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Abstract

According to the "Lesser of Two Evils Argument," deployment of solar radiation management (SRM) geoengineering in a climate emergency would be morally justified because it likely would be the best option available. A prominent objection to this argument is that a climate emergency might constitute a genuine moral dilemma in which SRM would be impermissible even if it was the best option. However, while conceiving of a climate emergency as a moral dilemma accounts for some ethical concerns about SRM, it requires the controversial claim that there are genuine moral dilemmas, and it potentially undermines moral action-guidance in emergency scenarios. Instead, I argue that it is better to conceive of climate emergencies as situations calling for agent-regret. This allows us coherently to hold that SRM may be morally problematic even if it ought to be deployed in some scenario.

Introduction

Given the lack of sufficient progress on mitigating greenhouse gas emissions, some climate scientists are calling for research on geoengineering techniques, or technologies that could be used to modify the global environment and potentially avert some impacts of climate change. In particular, some are advocating research on solar radiation management (SRM), or

geoengineering techniques that would increase the Earth's albedo and thus introduce some degree of global cooling that could compensate for emissions-driven global warming. For example, sulfate aerosol injections could increase the albedo of the stratosphere, reflecting an increased fraction of incoming solar radiation. Proponents of researching SRM note that such a technique could be relatively inexpensive and potentially fast-acting, making it useful in a climate emergency, or a scenario in which impending climatic impacts would result in substantial harm.[1]

However, many SRM techniques, if deployed, have the potential to result in substantial harm and injustice.[2] For example, SRM could alter regional precipitation patterns, causing drought in some regions; it could cause ozone depletion; it would not address the problem of ocean acidification; and it carries the so-called "termination problem," or the possibility that SRM would be discontinued abruptly, resulting in rapid and dangerous global warming.[3] While each of these outcomes could be substantially harmful to various parties, the harms and benefits

[1] See D. W. Keith, E. Parson, and M. G. Morgan, "Research on Global Sun Block Needed Now," *Nature* 463, no. 7280 (January 2010): 426–27, doi:10.1038/463426a.

[2] Toby Svoboda et al., "Sulfate Aerosol Geoengineering: The Question of Justice," *Public Affairs Quarterly* 25, no. 3 (2011): 157–80; Stephen M. Gardiner, "Is 'Arming the Future' with Geoengineering Really the Lesser Evil? Some Doubts about the Ethics of Intentionally Manipulating the Climate System," in *Climate Ethics*, ed. Stephen M. Gardiner et al. (Oxford: Oxford University Press, 2010); Christopher J Preston, "Re-Thinking the Unthinkable: Environmental Ethics and the Presumptive Argument against Geoengineering," *Environmental Values* 20, no. 4 (2011): 457–79.

[3] S. C. Doney et al., "Ocean Acidification: The Other CO2 Problem," *Annual Review of Marine Science* 1 (2009): 169–92, doi:10.1146/annurev.marine.010908.163834; Marlos Goes, Nancy Tuana, and Klaus Keller, "The Economics (or Lack Thereof) of Aerosol Geoengineering," *Climatic Change*, 2011, 1–26, doi:10.1007/s10584-010-9961-z; Jim M. Haywood et al., "Asymmetric Forcing from Stratospheric Aerosols Impacts Sahelian Rainfall," *Nature Climate Change* 3, no. 7 (March 2013): 660–65, doi:10.1038/nclimate1857; A. Jones et al., "Geoengineering by Stratospheric SO2 Injection: Results from the Met Office HadGEM2 Climate Model and Comparison with the Goddard Institute for Space Studies ModelE," *Atmospheric Chemistry and Physics* 10, no. 13 (July 2010): 5999–6006, doi:10.5194/acp-10-5999-2010; Kelly E McCusker et al., "Rapid and Extensive Warming Following Cessation of Solar Radiation Management," *Environmental Research Letters* 9, no. 2 (January 2014): 024005–024005, doi:10.1088/1748-9326/9/2/024005; A. Robock, L. Oman, and G. L. Stenchikov, "Regional Climate Responses to Geoengineering with Tropical and Arctic SO2 Injections," *Journal of Geophysical Research-Atmospheres* 113, no. D16 (2008): D16101, doi:10.1029/2008jd010050; Tilmes, Muller, and Salawitch, "The Sensitivity of Polar Ozone Depletion to Proposed Geoengineering Schemes."

of SRM also could be distributed in an unjust fashion.[4] There are also ethical concerns about researching SRM, such as risks of harm involved in large-scale field tests.[5] Despite these ethical concerns, one might think that SRM nonetheless warrants serious consideration, given the risks of harm and injustice associated with climate change.

