There's been a lot of attention paid to a geoengineering "experiment" conducted recently in the North Pacific. A team distributed iron into the ocean: This is a form of geoengineering because, in many parts of oceans around the world, iron is the main nutrient that limits the growth and productivity of phytoplankton. If you add more iron in these areas, then there will be substantial blooms of plankton. The photosynthetic activity from those plankton would consume carbon dioxide from the atmosphere. If the plankton, when they die, sink to the bottom of the ocean, then the carbon they have absorbed would also sink to the bottom of the ocean, removing it from the atmosphere for a long period of time.

A lot of the attention to the iron experiment has been negative: People questioned whether the fertilization would really work in the North Pacific (where iron may not be a limiting nutrient and therefore wouldn't really produce large plankton growths). Critics noted that iron fertilization, even if successful, does not mean that the carbon is sequestered – for instance, dying plankton might decompose before they sink to the ocean bottom, releasing carbon back into the atmosphere. And we have little or no evidence about what kinds of adverse side-effects such fertilization might have on ocean ecosystems.

I agree with all of these concerns. But I fear that they might be besides the point. Climate change is happening, and it will cause significant negative effects on lots of people around the world. People will surely adapt, but they also likely won't want to just sit by as they suffer the impacts of climate change. They'll want to do something about it. And geoengineering (rightly or wrongly) provides a siren song that promises to do something about climate change directly.

While some forms of geoengineering sound like futuristic, science-fiction tales (like deploying millions of tiny mirrors around the Earth to reflect sunlight away from the planet), other options are in fact quite simple and relatively inexpensive to pursue. The iron fertilization concept is one of these relatively easy options: In theory, you just need a boat and a lot of iron, and as long as you stay in the high seas, there's not really anything anyone can do about your fertilization efforts.

But while iron fertilization may, or may not, be successful in terms of carbon sequestration, there is another relatively easy geoengineering option that we're fairly certain will work: The distribution of sulfur dioxide aerosol particles into the upper atmosphere. These particles would make the Earth's upper atmosphere slightly more reflective, meaning that a little less sunlight would reach the lower atmosphere and surface. This would cool the planet just a bit, offsetting the

increase insulation caused by increased carbon dioxide levels. We know that this would work because large volcanic eruptions cause a similar effect – the eruption of Mt. Pinatubo in the Philippines in 1991 sent large amounts of sulfur into the atmosphere, resulting in a global temperature drop of a half a degree Celsius.

And it turns out that injecting these aerosol particles into the upper atmosphere isn't that complicated or expensive. It can be done with current technology (e.g., lots of howitzers that are aimed up!), and estimates of the annual cost run between $10 and 100 billion. (The sulfur has to be replenished regularly.)

If the cost is at the low end, it isn't too hard to identify at least a few countries in the world that might be adversely affected by climate change but might have the resources to spend to conduct such a geoengineering effort (India, Australia, and Indonesia come to mind). Coalitions of countries, even poor ones, might be able to muster the resources to pursue this option. If there are significant technological advances that reduce the cost, then it's possible that even wealthy private individuals might get in on the game.

Indeed, this recent research from a team out of Harvard indicated that this form of geoengineering might even be conducted in ways that maximize the benefits and minimize the costs for particular regions of the planet. If that's the case, then certain countries might have a very strong incentive to start pursuing this activity, because they would be able to capture more of the benefits that their geoengineering efforts produce.

Thus, I have a hunch we'll see a lot more events like the one that just occurred. And that's going to create all sorts of challenges, legal and otherwise, for everyone.