From Science to Policy: Navigating the Complexities of Emerging Climate Techniques in the Americas

Introduction

The Inter-American Institute for Global Change Research (IAI), in partnership with The Alliance for Just Deliberation on Solar Geoengineering (DSG) and the Degrees Initiative, is delivering a workshop series aimed at enhancing knowledge of emerging climate intervention techniques to support climate and environmental negotiators and policymakers in the Americas, ensuring that they are equipped with the necessary scientific and governance insights to engage meaningfully and equitably in multilateral climate deliberations.

The climate context

The climate crisis is worsening. Last year, global average temperatures crossed 1.5°C above pre-industrial levels, matching the 1.5°C Paris Agreement threshold well ahead of scientific projections. Countries' pledges to reduce greenhouse gas emissions are not aligned with even the 2°C upper limit set by the Paris Agreement. Given the low scale of ambition to deal with accelerating climate change, calls for climate interventions, including actions designed to remove greenhouse gases from the atmosphere (referred to as "carbon removal") or to change Earth's radiation balance (referred to as "solar radiation modification-SRM," or "solar geoengineering"), are growing.

SRM is a suite of large-scale, deliberate climate intervention approaches to increase the amount of sunlight reflected into space, thereby cooling the planet. Stratospheric aerosol injection (SAI) and marine cloud brightening (MCB) are two techniques that have received the most attention. SAI would involve the dispersion of small particles into the upper atmosphere to reflect a small proportion of sunlight back into space, while MCB would involve spraying sea salt into the lower atmosphere to create and brighten clouds to make the planet more reflective. Evidence from climate models indicates that moderate SRM use could significantly reduce climate risks, but not enough is known about the impacts of these approaches on physical and social systems (e.g., precipitation, agriculture, health, geopolitics) to make informed decisions.

Recent developments in SRM:

- August 2022: The IAI hosted the "Americas Conference on Solar Radiation Modification: Science, Governance and Implications for the Region" at the University of the West Indies, Kingston, Jamaica.
- 2023-2024: The Degrees Initiative funded 10 SRM research projects in the Americas (Argentina, Brazil, Chile, Jamaica and Mexico).
- January 2023: The government of Mexico announced its intention to ban SRM experiments after a US-based start-up, Make Sunsets, launched a small-scale outdoor experiment in Baja California without the consent of Mexican authorities.
- Following Months: Several UN bodies released reports on SRM, including the UNEP's One Atmosphere report. The US and the EU also released reports indicating that SRM

research and governance are necessary to determine the potential role of these technologies in climate response strategies.

- Early 2024: Environment and Climate Change Canada published its Science Strategy for 2024-2029, which includes activities to improve the understanding of SRM in the Canadian context.
- February 2024: The World Climate Research Programme (WCRP) launches a Lighthouse Activity (LHA) on Climate Intervention Research to explore potential future scenarios and provide an objective overview of expected risks, opportunities, uncertainties, and knowledge gaps.
- February 2024: A second draft resolution on SRM was debated at the 6th United Nations Environment Assembly (UNEA). Although a consensus wasn't reached and the resolution was withdrawn, it is likely that this issue will re-emerge at UNEA-7.
- April 2024: An SRM experiment by the University of Washington in Alameda was shut down in June by local authorities due to a lack of public engagement.
- April 2024: The UK's Advanced Research and Invention Agency (ARIA) announced its upcoming funding of a USD 75 million program Exploring Options for Actively Cooling the Earth.
- April 2024: US-Israeli for profit start-up Stardust became public about their plans to develop means to launch reflective particles into the stratosphere.
- April 2024: The Tennessee state House of Representatives and Senate passed a bill to prevent technological climate interventions, including SRM and cloud seeding.
- July 2024: UNEP released the report Navigating New Horizons: A global foresight report on planetary health and human wellbeing, identifying SRM as one of 18 potential signals of change that could disrupt planetary health and wellbeing. This report warned that "choosing to ignore SRM altogether at this stage could carry its own risks, leaving society and decision-makers ill-prepared and potentially misguided."
- October 2024: The American Geophysical Union (AGU) published its Ethical Framework Principles for Climate Intervention Research – a code of conduct to guide the ethics of climate intervention.
- October 2024: ECLAC publishes a background paper on SRM "Strengthening Regional Capacities to Address the Risk of and from Overshooting 1.5°C Global Warming in Latin America and the Caribbean" providing key insights for decision-makers across Latin America and the Caribbean (LAC) on SRM.
- October/November 2024: CBD COP16 decisions reaffirming previous CBD decisions.
- December 2024: European Union (EU) published three major reports – a Scientific Opinion, an Ethical Opinion, and an Evidence Review Report – to guide the European Commission (EC) in forming a position on the research and potential deployment of SRM technologies, including in international deliberations.

