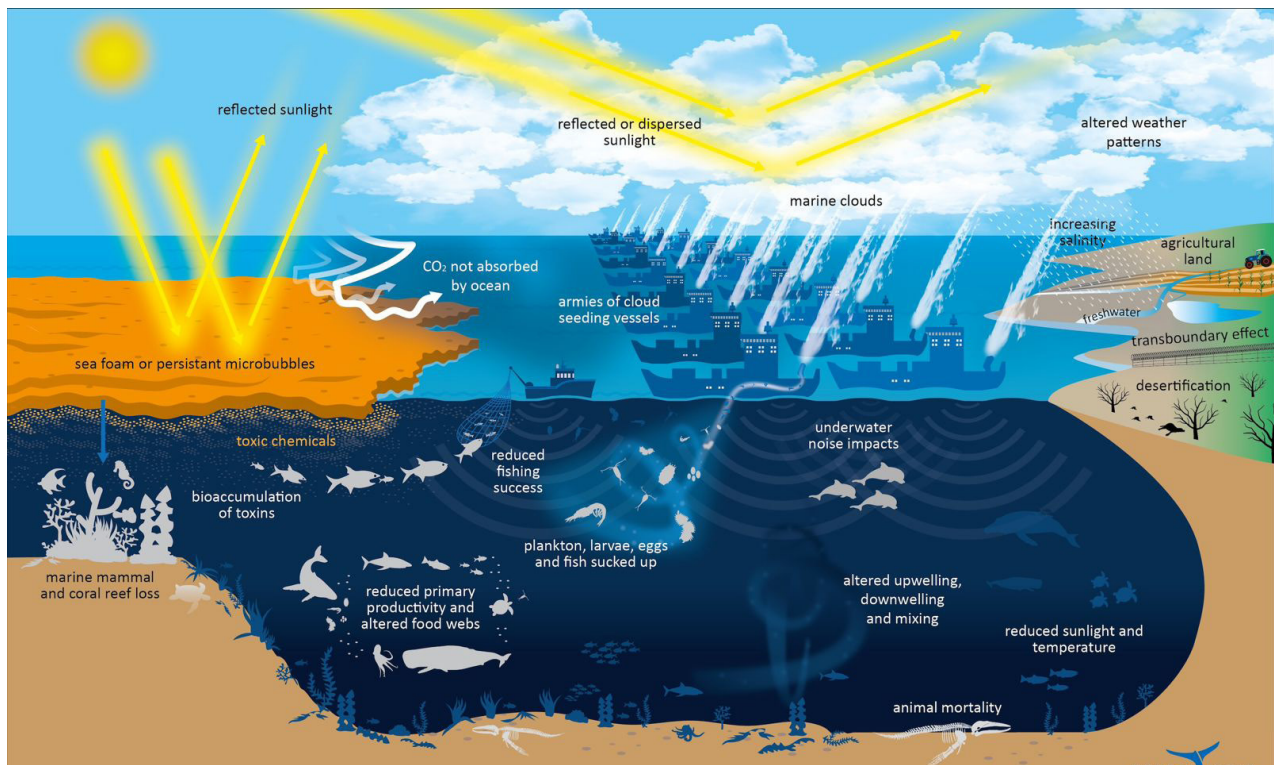
5 International Maritime Organization (2023) 45th Consultative Meeting of Contracting Parties to the London Convention and the 18th Meeting of Contracting Parties to the London Protocol (LC 45/LP 18) <https://bit.ly/4diiTrS>

6 Geoengineering Monitor, November 8, 2022, UNFCCC Article 6.4: No to legitimizing geoengineering and land-based offsets <https://bit.ly/3hrMKWY> and ETC Group, November 3, 2022, False Solutions Alert: Geoengineering in climate negotiations, <https://bit.ly/44CgQet>

7 Solar Geoengineering Non Use Agreement <https://www.solargeoeng.org>

8 The African Ministerial Conference on the Environment (AMCEN) 19/6, August 17, 2023. <https://bit.ly/3Qqt0Rs>

9 ETC Group, March 2, 2024, A solar geoengineering Trojan horse at UNEA-6, <https://bit.ly/3JFNrqQ>



OceanCare

Geoengineering experiment at seas: no consultations, many risks.

