Geo-Engineering

Why in news?

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For the third year in a row, 2016 set a record for the highest global average surface temperatures. The global mean surface temperature is now 1.1 degrees celsius above pre-industrial levels.

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What are the impacts of CO2?

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- Carbon dioxide in the atmosphere — above 400 parts per million and it will stay there for a long time.
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- The impacts are likely to be severe. Like rising sea levels; heat and water stress affecting health, mortality, agricultural yields and industrial output; and billions of dollars of damage to infrastructure.
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Can geo-engineering be the solution?

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- Geo-Engineering is defined as **the deliberate large-scale intervention in earth's climate system, to limit adverse global warming.**
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- **Solar geo-engineering was mentioned in the first report on climate change to President Lyndon Johnson in 1965**, and was discussed in reports of the US National Research Council (NRC) in 1977, 1983 and 1992.
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- The case rests on two arguments: To limit climate risks, net emissions must fall to zero; and cutting emissions does not eliminate risks because of gases already in the atmosphere.
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- One category of technologies, i.e., carbon dioxide removal to reduce atmospheric concentrations includes bio-energy with carbon capture and storage, direct air capture, and **ocean fertilisation** (adding nutrients to stimulate marine food production to absorb CO2).
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- The other category is **solar radiation management,** or solar geo-engineering, to reflect sunlight and reduce the amount of infrared radiation getting trapped by greenhouse gases.
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- Proposed technologies include **brightening marine clouds, and deploying space mirrors**. But the most discussed is injecting the stratosphere with reflective sulphate aerosols.
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What are the forums for international governance?

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- In 2010, the Convention on Biological Diversity imposed an unenforceable moratorium on geo-engineering experiments. **No other international rules exist.** But several forums could be relevant.
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- **Applicable to all geo-engineering methods:** UNFCCC; the dormant UN Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques.
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- **To specific methods:** Montreal Protocol; MARPOL 73/78; UN Outer Space Treaties.
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- **To specific substances:** Convention on Long Range Transboundary Air Pollution; International Maritime Organization.
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- **To specific geographies:** Antarctic Treaty System; UN Convention on the Law of the Sea.
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- In 2017, **the Carnegie Climate Geo-engineering Governance Initiative** was launched, to initiate dialogue and develop governance frameworks.
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What should India do?

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- First, the Department of Science and Technology should assess ongoing research in India and elsewhere, and identify uncertainties relevant for India (impact on monsoons, for instance).
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- Second, Indian universities and think-tanks should collaborate to develop governance templates (for laboratory research, field experiments, and large-scale deployment) and test their applicability and legitimacy.
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- Third, India should call for all national geo-engineering research programmes to voluntarily report to an international forum.
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- Fourth, it could consider joining an international research programme, taking account of research capacities, funding mechanisms, liability rules, and intellectual property.
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What is the way ahead?

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- Scientific research, transparency, public engagement, and the application of the precautionary principle must go hand-in-hand.
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- An inclusive approach to understanding ethical, legal, moral, political, and technological concerns is needed. India must add its voice to the conversation.
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Source: Business Standard

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