This shifting landscape underscores the growing importance of understanding SRM's potential benefits and risks, requiring informed, inclusive, evidence-based discussions among policymakers and stakeholders globally.

SRM and its complex dimensions

While SRM technologies offer potential to reduce the average global temperature, their possible use raises significant ethical, social, governance and equity concerns that must be carefully considered:

- Ethical considerations: the potential deployment of SRM – or the decision to reject it – poses profound ethical questions, including issues of intergenerational justice, consent, and the equitable distribution of benefits and risks. The potential for unintended consequences and the need for transparent and informed decision-making processes are critical ethical concerns.
- Social impacts: SRM could have positive or negative impacts on different communities and the systems they depend on, particularly those already vulnerable to climate change. Evaluating these social dimensions requires a risk-risk approach alongside equity and justice considerations to ensure that SRM does not exacerbate existing inequalities or create new social injustices.
- Governance frameworks: SRM requires robust international, regional, and local frameworks to effectively govern research, possible future deployment and potential transboundary effects. This includes developing national and regional positions on SRM and policies that are inclusive, transparent, and adaptable to evolving scientific understanding and societal values.
- Equitable scientific capacity: Although this picture is changing quickly with significant research now developed in the Global South, historically most research on SRM took place in the Global North. Greater awareness of regional experts on SRM may promote increased collaboration among research institutions in the Global South and provide policymakers with the needed information to prepare for deliberations.

Building more regional knowledge on SRM

While much of the SRM narrative has been shaped by research and policy discussions in the Global North, this trend is shifting towards the Global South, addressing scientific, ethical, social and governance asymmetries inherent in the SRM debate. For a technology with potentially global impacts, it is crucial to continue enhancing the capacity of vulnerable nations and communities to engage equitably in SRM research as well as in national, regional and global discussions on SRM governance. This is particularly relevant in the region of the Americas, where many countries and local communities are already facing severe impacts from climate change and where the impacts of choosing to deploy or to ban SRM will be felt the most.

Workshop series objectives

To build and strengthen the capacities of a set of key stakeholders, climate and environmental negotiators in the Americas, IAI, DSG and The Degrees Initiative are collaboratively delivering a workshop series aimed at:

- Providing a comprehensive understanding of the science, ethical, social, and governance dimensions of SRM in the context of the increasing risks from global warming.
- Enhancing the development of national/regional perspectives and capacity to engage in international SRM discussions and decision-making processes.
- Empowering participants with the knowledge and tools necessary for evidence-based contributions to the deliberative multilateral process.

Workshop structure

The series will include two virtual workshops and one in-person convening, each designed to progressively deepen understanding and foster collaborative dialogue on SRM. Through regional experts' presentations and an in-person interactive session, participants will gain an increased understanding of the science of SRM and how climate scenarios, with and without climate interventions, are modeled, explore the potential risks and benefits of SRM, identify knowledge and governance gaps, and participate in a multilateral negotiation simulation exercise that will empower them to start shaping their country's position.

By integrating these multiple dimensions into the workshop series, IAI, DSG and the Degrees Initiative aim to equip policymakers in the Americas with a nuanced, comprehensive understanding of SRM, enabling them to contribute effectively to global discussions and the governance of these emerging climate intervention technologies, as well as foster regional collaboration.

Workshop series outcomes

By delivering these workshops, IAI, DSG and Degrees aim to achieve the following outcomes:

- Informed policymakers: enable policymakers in the Americas to become well-informed and prepared to engage in SRM discussions and decision-making at international forums, such as UNEA, UNFCCC CoP, CBD CoP, among others.
- Regional leadership: facilitate the dissemination of tools and South-South cooperation to support parties' engagement in SRM so they can play a leading role in shaping the outcome of negotiations based on their ethical, social, and environmental concerns.
- Transdisciplinary and cross-sectoral collaboration: strengthen transdisciplinary and cross-sectoral networks, by leveraging regional expertise and enhancing collaboration between scientists, policymakers, civil society, and other stakeholders in the Americas.