It is time to take action before irreversible harm occurs. There are over 40 companies, mostly private and most of them based in the US, that are doing or pushing to do dozens of open-sea marine geoengineering experiments and projects, some of them at a very large scale. At least half of these companies are already selling “carbon credits” in the voluntary carbon markets, even if there is no proof that the carbon removal the companies are claiming is actually occurring or that the removal will be permanent. If these projects were scientifically scrutinized it is likely that most of these projects would be shown to be fraudulent. However, the impacts that these experiments could have on marine and coastal environments and biodiversity do exist, as do their impacts on the livelihoods of Indigenous Peoples and marine, Arctic and coastal communities, almost all of whom have not been informed or consulted about these projects. Their right to Free, Prior and Informed Consent is being denied.

Among the techniques that companies are pursuing for carbon removal are ocean fertilization (now called “ocean pasture”, “ocean seeding” or even “whale poo”); Artificial Ocean Upwelling;¹⁰ Ocean

Alkalinity Enhancement (OAE);¹¹ biomass sinking;¹² and industrial macroalgae/seaweed cultivation and sinking.¹³ Technologies being pursued for the purpose of increasing albedo / sunray reflection (solar geoengineering) include marine cloud brightening, Arctic ice and glacier management and a few others.^{14 15}

In addition to private projects, some countries, especially the US, but also others like the UK, Canada, Australia and Israel, along with the European Union, are promoting or collaborating in private-public geoengineering project partnerships that impact the marine environment.

See ongoing and planned geoengineering experiments and projects, including actors, techniques and current status at the interactive Geoengineering Map:

<https://map.geoengineeringmonitor.org>

10 Nathan Thanki and Serayna Solanki, June 6, 2023, Marine Geoengineering: Between profits and climate protection, our oceans are becoming an experimental field, *Geoengineering Monitor*, <https://bit.ly/3wefhXb>

11 Anja Chalmin, April 3, 2024, Carbon market-driven experiments in the open ocean endanger the marine environment, *Geoengineering Monitor*, <https://bit.ly/3JGUUnTA>

12 Anja Chalmin, April 10, 2024, Dumping biomass in the open ocean is an unproven carbon removal strategy, but that hasn't stopped companies from selling carbon credits, *Geoengineering Monitor*, <https://bit.ly/3JFDMzB>

13 ETC, 2023, The Seaweed Delusion: Industrial Seaweed will not cool the climate or save nature, <https://bit.ly/4bdKrwE>

14 Anja Chalmin, April 12, 2024, Arctic ice management and other marine geoengineering projects should remain science fiction, *Geoengineering Monitor*, <https://bit.ly/3JEgwlt>

15 See geoengineering technology briefings and fact sheets here: <https://bit.ly/3UEOxsc>

Impacts of the techniques

Each of the proposed marine geoengineering techniques has potentially serious impacts on the marine environment, many of which have already been known about for a long time. In 2012 CBD produced a Technical Series report that lists many significant impacts.¹⁶ In 2019, The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) similarly published a review of proposed marine geoengineering technologies,¹⁷ which led this group of experts to call for a precautionary approach to these techniques.¹⁸

For example, ocean fertilization leads to the disruption of the marine food web, producing anoxia at some levels of the ocean, and enhancing the growth of toxic algae.¹⁹ The use of enhanced weathering or Ocean Alkalinity Enhancement (OAE) requires vast quantities of rock, multiplying the impacts of mining and generating a high demand for energy. The impacts of OAE on the carbon cycle and biodiversity are also highly unpredictable due to the complexity of the marine environment and carbon exchange processes and may also threaten marine food chains.²⁰ Several of the techniques, including large-scale macroalgae cultivation, disrupt light and temperature levels; increase turbidity; and add organic material and CO₂, increasing acidification and reducing oxygen. All of these will impact marine life and food chains.