In this paper, I examine an argument that SRM deployment would be morally justified in a climate emergency because it likely would be the best option available (or the least bad option, if no goods ones are available). I also consider an objection to this argument, namely that a climate emergency would constitute a genuine moral dilemma and hence SRM deployment would be impermissible even if it was the best (or least bad) option. While conceiving of a climate emergency as a genuine moral dilemma accounts for some ethical worries we might have about SRM, it requires the very controversial claim that there are genuine moral dilemmas and it potentially undermines moral action-guidance in emergency scenarios. Instead, I argue that it is better to conceive of climate emergencies as situations calling for agent-regret regarding both previous moral failures that have caused such emergencies and the moral disvalue that deployment produces. This allows us coherently to hold SRM deployment may be morally problematic even if it ought to be deployed in some situation.

[4] Svoboda et al., "Sulfate Aerosol Geoengineering: The Question of Justice."
[5] Martin Bunzl, "Researching Geoengineering: Should Not or Could Not?," *Environmental Research Letters* 4, no. 4 (2009): 045104; N. Tuana et al., "Towards Integrated Ethical and Scientific Analysis of Geoengineering: A Research Agenda," *Ethics, Policy & Environment*, 2011; David R Morrow, Robert E Kopp, and Michael Oppenheimer, "Toward Ethical Norms and Institutions for Climate Engineering Research," *Environmental Research Letters* 4, no. 4 (2009): 045106.

The Lesser of Two Evils Argument and the Moral Dilemma Objection

Some proponents of SRM research argue that deployment of SRM could be justified in climate emergencies.[6] Roughly, the argument is that in some scenarios SRM could be preferable to any other available option, and therefore deployment could be justified or permitted in such cases as "the lesser of two evils." Call this the Lesser of Two Evils Argument (LTEA) for SRM, which we may present as follows:

The Lesser of Two Evils Argument

(1): All available options for responding to a climate emergency are likely to be bad options.

(2): If we are forced to choose among exclusively bad options, then we ought to choose the best of those bad options.

(3): In a climate emergency, deployment of SRM is likely to be the best option.

(4): So in a climate emergency, it is likely the case that we ought to deploy SRM.

At first glance, the argument seems to have some plausibility. However, some philosophers have critiqued LTEA by suggesting that some climate emergencies might constitute genuine moral dilemmas, or scenarios in which it is impossible to avoid moral wrong-doing.[7] If that is the case, then deploying SRM in a climate emergency would be morally impermissible even if it is the best option available, given that such a scenario would be a tragic situation in which *all* courses

[6] Keith, Parson, and Morgan, "Research on Global Sun Block Needed Now."
[7] Gardiner, "Is 'Arming the Future' with Geoengineering Really the Lesser Evil? Some Doubts about the Ethics of Intentionally Manipulating the Climate System."

of action would be morally impermissible. Call this the Moral Dilemma Objection (MDO) to SRM.[8]

One might have some initial sympathy for both LTEA and MDO. On the one hand, it seems reasonable to think that, in a climate emergency, we would have reason to take the best option available. After all, however problematic it might be, the best option is by definition better than all others. This seems to favor the thought that SRM would be permissible in such an emergency, provided that it is in fact the best option. On the other hand, it seems reasonable to find SRM to be morally problematic, given its potential for harm and injustice to present and future parties. For this reason, an agent's deployment of SRM might entail what Gardiner calls a "marring evil," which licenses "a serious negative moral assessment of that agent's life considered as a whole."[9] This seems to favor the thought that SRM could be morally impermissible, regardless of whether it is better than other available options in some scenario. I shall examine LTEA and MDO in greater detail below. For now, I suggest only that it is *prima facie* plausible to treat each of these as a reasonable position.

Yet there is an obvious tension between LTEA and MDO. One option for resolving this tension is a wholesale acceptance of one and wholesale rejection of the other.[10] However, it would be preferable instead to maintain as many of the plausible features of both LTEA and

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[8] There are different kinds of dilemma that SRM deployment might entail. Konrad Ott argues that deployment of SRM by one generation might impose a dilemma on some future generation. For example, if SRM involves substantial harm of its own, a future generation might be forced to choose either to continue SRM (and tolerate its harm) or to cease SRM (and face the risks associated with termination and a planet with a high concentration of greenhouse gases). This is reasonably construed as a dilemma in some sense, but it is not clear that it is a genuine *moral* dilemma for the future generation. It is plausible to hold that "it is morally either repugnant or wrong" for the deploying generation to impose such a choice on a future generation, but it is not evident that it would be impossible for the future generation to avoid moral wrong-doing in that future case. In this paper, I am interested in the question of whether the agents of SRM deployment in an emergency scenario would face a genuine moral dilemma. See Konrad Ott, "Might Solar Radiation Management Constitute a Dilemma?," in *Engineering the Climate: The Ethics of Solar Radiation Management* (Rowman & Littlefield, 2012), 33, 40..