Participant profile

Given the specific focus of this workshop series on policymakers and negotiators, we recommend the designation of participants who are directly involved in climate or environmental negotiations and policy-making processes. Ideal participants include:

- Government representatives: Climate or environment negotiators or diplomats who will be participating in negotiations at UNEA, UNFCCC CoP, CBD CoP, and other relevant international forums.
- Policy advisors: Advisors to government bodies on climate change, environmental policy, and international relations, with a mandate to influence policy development and negotiations.
- Senior officials: High-ranking officials in environmental and climate departments who are responsible for policy formulation and implementation at national and regional levels.
- Technical experts and researchers: Experts within governmental or intergovernmental organizations and researchers from the Americas with a focus on climate science, climate intervention approaches, and environmental policy.

Workshop 1: Introducing the science basics of climate change and climate intervention techniques – 16 April 2025

Objectives:

- Introduce the science of climate change, modelling and available research resources in Latin America and the Caribbean to review projected impacts, with a focus on regional vulnerabilities and risks.
- Provide a basic understanding of main SRM techniques (SAI and MCB) and explore the current state of research, with particular attention to the region.
- Identify potential regional impacts of SRM, both positive and negative, and the importance of comprehensive impact assessments to guide decision-making.
- Start identifying key knowledge gaps that need to be addressed for informed decision-making in SRM discussions.

Workshop 2: Governing Solar Radiation Modification: Institutional Frameworks, Ethical Considerations, and Climate Justice – 25 June 2025

Objectives:

- Examine existing governance frameworks relevant to SRM, including international treaties, institutions, and soft law mechanisms.
- Explore the ethical, social, and economic dimensions of SRM, including equity considerations, climate justice, moral hazard, and potential risks and benefits for vulnerable regions.
- Discuss the current landscape of SRM actors, including researchers, policymakers, funders, and civil society organizations, as well as the motivations and sources of funding for SRM research.
- Identify governance gaps and assess potential platforms or mechanisms (e.g., CBD, UNFCCC, UNEA) for advancing discussions on SRM governance.
- Facilitate dialogue on regional perspectives, ensuring all voices in the Americas contribute meaningfully to global deliberations on SRM.

Workshop 3: Multilateral negotiation simulation – date and location to be confirmed

Objectives:

- Simulate multilateral negotiations on SRM where participants engage in debating a draft resolution.
- Provide information to facilitate the development of national/regional positions on SRM reflecting parties' needs, concerns and priorities.
- Ensure ethical considerations, such as intergenerational, climate justice and equity are considered in SRM decision-making.
- Practice consensus-building and collaborative diplomacy to encourage South-South and North-South collaboration within the region and beyond.

About the organizers

The Inter-American Institute for Global Change Research (IAI) is a regional intergovernmental organization that promotes interdisciplinary scientific research and capacity building to inform decision-makers on the continent and beyond. Since the establishment of the Agreement in

1992, 3 additional nations have acceded the treaty, and the IAI has now 19 Parties in the Americas, which come together once every year in the Conference of the Parties to monitor and direct the IAI's activities.

The Alliance for Just Deliberation on Solar Geoengineering (DSG) is a new Washington DC-based nonprofit focused on the intersections of this emerging space with climate change justice and its international governance. Its mission is to work toward just and inclusive deliberation around research and potential future use of SRM. This work is not advocacy focused, rather an effort to empower governments and civil society in climate vulnerable countries to participate in this space, and reduce the Global North-South divide in terms of knowledge and decision making capacities. The core components of DSG's work include:

- Expanding the SRM narrative to be centered on global climate justice and de-risking engagement;
- Empowering policy engagement from civil society and other policy actors in climate vulnerable communities and nations through capacity building; and
- Fostering connections across the Global North and South to build pathways for engagement in arenas where governance and decision making is evolving quickly.

The Degrees Initiative is a non-profit that builds the capacity of developing countries to evaluate solar radiation modification (SRM). It has run more than 30 SRM engagement workshops across the Global South and its research funds are changing how the world evaluates SRM. To date they have supported 37 SRM research projects in 23 developing countries in the physical and social sciences, with more than 170 researchers exploring how SRM could affect their regions. These are the first SRM research projects of any kind in South America, the Caribbean, Africa, the Middle East, and Southeast Asia, and the experts who came into SRM research through Degrees' research funds are now providing an expert Southern voice in all SRM discussions.

Please note that the IAI and other co-organizers do not take a position on whether climate intervention techniques should be used or how it should be governed but rather support well-governed research and inclusive, science-based discussions at both regional and global levels.