Solar Radiation Modification and youth perspectives on its governance

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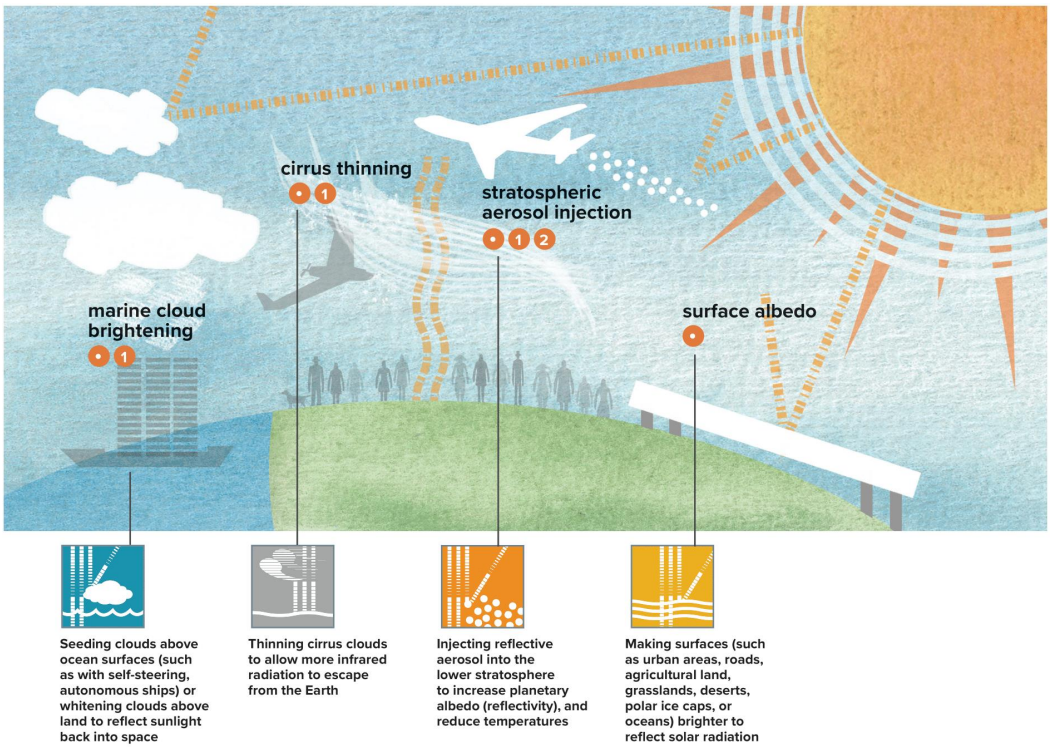
Abstract

As global temperatures continue to rise, current climate actions are considered insufficient to meet the 1.5–2°C goal of the Paris Agreement. Moreover, the latest IPCC report states that emission reductions alone are unlikely to prevent temperature overshoot. In this context, the case for emerging technologies, such as Solar Radiation Modification (SRM), grows stronger to tackle effects of climate change. However, SRM presents serious potential risks and remains distant from the public and governing bodies, as no significant efforts are made to address its governance, let alone to involve youth. Considering that decisions made on SRM will mainly impact the lives of younger and future generations, the relevance of youth involvement in the governance of climate-altering technologies like SRM is presented, together with recommendations for possible pathways to improving it.

The Intergovernmental Panel on Climate Change (IPCC) reported in its 2021 assessment that exceeding the 1.5°C target of global warming levels between 2021-2040 was likely (>66% chance) in the high and intermediate greenhouse gases (GHGs) emissions scenarios and very likely (>90% chance) in the very high emissions scenario. Considering that current climate mitigation efforts are still insufficient to reduce GHGs emissions (UNEP, 2020; WMO, 2020), and that mitigation after 2030 can no longer establish a pathway that limits global warming to 1.5°C without significant overshoot during the 21st century, technologies that can artificially cool the planet, such as Solar Radiation Modification (SRM), could be seen as tools to counter the negative effects of the climate crisis (IPCC, 2021, p4). This type of technology (examples presented in Figure 1) has the potential to reduce some of the negative impacts of climate change, or at least to allocate more time to adapt to rising temperatures, especially in highly climate vulnerable areas, such as glaciers and coral reefs, but also for communities that are highly dependant on agriculture production (Ricke, et al, 2010; Nassiry, et al, 2017).

Figure 1. Examples of Solar Radiation Modification (SRM) Techniques



Credit: C2G, 2018 (Rounds 1 and 2 refer to governance challenges mentioned in the original infographic)

On the other hand, these technologies do not address the root causes of climate change, such as greenhouse gas emissions, they do not tackle carbon concentration or ocean acidification, and cannot be considered as substitutes to mitigation and adaptation efforts (IPCC, 2018). At most, SRM constitutes a last resort measure and a mask on climate change consequences (UNEP, 2023). However, due to a lack of research, governance[1] and awareness about SRM, it remains an under-discussed and controversial topic. Its consequences are multi-faceted and cover issues ranging from environmental to social, ethical, geopolitical and religious spheres.

The need for an inclusive governance

While SRM is discussed by a few in academia and the civil society, there is no existing formal international framework on the governance of SRM research, development or deployment (UNEP, 2023). Indeed, even if some SRM-related experiments are being conducted around the globe, no intergovernmental institution has yet taken up the responsibility to manage SRM. Given that this technology has transboundary effects, these governance gaps pose potential negative environmental and geopolitical impacts (Honegger, et al, 2021). Moreover, now that the urge for SRM governance starts to be expressed in the literature (Harrison, et al, 2021), it is also vital to ensure that young people are included in SRM discussions and policymaking, keeping in mind that its governance should be inclusive and transparent, with the Global South as a key decision maker, as it is the most affected by the climate crisis (Brock, 2012).