[9] Gardiner, "Is 'Arming the Future' with Geoengineering Really the Lesser Evil? Some Doubts about the Ethics of Intentionally Manipulating the Climate System," 301.

[10] We also could reject both, of course, but I will not examine a case for doing so here.

MDO as possible, given that each position seems to have a reasonable rationale. In this paper, I argue that we have good reason to question MDO's conceptualization of climate emergencies as genuine moral dilemmas. While viewing such emergencies as genuinely dilemmatic would underwrite the plausible judgment that deploying SRM would be morally problematic in some ways, that view seems incompatible with the plausible judgment that in climate emergencies we ought to adopt the best option available. Since it is impossible to avoid moral wrong-doing in a genuine moral dilemma, there simply is no course of action we *ought* to adopt in such a situation (at least in a moral sense of "ought"). This is an unfortunate implication for MDO. In a climate emergency in which all available options would (say) result in substantial net harm, but where one option is substantially less harmful than the others and all else of moral relevance is equal, it is difficult to deny that we ought to adopt that least harmful option.[11] Yet if that emergency is genuinely dilemmatic, then we must deny this, because the least harmful option still would entail moral wrong-doing.

Yet even if LTEA is sound, it would be unsatisfactory to advocate deploying SRM in a climate emergency without further consideration of other moral issues. Let us imagine some climate emergency in which SRM would be the best option available, and let us imagine someone who, convinced by LTEA, cavalierly advocates SRM and takes an active role in its deployment, all while washing his hands of any of the morally questionable features of SRM. Call this kind of person the Satisfied Geoengineer. He might reason as follows: "A climate emergency leaves us limited options. Since SRM is the best of those options, we ought to deploy it. Although this will result in substantial harm to various parties, we should not regard our decision to deploy SRM as morally problematic. After all, it is the best option available, and so

[11] Toby Svoboda, "Is Aerosol Geoengineering Ethically Preferable to Other Climate Change Strategies?," *Ethics & the Environment* 17, no. 2 (2012): 111–35.

there is nothing morally suspect about deploying it." We should worry that this kind of rationale overlooks morally salient features of both climate emergencies and SRM deployment. In particular, it ignores the presumable moral failure that created the climate emergency in the first place, it ignores the moral disvalue produced by SRM, and it ignores the moral impact that SRM deployment may have on the lives of those agents who deploy it.[12] MDO has the advantage of addressing these matters, but only at the cost of implying that no option is permissible in an (allegedly dilemmatic) emergency scenario.

Rather than viewing climate emergencies as moral dilemmas, I argue below that it is more plausible to view them as cases in which agent-regret is appropriate. It can be the case that some action is morally permissible (or even morally obligatory) and yet calls for agent-regret on the part of whomever performs that action. Assuming that it is the best option in some climate emergency, it is at least *coherent* to hold both that we ought to deploy SRM and that we ought to harbor agent-regret for doing so. As I shall argue, an agent-regret account allows us to hold onto the thought behind LTEA that SRM might be permissible in conceivable cases, yet it also allows us to assess the Satisfied Geoengineer's posture as morally problematic, because he lacks an attitude of regret that he ought to have. Before presenting this argument, however, I first suggest some reasons to be skeptical that climate emergencies would involve genuine moral dilemmas.

Skepticism Regarding Moral Dilemmas in General

There are reasons to doubt that climate emergencies are genuine moral dilemmas. First, one might be skeptical that there are *any* genuine moral dilemmas, given that they seem to be inconsistent with very plausible moral principles. Perhaps most obviously, the principle of

[12] Gardiner, "Is 'Arming the Future' with Geoengineering Really the Lesser Evil? Some Doubts about the Ethics of Intentionally Manipulating the Climate System."

"ought implies can" holds that if a moral agent is morally obligated to perform some action (or to abstain from doing so), then it must be possible for that moral agent to perform that action (or to abstain from doing so). A genuine moral dilemma would be inconsistent with "ought implies can," because it is by definition a scenario in which it is impossible to do as one ought. If some climate emergency would be a genuine moral dilemma because all available options (including doing nothing) would be morally impermissible, then it would be impossible for a moral agent to act as she ought in that situation. If "ought implies can" is a conceptual truth, then such scenarios cannot hold.[13] In order to preserve this principle as a conceptual truth, it must always be possible for an agent to do what she ought to do, no matter how grim the situation. In a climate emergency then, assuming this moral principle, at least one option must be morally permissible.

