THIS WEEK

A charter for geoengineering

A controversial field trial of technology to mitigate climate change has been cancelled, but research continues. A robust governance framework is sorely needed to prevent further setbacks.

Geoengineering research has a problem. That much should be clear following last week's cancellation of a field trial for the Stratospheric Particle Injection for Climate Engineering (SPICE) project. The solutions to this problem are not so obvious, but they must be found — and fast.

The SPICE field trial was supposed to involve spraying water into the atmosphere at an altitude of 1 kilometre using a balloon and hosepipe, as part of a host of work exploring whether it is possible to mitigate global warming by introducing particles into the stratosphere to reflect some of the Sun's energy away from Earth.

But the field trial — which is only a small part of the overall SPICE project — became bogged down in protests and delays almost as soon as it was announced. Last week, as first reported by *Nature*, the project's lead investigator announced that it was being abandoned, citing concerns about intellectual-property rights, public engagement and the overall governance regime for such work.

Colleagues have leapt to the defence of the SPICE team, and praised its decision to continue with the theoretical strands of its work. Indeed, the researchers have acted with commendable honesty. But the SPICE issue is a perfect example of the problems that will persist until geoengineers grasp the nettle of regulation and oversight.

We have been here before. Work on 'fertilizing' the oceans to promote blooms of phytoplankton that would lock up carbon dioxide ran into similar protests and governance wrangles. In 2009, an experiment to test the idea by dumping tonnes of iron sulphate into the Southern Ocean caused huge public disquiet and went ahead only after further discussions.

Researchers argue that 'geoengineering' is a falsely inclusive term. They say that SPICE-style 'solar-radiation management' is completely different from ocean fertilization, and different again from carbon capture. But these technologies have similar aims and, when it comes to rules and regulations, they probably need to be dealt with together.

The geoengineering community has tried to bring some discipline to the emerging field. The 'Oxford Principles' — developed in 2010 by researchers at the University of Oxford, UK — offer some useful ground rules. They say that geoengineering should be regulated as a public good; there should be public participation in decision-making; research should be disclosed and results published openly; impacts should be assessed independently; and decisions to deploy the technologies should be made within a robust governance framework.

These are excellent principles. But they are vague, and cannot serve as a guide to conducting specific experiments in such a broad field.

A meeting of geoengineers in Asilomar, California, in 2010 — influenced by a meeting at the same location in 1975, when researchers hashed out guidelines for genetic engineering — produced similarly vague recommendations, such as the need to conduct research openly and to consult the public when planning research. It also called for governments to "when necessary, create new mechanisms for the governance and oversight of large-scale climate engineering research activities".

The SPICE fiasco starkly demonstrates the need for such mechanisms. For a project of such high profile to founder on problems of intellectual property, regulation or public protest would be bad enough. That it ran into difficulties in all three areas shows an underlying problem.

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Of the issues raised, intellectual property may turn out to be the easiest to resolve (see page 429). Science has a long and generally happy relationship with patents, including those for technology with the ability to drive worldwide change. Likewise, lessons on public engagement and dealing with protests can be taken from earlier rows over genetic modification, stem cells, fertility work and animal research.

More troubling is the lack of an overarching governance framework. Although the SPICE trial has been cancelled, other tests of geoengineering technology will surely follow. Other work, such as fiddling with clouds to make them more reflective or to try to bring on rain, touches on both climate-change mitigation and weather modification.

Geoengineers should keep trying. They should come together and draft detailed, practical actions that need to be taken to advance governance in the field. Regulation in these cutting-edge and controversial areas needs to be working before the experiments begin, rather than racing to catch up. ■

In from the cold

Research into the Fukushima meltdowns has given a new lease of life to a valuable group.

The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) is a relic of the cold war. Established in 1955 to study fallout from above-ground nuclear-weapons tests, the committee, which is based in Vienna, acted as one of the few channels for cooperation between the United States and the Soviet Union, and served to exchange information between East and West.

It was invaluable in its time: after the catastrophic meltdown at the Chernobyl nuclear power plant in Ukraine in 1986, the committee's ties to the Soviet Union allowed it to produce some of the first