Youth involvement

The climate crisis is intrinsically intergenerational, as climate decisions of today's generations will directly alter the future of next generations (Sanson, et al, 2020; Weston & B.H., 2007). Therefore, young voices need to be heard and actively participate in the process to regulate Solar Radiation Modification, as they are the ones who will either benefit or suffer the most from the consequences of these emerging technologies. Apart from being soon in a position to make decisions in an even warmer world, they are the closest link to the generations that are yet to come, and will in turn be responsible for ensuring decent livelihoods for them. Young people are in transition between childhood and adulthood and can bring a fresh perspective to the table, one that is critical to developing innovative solutions to ensure a long-term success of SRM governance. They are tech-savvy and, through proper training and access to information, they have the ability to gain a unique understanding of the technological advancements that are critical to the development of SRM. In order to include young people in a relevant, legitimate and non-tokenistic way in SRM discussions, training and capacity building are the first key steps. Popularising science among youth is also crucial in order to build youth awareness and understanding of SRM and its governance while encouraging them to ask important questions.

Some efforts are being made to include sustainable development topics into teaching and learning, such as through Education for Sustainable Development (ESD) (O'Flaherty, et al, 2018), which informs and equips the younger generation with skills to be active players into the ecological transition. Nevertheless, emerging technologies to curb the negative impacts of the climate crisis are not widespread knowledge and research is still not conclusive about SRM's consequences (IPCC, 2018; Honegger et al, 2021). In order to improve governance and thus research on SRM, it is also necessary to motivate the younger generation to form opinions about and work with these technologies which, if deployed, can have a significant impact on their lives. The sooner they start to understand SRM, the more prepared they will be to take positions at the decision-making tables which determine their future. Considering young people as full-blown actors in the governance of SRM would help to foster a sense of ownership and responsibility for the technology. This could lead to a more informed and engaged public, and will help to ensure that discussions on its governance are conducted in a transparent, accountable, and inclusive way.

[1] Governance in this context refers to: "*…the full range of means for deciding, managing, implementing and monitoring policies and measures [and] the contributions of various levels of government… the private sector, …non-governmental actors, and of civil society.*" (IPCC, 2018, p550). In the case of SRM, "governance" may cover deployment control, moratorium, complete ban, among others.

Policy recommendations

Keeping in mind the existing knowledge and governance gaps on SRM, the current lack of concrete youth inclusion, and building on work undertaken by UN DESA and OECD on youth involvement (UNDESA, 2010; OECD, 2017), the following recommendations suggest important aspects and phases of youth involvement in SRM governance of research, development and deployment.

These recommendations are mainly aimed at policymakers and scientists, but also at other actors interested or involved in SRM discussions. The recommendations follow four steps: better informing young people about SRM, collecting young people's ideas on these technologies, giving young actors the means to organise themselves and collaborate with decision makers, and finally, fully integrating young people into decision making processes.

1) *Informing*: it is important to ensure that young people have access to accurate, relevant, up-to-date and evidence-based information about SRM, including its science, its potential benefits and risks. This enables young people to develop essential critical thinking, but also to gain strong legitimacy and the ability to form well-informed opinions and decisions. Firstly, it is crucial to mainstream courses on climate change and its science in curriculums at an early stage of education, such as elementary school. Secondly, the presentation of SRM technologies should come at a later stage, once climate change is well understood by students. It should be made clear from the beginning that SRM does not address the root causes of climate change, and that it should be considered at most as a last resort measure, supplementary to climate mitigation and adaptation efforts. Finally, social sciences should be connected to SRM discussions, as its research and potential deployment raise ethical, philosophical, political and even spiritual questions, including on the relationship of humans with nature and technologies. Making SRM interdisciplinary is crucial to accurately grasp the issues at stake.

2) *Consulting:* a first level of youth involvement in SRM governance could take place in an indirect way, through the collection of ideas and information on youth positions, such as through the organisation of surveys or public meetings.

3) *Collaborating:* a second level of involvement should allow a better collaboration between governing bodies and groups of young people. First, this would mean empowering young people to build capacity to organise themselves and form consolidated ideas. Second, improved interactions with governments could be achieved through the support to and development of youth advisory boards and youth-led programs at local, national and international levels. This degree of involvement plays a critical role in establishing networks and partnerships between youth organisations, academia, government, and the industry, and facilitating dialogue and collaboration around emerging climate-altering technologies.

4) *Including:* the last level of involvement, and probably the most important and impactful, should provide a concrete space for the youth to directly take part in policymaking on SRM governance. To this end, it would be essential to enhance the recruitment of young and early-career individuals to serve as real actors, such as policy advisers in international organisations, public and diplomatic services that will deal with SRM, and as young scientists in SRM research projects. This would ensure that young actors are an integral part of the development and decision-making processes and are not simply considered as observers during negotiations and policy-making. This should be made in international, national and local settings.

Concerted efforts are needed to engage young people as real actors in the policy and decision-making processes of SRM governance. Actions of specific importance include providing training and resources for young people to become involved in advocacy, in research and innovation activities, but also creating opportunities for the youth to actively and fully participate in policy making. As governance frameworks for SRM are still to be designed, fostering meaningful youth engagement from the outset is an opportunity that should not be missed if we are to ensure that those processes will be inclusive and future-proof.

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