One response to this is to deny that "ought implies can" is a conceptual (or even a necessary) truth yet maintain that the principle admits of exception in only rare, special cases. Along these lines, one might suggest that there are genuine, *self-imposed* moral dilemmas. Arguably, this variety of dilemma does not threaten the plausible thought behind "ought implies can," although the existence of such a genuine dilemma would disqualify that principle as a conceptual (or even a necessary) truth. Perhaps "ought implies can" holds in almost all cases, but not those in which an agent's own wrong-doing has made it impossible for him to satisfy his obligations. The standard example of this is making incompatible promises.[14] If I promise George that I will watch a movie with him at his house at 6:00 pm on Monday, and if I then promise Terrence that I will go for a walk with him outdoors at 6:00 pm on Monday, it is not possible for me to keep both promises. Presumably, I am obligated to keep each promise, and therefore I am obligated to keep both promises. But this is impossible, since doing so would

[13] Michael J Zimmerman, *The Concept of Moral Obligation* (New York: Cambridge University Press, 1996).
[14] Terrance C. McConnell, "Moral Dilemmas and Consistency in Ethics," *Canadian Journal of Philosophy* 8, no. 2 (1978): 269–87, doi:10.1080/00455091.1978.10717051.

require me to be in two different places at once. Instead, I must break at least one of my promises, and arguably this would be morally wrong to do. If so, then this would be a case of a genuine moral dilemma. How should we view this case? We might view breaking my promise to Terrence or George (or both) as morally wrong, even though it is impossible to avoid breaking at least one of these promises. In that case, the situation would be genuinely dilemmatic. Although this is inconsistent with "ought implies can," we might find this philosophically untroubling, given that the dilemma was created through my own fault. If previously I had acted as I ought to have done, I would not have made incompatible promises in the first place. But since I did make incompatible promises, I have only myself to blame for the existence of this genuine dilemma, which now forces me to act as I ought not to act.

Dilemmas of this self-imposed variety are at least less mysterious than other varieties. For example, we might be suspicious of the claim that there are "externally" imposed dilemmas, or scenarios in which an agent is forced into moral wrong-doing through no fault of her own, such as through the impermissible actions of others. *This* kind of exception to "ought implies can" seems particularly implausible. In contrast, self-imposed moral dilemmas arguably do not violate the spirit behind "ought implies can." If an agent acts as she ought to act, then self-imposed moral dilemmas arguably will not arise. It is only when an agent acts wrongly that self-imposed dilemmas are created, and so it is within one's power to prevent such dilemmas from arising for oneself.

It is tempting to view climate emergencies as self-imposed moral dilemmas. I assume that we have a moral obligation to reduce greenhouse gas emissions.[15] If we do not fulfill this obligation, we reasonably can expect to reach a point in the future at which we are committed to dangerous climate change, including threshold collapses in the climate system, the impacts of

[15] For the moment, I leave this "we" intentionally vague.

which could be severely harmful while also outstripping our adaptive capacities. This future point is plausibly construed as a climate emergency. One might view such an emergency as a self-imposed moral dilemma, since it arises from our past moral failure to reduce our emissions. Proponents of MDO might then reason as follows. While "ought implies can" is a reasonable moral principle that holds in most cases, exceptions to it can arise due to our own moral wrong-doing in previous, non-dilemmatic cases. In failing to make obligatory cuts to our emissions, we risk imposing a future dilemma on ourselves. In a climate emergency that we could have avoided, we might no longer be able to act as we ought to act, but this merely reflects our past decision not to comply with our moral obligations.

Let us suppose for the sake of argument that there are genuine moral dilemmas of the self-imposed variety. Having granted this, it is unclear that a climate emergency would meet the conditions necessary for it to be plausibly considered an instance of one. Up to this point, I intentionally have been vague concerning the agents involved in some putatively dilemmatic climate emergency. Yet a scenario counts as a self-imposed moral dilemma only if the agent who faces it is identical to the agent who imposed it—otherwise, a scenario could not be a *self*-imposed dilemma. In the case of incompatible promises, I am the agent who wrongly makes the promises to both George and Terrence, and I am also the agent who must break at least one of those promises. But there are reasons to doubt that the agents who culpably fail to cut their emissions and thereby create a climate emergency would be identical to the agents who face that allegedly dilemmatic emergency.

