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International Legal Framework for Geoengineering, Managing the Risks of an Emerging Technology

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Summary

The present work titled *International Legal Framework for Geoengineering: Managing the Risks of an emerging Technology* examines the rules and principles that apply to geoengineering techniques under contemporary international law and proposes a framework for the governance of geoengineering in the future. This book aims to identify and develop the rules and principles that control the risks arising from geoengineering activities to the environment and human health without neglecting the contribution that geoengineering could make in preventing serious or irreversible climate change and its impacts.

Chapter 1 addresses the international background and scientific aspects of geoengineering. Geoengineering refers to the large-scale manipulation of the planetary environment to counteract anthropogenic global warming and its effects. It consists of two main modalities: carbon dioxide removal (CDR) and solar radiation management (SRM). The international background is that traditional mitigation methods may not be sufficient to achieve the target of limiting the increase in global average temperature to 2 °C compared to pre-industrial levels; novel methods such as geoengineering would be required to complement conventional emission reduction methods. Sections 1.4 and 1.5 describe various geoengineering methods and their possible adverse impacts on the environment, demonstrating that there is a wide diversity between the location, material, principle, feasibility and effectiveness of different methods. Since this book is on international environmental law, it focuses on the techniques designed to be deployed transnationally or in the areas of global commons, and the techniques that may cause transboundary interferences to environmental media and the climate system. Hence, six geoengineering techniques are selected for the legal analysis in this book: ocean fertilization, ocean upwelling, ocean alkalinity addition, bioenergy with carbon capture and storage (BECCS), sulphate aerosol injection (SAI) and marine cloud whitening (MCW).

Chapter 2 addresses the rules and principles under contemporary international law that apply to geoengineering in general. First, the climate change regime, including the United Nations Framework Convention Climate Change (UNFCCC), the Kyoto Protocol (KP), the Paris Agreement (PA) as well as relevant decisions made by the Conference of Parties (COP) to the UNFCCC and the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), is applicable to CDR, mainly because the purpose of implementing CDR is consistent with the ultimate objective of the UNFCCC. However, it is unclear whether the climate change regime applies to SRM. Second, the Convention on the Prohibition of Military or Any Hostile Use of Environmental Modification Techniques (the ENMOD Convention) prohibits geoengineering activities if they are applied for hostile purposes and would have widespread, long-lasting or severe effects. Third, the prevention principle applies to geoengineering in terms of preventing significant harm arising from geoengineering activities to the environment and human health and controlling the risk of causing such harm. Fourth, the precautionary approach is applicable to geoengineering to deal with scientific uncertainties.

Chapter 3 addresses how the rules and principles under contemporary international law apply to each of the six geoengineering techniques specifically. Two aspects of each technique are elaborated upon: (1) Whether the conduct of undertaking of a certain technique or the use of a substance in the technique, for the purpose of research or deployment, is lawful under existing international law; and (2) Whether the adverse impacts caused by a particular technique would lead to it being prohibited or heavily restricted under contemporary international law. With regard to marine geoengineering activities, the London Convention on the Prevention of Marine pollution by Dumping of Wastes and Other Matter and its 1996 Protocol (LC/LP) as well as the United Nations Convention on the Law of the Sea (UNCLOS) are the major instruments that provide for the rules determining the lawfulness of activity as well as the rules relating to the obligation to protect and preserve the marine environment. Regarding BECCS, the

applicable rules relate to the four steps of: (1) planting and harvesting bioenergy; (2) producing energy; (3) transporting the resulting CO2; and (4) storing the resulting CO2. With regard to SAI, rules related to the prevention of air pollution, marine pollution and ozone layer depletion as well as the conservation of ecosystems are applicable.

Chapter 4 examines the approaches to governing geoengineering in the future. Multilateralism can be considered the most appropriate approach, as it represents an inclusive forum for equitable participation of states and can provide international oversight over geoengineering activities. On the short term, the governance of geoengineering could focus on enhancing the synergies of scientific institutions, experts and relevant international organizations to actively engage in an inclusive discussion and to deepen the understanding of geoengineering technology. On the middle to longer term, systematic governance of geoengineering techniques would be possible, once geoengineering techniques are more mature and their roles in the portfolio of strategies to combat climate change are clearer. In the systematic governance framework, the UNFCCC would play the leading role, and a host of sectoral legal instruments would play complementary roles.

Chapter 5 proposes a risk assessment framework and the tailored implementation of the precautionary approach for the purpose of balancing the risk of dangerous climate change against geoengineering activities. The basic criteria for the balancing are to control the risk of significant harm arising from geoengineering activities and to avoid indiscriminate inhibition or restriction of the appropriate development of geoengineering. The assessment framework consists of the EIA (Environmental Impact Assessment) process, consultation and monitoring. The tailored implementation of the precautionary approach contains a flexible threshold of triggering this approach, proportionate actions, and lowering or shifting the burden of proof, if applicable.

It is concluded that the rules and principles that aim at controlling the risk of causing significant harm arising from geoengineering to the environment and human health should be developed first. The comprehensive risk assessment and the tailored implementation of the precautionary approach could serve as two vital tools to facilitate the appropriate development of geoengineering techniques.