A recent UNEP report found that “*Seaweed farming has various environmental risks, including competition with wild habitats for nutrients and light, spillover of diseases and invasive species and genetic pollution from farms to the environment, and entanglement of marine megafauna from seaweed farming infrastructure such as ropes*”²¹

Dumping seaweed and terrestrial biomass (such as wood) into the ocean, to capture carbon and sink it to the ocean floor negatively impacts deep ocean ecosystems, ocean bio-geochemistry and marine food webs.²²

There is generally a growing concern among marine scientists, that the impacts of these techniques on the deep sea could be very serious and irreversible, but that they are generally not taken into account.²³

“Especially given the vastness, vulnerability, comparatively pristine nature, and poor scientific understanding of the deep-sea ecosystem, we should be careful to green-light these [marine geoengineering] activities that could have irreversible impacts,”

Moriaki Yasuhara, The University of Hong Kong
ScienceDaily, 10/3/23



16 CBD (2012), Technical Series 66, Geoengineering in Relation to the Convention on Biological Diversity - Part I. Impacts of Climate-Related Geoengineering on Biological Diversity <https://bit.ly/3Ws7LT4>

17 GESAMP (2019), High level review of a wide range of proposed marine geoengineering techniques, GESAMP Working Group 41, <https://bit.ly/3UEOMDC>

18 GESAMP (2019), Marine and social scientists are urging a precautionary approach towards marine geoengineering techniques which involve deliberate large-scale manipulation of the environment, 12 March 2019 <https://bit.ly/4aTHaD6>

19 Geoengineering Monitor (2021), Ocean Fertilization, Technology Briefing <https://bit.ly/3UCwC5v>

20 Anja Chalmin, (2024), Carbon market-driven experiments in the open ocean endanger the marine environment, *Geoengineering Monitor*, April 03, 2024 <https://bit.ly/3JGUnTA>

21 UNEP (2023), Seaweed Farming: Assessment on the Potential of Sustainable Upscaling for Climate, Communities and the Planet. Nairobi. <https://bit.ly/3Uo8fXI>

22 Wu, J., Keller, D. P., and Oschlies, A. (2023), Carbon dioxide removal via macroalgae open-ocean mariculture and sinking: an Earth system modelling study, *Earth Syst. Dynam.*, 14, 185–221, <https://doi.org/10.5194/esd-14-185-2023>.

23 Levin, L. A., et al. (2023), Deep-sea impacts of climate interventions. *Science*. <https://www.science.org/doi/10.1126/science.ade7521>

What CBD needs and can do:

- CBD Parties need to affirm precaution and prevent geoengineering experiments from harming biodiversity, marine and coastal biodiversity and violating the rights of Indigenous Peoples, and to protect the human rights of local communities, by recalling decisions IX/16 (c) and X/29 on ocean fertilization, and decision X/33 paragraph 8 (w) on geoengineering, in the discussions of marine biodiversity at SBSTTA 26, as well as in all discussions on biodiversity and climate change in COP16 and beyond.
- SBSTTA 26 needs to send a clear message that COP16 must recall and implement the existing precautionary decisions and additionally ensure that geoengineering open field experiments should not be permitted.
- CBD should recognize the ongoing work at the London Protocol / London Convention on geoengineering techniques that affect the oceans and instruct the COP to consider the results of that work.
- In line with COP decision XI/20,²⁴ paragraph 9, the SBSTTA should mandate the CBD Secretariat to require all CBD parties to report, on a regular basis, on any geoengineering initiative taken in and / or by their countries and report measures undertaken related to decision X/33 (w).²⁵ The CBD Secretariat should compile reported measures from the parties and bring them to the attention of the Conference of the Parties.
- The CBD Secretariat should be mandated to proactively reach out to all other UN bodies discussing geoengineering to inform them about relevant CBD decisions, requesting them to honour these decisions and highlighting the need for a precautionary approach.

²⁴ See CBD Decision XI/20: <https://www.cbd.int/doc/decisions/cop-11/cop-11-dec-20-en.pdf>

²⁵ See CBD Decision X/33: <https://www.cbd.int/decision/cop/?id=12299>



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More information:

Summary of recent developments on marine geoengineering:
<https://www.geoengineeringmonitor.org/2024/04/marine-geo-arctic-ice/>

<https://www.etcgroup.org/issues/climate-geoengineering>

<https://www.geoengineeringmonitor.org>