First, there are well-known challenges to determining what agents are obligated to reduce their emissions.[16] Clearly, the class of agents so obligated is non-identical to the class of greenhouse gas emitters. It would be deeply implausible to hold that the global poor are obligated to cut emissions that are necessary for their own subsistence, for example.[17] We need some plausible criteria for identifying emitters who are obligated to cut their emissions, and this presumably would involve specifying some emissions threshold that emitters ought not to surpass. A further question here is what *kind* of agent we should be trying to identify, whether individuals, states, corporations, or some combination of these.[18] Further, there are difficult questions regarding historical emissions. It would be implausible to hold that early twentieth-century emitters were obligated to cut their emissions, since the risks of climate change were not well understood at the time. But at what historical point did emitters become morally culpable for their emissions? These challenges are relevant here because, if we are to determine whether some climate emergency is a self-imposed moral dilemma, we need to know whether the agents who are morally culpable for the emergency are identical to those who face it, and this requires becoming clear on who those culpable agents are.

Even if these difficult questions can be answered plausibly, there is a second challenge for the view that climate emergencies are self-imposed moral dilemmas, namely that the class of agents responding to a climate emergency is likely to be non-identical to the class of agents culpable for that emergency itself. To begin with, these two classes can be temporally distinct from each other. For example, the wrongful emissions of one generation could ensure some

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[16] Christian Baatz, "Responsibility for the Past? Some Thoughts on Compensating Those Vulnerable to Climate Change in Developing Countries," *Ethics, Policy & Environment* 16, no. 1 (2013): 94–110, doi:10.1080/21550085.2013.768397.
[17] Henry Shue, "Subsistence Emissions and Luxury Emissions," *Law & Policy* 15, no. 1 (1993): 39–60, doi:10.1111/j.1467-9930.1993.tb00093.x.
[18] Simon Caney, "Cosmopolitan Justice, Responsibility, and Global Climate Change," *Leiden Journal of International Law* 18, no. 4 (2005): 747–75.

threshold event (e.g., the collapse of a major ice sheet) that, due to inertia in the climate system, would occur only at some point in the future. In such a case, a future generation might face the decision of whether or not to deploy SRM to avert this otherwise-imminent threshold collapse. But if this would be a genuine moral dilemma for the future generation, it is not a self-imposed one, since those who face the emergency are not identical to those who caused it. This is relevant here because very few proponents of SRM research argue for near-term deployment of SRM.[19] Rather, such proponents tend to argue that research is needed now because deployment might be needed in a future emergency.[20]

Moreover, even putting questions of temporal distinctness to one side, there still could be cases of non-identity between the culpable agents of some climate emergency and those who must respond to it. For example, the very existence of some small-island states is threated by sea-level rise. Given continued emissions, averting such sea-level rise might become impossible without deployment of SRM. Presumably, this would count as a climate emergency for affected states. Faced with such an emergency scenario, one such state might choose to deploy SRM to stabilize the climate and preserve its own territory.[21] Given the low per capita and overall emissions of small-island states, it is not plausible to treat them (nor their citizens) as culpable agents of the climate emergency they would face in that scenario. Once again, if this climate emergency would be a moral dilemma for the state threatened by it, it is not plausibly viewed as a self-imposed one.

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[19] Although cf. the Arctic Methane Emergency Group, a group of scientists calling for serious consideration of deploying SRM in the near future: Arctic Methane Emergency Group, "AMEG's Declaration," accessed April 1, 2014, http://ameg.me/index.php.

[20] Keith, Parson, and Morgan, "Research on Global Sun Block Needed Now"; Jason J Blackstock et al., *Climate Engineering Responses to Climate Emergencies*, February 2009, http://arxiv.org/pdf/0907.5140.

[21] Adam Millard-Ball, "The Tuvalu Syndrome," *Climatic Change* 110, no. 3–4 (2012): 1047–66.

Finally, there could be cases of partial but incomplete overlap between the set of agents culpable for a climate emergency and the set of agents tasked with responding to it. That is, those who face a climate emergency could be "mixed," including some who were obligated to reduce their emissions but failed to do so, as well as some (perhaps many) who were not so obligated. This makes it more difficult to evaluate whether the emergency scenario could be a self-imposed moral dilemma. Describing deployment of SRM by a "mixed" set of agents as morally wrong because of the past wrong-doing of only some members of that set seems implausible. Why should the actions of those who are not culpable for the climate emergency be morally tainted by the previous wrong-doing of their collaborators? Now one might reply that *only* agents culpable for the climate emergency would act wrongly in deploying SRM, whereas their collaborators would not act wrongly in joining them. But this has the very implausible implication that a single deployment of SRM both is and is not morally wrong.

Action-Guidance in Climate Emergencies

Putting aside the concerns just mentioned, the view that climate emergencies are genuinely dilemmatic has the further problem that it leaves us with little prospect for moral action-guidance in such cases. A genuine moral dilemma is a situation in which no available course of action is morally permissible and thus a situation in which it is impossible for an agent to avoid moral wrong-doing. It would be very odd to hold that we (morally) ought to take an (morally) impermissible course of action. If all available courses of action are morally wrong, then arguably it is not the case that any of them ought to be adopted, at least in a moral sense of "ought." Therefore, in a genuine moral dilemma, there seems to be no answer to the question of how we should act. For if there was an answer to this question, then there would be some action

we ought to take, and an action we ought to take must be a permissible one. But there are no permissible actions in a genuine moral dilemma.

This is at least a serious drawback for MDO, since it would be valuable to know how we ought to act in an emergency. Further, in a climate emergency, there could be many feasible courses of action that differ markedly in their prospects for causing harm and injustice. For instance, it seems that in such a scenario we would have moral reason to prefer some less harmful or unjust option over some more harmful or unjust option, all else being equal. Indeed, recognition that some options are "lesser evils" seems implicitly to grant this. Yet it is difficult to see how we could make sense of this in a genuine moral dilemma. If all available courses of action are morally wrong, then we seem to be prohibited from taking any of those courses. An implication of this is that, contrary to our intuitions, we would lack sufficiently good moral reason to adopt substantially less harmful or unjust options over those that are more harmful or unjust, even assuming all else is equal among those options. Treating a climate emergency as a genuine moral dilemma therefore seems to undercut potentially helpful action-guidance we might have received from moral theory. It leaves us at a loss regarding how we ought to act in such cases, and this is unfortunate.

One advantage of LTEA is that it provides moral action-guidance in emergency scenarios. Given a situation in which all our options are bad ones, LTEA directs us to choose the least bad option. The argument contends that, in a climate emergency, this likely would be SRM. At least in principle, we can determine whether or not this would be the case. While virtually no proponent of SRM research thinks that deployment of SRM is a desirable goal in its own right, many such proponents are sympathetic to something resembling LTEA. Particularly in an emergency scenario, some hold that there is good reason to think SRM could be preferable to

other available options.[22] This is compatible with thinking that SRM is morally problematic. A Tentative Geoengineer could reason as follows: "Deployment of SRM is morally problematic in various ways. It could cause substantial harm and injustice to present and future persons. We instead ought to make substantial cuts in our emissions in order to avoid dangerous climate change in the future. Ideally, if we reduce emissions as we ought, SRM would not be necessary in the future. But if we continue to fail in cutting our emissions substantially, the situation may need to be reassessed. In a climate emergency, it could be too late for emissions cuts to avoid dangerous climate change, and adaptive measures may be insufficient to prepare for it. In such a scenario, *if* some SRM technique was better than all other available options, then we ought to deploy that SRM technique. Despite its moral problems, doing so is morally preferable to all other options. Therefore, in that situation, it ought to be deployed."

There is much to question about LTEA, of course. We might be skeptical that a climate emergency could be anticipated with sufficient confidence that SRM could be deployed in time to avert it, and we might be skeptical that SRM would indeed be the best option in such an emergency. For the sake of argument, however, let us suppose with the Tentative Geoengineer that deployment of SRM would be the best option available in some scenario. Assuming that is true, it seems reasonable to hold that we ought to deploy SRM. A weakness of MDO is that it does not address the Tentative Geoengineer's reasoning, since the objection merely notes that SRM is morally impermissible even in the kind of case just described. The Tentative Geoengineer might reply, "Yes, SRM is morally problematic, but what else ought we to do in a climate emergency?" I suggest that the proponent of MDO cannot offer a plausible answer to this question. If a climate emergency is a genuine moral dilemma, then there is *no* option that we

[22] Keith, Parson, and Morgan, "Research on Global Sun Block Needed Now"; D. G. Victor et al., "The Geoengineering Option A Last Resort Against Global Warming?," *Foreign Affairs* 88, no. 2 (2009): 64–76.

ought to adopt, since all courses of action would be morally impermissible in that emergency. This is deeply unsatisfying, and the Tentative Geoengineer has ground for complaint. One task of moral theory is to provide action-guidance in difficult cases, but MDO seems to undermine any prospect for such action-guidance in those scenarios in which it may be needed most. This is a very serious drawback of viewing climate emergencies as genuine moral dilemmas.

SRM and Agent-Regret

We have examined some reasons to be skeptical of MDO: it is incompatible with plausible moral principles, and it undermines moral action-guidance in scenarios alleged to be dilemmatic. However, we should not ignore the advantages of MDO, namely that it offers an explanation of why both SRM deployment and the figure of the Satisfied Geoengineer are morally problematic. MDO is able to explain these—or more precisely, the individual advancing MDO easily can explain these—by claiming that such deployment would be morally impermissible even if it was the best (or least bad) option available. However, we can explain these phenomena without taking on the disadvantages of MDO. We can do this by maintaining that SRM deployment calls for agent-regret. This allows us to preserve "ought implies can," and it allows for moral action-guidance in such emergencies. In this section, I first sketch what would be involved in feeling agent-regret as a response to deployment of SRM. I then argue that it is appropriate to feel agent-regret in such a case.

Associated with Bernard Williams, agent-regret is a type of regret one harbors toward some action of one's own or a collective action in which one has participated. This regret may be informed by thoughts regarding how one might have acted differently than one did in fact act.[23] Agent-regret need not pertain to morally culpable actions. One might feel agent-regret for actions

[23] Bernard Williams, *Ethics and the Limits of Philosophy* (Cambridge: Harvard University Press, 1985), 123.

that she is not blameworthy for performing, such as in Williams' example of someone who is driving safely and kills a child who suddenly runs into the road. Agent-regret is therefore not limited to genuinely dilemmatic scenarios. Importantly, agent-regret is not necessarily a phenomenon of wishing that one had acted differently in a given set of circumstances. Instead, agent-regret could involve wishing that those past circumstances themselves had been different, that they had afforded different options, or that the course of action taken had not entailed certain consequences. Williams notes, "Regret necessarily involves a wish that things had been otherwise, for instance that one had not had to act as one did. But it does not necessarily involve the wish, all things taken together, that one had acted otherwise."[24]

In the case of a climate emergency, it is at least coherent to judge that some course of action is morally permissible (or even obligatory) and to partake in that action while also harboring agent-regret, since such regret need not involve judging one's action to have been impermissible. The application to SRM is apparent. *If* it was the case in some climate emergency that SRM deployment was the best option available, then it would be reasonable to hold that deployment was morally permissible, but it would be coherent simultaneously to regret that such a drastic measure was needed, and it would be coherent to regret one's own participation in that deployment. One could regret the circumstance of one's participation in the deployment, for example that SRM was needed (as we are supposing for the moment) in the wake of our moral failure to mitigate our emissions. One also could regret the outcome of one's permissible action, for example that SRM deployment likely would result in serious harm and injustice to some parties. Despite these regrets, however, this agent could hold consistently that SRM morally ought to be deployed in those unfortunate circumstances, since agent-regret may be directed toward morally permissible actions.

[24] Ibid., 127.

Agent-regret is not merely an attitude that it is coherent to have in such a case, but it is also an appropriate one. Supposing that SRM is morally preferable to all other options in a climate emergency, one *should* regret the circumstances that make this the case, and one *should* regret the harm and injustice that one's involvement in deployment might cause. It is appropriate to harbor agent-regret here for at least two reasons. First, the context in which SRM deployment is (as we are supposing) morally permissible depends upon serious moral wrong-doing in the past. An agent participating in SRM deployment in such a context should regret that this past wrong-doing has forced her into such a bad situation, even if she is not among those who are guilty of this past wrong-doing. Regretting this fact involves recognizing that SRM likely would be unnecessary in a world in which moral agents largely complied with their obligations. Agent-regret allows one to countenance the fact that deploying SRM in a climate emergency, even if morally justified, signals an enormous moral failure on the part of the many agents who were obligated to reduce their emissions but opted not to do so. This moral failure would then have created a set of circumstances in which it falls to certain agents to adopt a morally problematic option, one that never should have been needed. This surely would be something worth lamenting.

Second, it is plausible that we should harbor agent-regret for those of our actions that create substantial moral disvalue. As I have noted above, SRM has the potential to result in serious harm and injustice, both of which carry substantial moral disvalue. One thought in LTEA is that, in a climate emergency, all available options are likely to be bad. Imagine, for example, that all such options likely would involve substantial harm and injustice, but that there is good reason to believe SRM would involve less harm and less injustice than any other option. The proponent of LTEA takes it that (assuming all else of moral relevance to be equal) SRM ought to

be deployed in that case. But holding this is compatible with recognizing that SRM likely would produce substantial moral disvalue. Suppose that SRM is deployed and causes drought in some regions, thus substantially harming many persons. It is morally bad that SRM results in this harm, even if its deployment was morally permissible. Likewise, it is morally bad for our permissible actions to cause injustice, such as if permissible SRM deployment puts future generations at risk of the termination problem. Even if we grant that LTEA is sound, we nonetheless ought to recognize that SRM could create many instances of moral disvalue. An agent of SRM deployment ought to feel agent-regret for helping to bring about that disvalue. Causing harm or injustice is a bad thing, even if doing so is justified in some case.

The Satisfied Geoengineer would lack agent-regret, and it is why this figure is morally problematic. Harboring agent-regret for neither the circumstances in which he acts nor the moral disvalue his actions produce, the Satisfied Geoengineer simply would note that SRM is the best course of action in a climate emergency, conclude that it therefore ought to be deployed, and give no further thought to the moral features of that decision. This figure is rather similar to a driver who, having killed a child through no fault of her own, feels no agent-regret for her action. She might say, "The death is unfortunate, but I regret it in the same way as non-participants of the event regret it—like an onlooker, I view it as a bad thing that the child died. But why should I feel *agent*-regret for the child's death? After all, I was driving at the speed limit, and it was the child's fault for running into the road without looking first." As Williams notes, we would feel "some doubt" regarding a person who reasoned in this way.[25] We tend to think that the driver should regret that *she* killed the child, however unavoidable that death may have been. In conjunction with that regret, she could wish (counter to fact) that she had been able to apply the brakes in time or that the child had not been seriously harmed by the collision. Further, she could

[25] Ibid., 124.

recognize the moral disvalue of the harm caused to the child and to those who care about that child. Someone who cavalierly eschews such regret seems to engage in morally questionable behavior.

The Advantages of an Agent-Regret Account

The Satisfied Geoengineer would be morally problematic because he lacks agent-regret for an action that both occurs within a context created by a past moral failure and produces substantial moral disvalue in the form of harm and injustice. By relying on this agent-regret account, we can avoid the controversial commitments of MDO without condoning the way in which the Satisfied Geoengineer goes about deployment. Whereas MDO controversially holds that there are genuine moral dilemmas and undercuts moral action-guidance in climate emergencies, the agent-regret account allows us to disapprove of the Satisfied Geoengineer while also admitting that SRM may be morally permissible or even obligatory in some contexts. Accepting the latter account opens the following possibility. We might deny that a climate emergency would constitute a genuine moral dilemma, hold that there is some permissible action that may be taken (or some obligatory action that ought to be taken) in that context, and rely on some moral theory to guide our subsequent decision and course of action. We can recognize that a climate emergency is a very bad situation, one created by an enormous moral failure in our past, and we ought to regret that this is the case. Whatever course of action we choose (SRM or otherwise), we can recognize that it may result in harmful and unjust outcomes, and we also ought to regret that our action produces such outcomes. However, those regrets need not lead to moral paralysis. We can hold that some course of action ought to be taken despite its problems, provided that we feel agent-regret when appropriate.

These considerations undercut much of the motivation for accepting MDO, because they show that we need not conceive of SRM as morally impermissible in order to account for its problematic features. Gardiner suggests that how we view arguments like LTEA may depend on whether we think there are genuine moral dilemmas. Those who believe in such dilemmas may be "reluctant to consider SRM even as a last resort, and even then are unhappy about having to do so." The concern is that those who endorse LTEA "do not really seem to address the core concerns" of those individuals who believe in genuine moral dilemmas.[26] However, if the foregoing is correct, then perhaps a proponent of LTEA can address these concerns. Unlike the Satisfied Geoengineer, one might endorse LTEA while feeling the appropriate agent-regret, recognizing the moral problems of SRM while also holding that it ought to be deployed. In this way, we can reject the posture of the Satisfied Geoengineer without taking on the controversial baggage of MDO. These considerations also suggest that LTEA is defensible in at least *one* respect. If geoengineering really was the best option in some scenario, then it seems reasonable to hold that it would be permissible, perhaps even obligatory, to deploy it in that scenario. MDO implausibly denies this. Conversely, my account is compatible with this particular claim of LTEA. This gives us a reason to prefer the agent-regret account over MDO's position that SRM (like all other options) would be morally wrong in a climate emergency.

To reiterate, I am not endorsing LTEA. There are many other questions about that argument that would need to be addressed before any such endorsement. For example, it is far from clear that some form of SRM would in fact be the best option available in a climate emergency. Becoming clear on this would require further consideration of what would count as the best (or least bad) option in such a case, a task that I am unable to pursue here. However, the

[26] Gardiner, "Is 'Arming the Future' with Geoengineering Really the Lesser Evil? Some Doubts about the Ethics of Intentionally Manipulating the Climate System," 302.

conditional premise of LTEA, namely that SRM ought to be deployed *if* it is the best option, is plausible. The agent-regret account can accept this while ignoring neither moral failures that created some climate emergency nor the moral disvalue produced by SRM deployment. While there might be some other (perhaps fatal) problem with LTEA, MDO is not a convincing objection.