
Centre for International
Governance Innovation



Canada-India Track 1.5 Dialogue Paper No. 4

Preparing for Climate Intervention Decision Making in the Global South A Role for Canada and India

Timiebi Aganaba-Jeanty



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Governance Innovation

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About the Author

Timiebi Aganaba-Jeanty is a CIGI fellow and assistant professor in the School for the Future of Innovation in Society at Arizona State University. She also holds a courtesy appointment at the Sandra Day O'Connor College of Law. With a background in global space governance, Timiebi is focused on how developing countries and marginalized groups are impacted by emerging technologies. Previously a legal affairs and international cooperation officer at the Nigerian Space Research and Development Agency, she has represented Nigeria at the Legal Subcommittee of the UN Committee on the Peaceful Uses of Outer Space (2011) and at the UN International Civil Aviation Organization Model Council (2014).

About the Project

The Canada-India Track 1.5 Dialogue on Innovation, Growth and Prosperity is a three-year initiative between CIGI and Gateway House: Indian Council on Global Relations to explore areas for closer cooperation. Experts, government officials and business leaders will convene annually to promote bilateral economic growth and innovation in today's digital economy.

Canada and India maintain strong bilateral relations built on the foundation of shared values and healthy economic ties. Economic exchanges between Canada and India are on an upward trajectory, but there continue to be unexplored areas for mutually beneficial growth, especially in light of rapid developments in technology that are changing every facet of the economy and society in both countries. To address these challenges, the partnership is helping to develop policy recommendations to promote innovation and navigate shared governance issues that are integral to the continued growth of Canada-India bilateral relations.

The Canada-India Track 1.5 Dialogue on Innovation, Growth and Prosperity strives to build closer ties between Canada and India and nurture the relationship to its full potential. Canada and India can be global leaders in innovation, and the Canada-India Track 1.5 Dialogue seeks opportunities to work jointly on multilateral issues and identify areas where improved cooperation could benefit both countries.

In addition to its focus on innovation, the partnership examines topics such as collaboration on research and higher education, promotion of Canada-India trade and investment, energy cooperation and issues pertaining to global governance.

Through this partnership, Canada and India can be intellectual partners and cooperate in the design of their global governance frameworks.

Executive Summary

Countries in the Global South are incentivized through funding schemes, such as the Solar Radiation Management Governance Initiative (SRMGI) Decimal Fund,¹ to invest in pathways that could lead toward justification for deployment of climate intervention technologies, without adequate consideration of the social dimensions of engagement in climate intervention research. The objectives of the Decimal grants are to support science, build capacity for Solar Radiation Management (SRM) analysis, engage local stakeholders and build links through SRM research. While the fund recognizes that due to limited modelling experience in the Global South, grantees must be connected with expert collaborators and work with data generated by existing climate model runs, the initial request for proposal specified that “social science research is not supported at this stage.”

The Decimal Fund is a unique pilot project, but despite these incentivization schemes in the Global South, the majority of actors do not yet have the systems required for basic research governance. The SRMGI has defined such a system as the resources, information, expertise and methods needed for the control of a climate intervention activity to maximize the potential societal benefits provided by SRM while managing associated risks. Evidently, such a system is not in place in many countries, and from a climate justice perspective, to seek to advance SRM research is irresponsible in the absence of wider public engagement and a systems approach to capacity development and research governance. Such an approach would allow for discussion about the potential and risks of engagement, which itself requires a basic understanding of the varying implications. This is a timely discussion as the executive director of the Carnegie Climate Geoengineering Governance Initiative (C2G2)² recently reported on social media, “Exciting times!

1 See www.srmgi.org/decimals-fund/.

2 The C2G2, hosted by the Carnegie Council for Ethics in International Affairs, seeks to catalyze discussion around effective governance for climate intervention technologies by shifting the conversation from the scientific and research community to the global policy-making arena. They argue that there is a need for a broad inclusive global discussion on how to govern the research, the possible testing and the deployment of these emerging technologies.

Switzerland, supported by Burkina Faso, Niger, Mali, Micronesia and Mexico submitted a draft resolution on the governance of geoengineering for consideration by UNAE [United Nations Environment Assembly] in March!” (Pasztor 2019).

For current proponents of technological responses to climate change, the topic of climate intervention governance should indeed be on the international agenda, but if this goal is achieved, the Global South should be prepared and understand the implications from the perspective of their citizens.³ Funding for developing country engagement, should, thus, in part, be directed toward the systems required for research governance, including the education required to prepare policy makers for increased attention directed to climate intervention.

To determine how Canada and India can contribute to furthering understanding around the global implications of climate intervention, diplomatic channels should be used to increase the global multi-stakeholder dialogue. To do so, several questions need to be answered, including what diplomatic channels should be propelled into action and how; should such action encourage funding for social science research; and should such action utilize a systems approach for research governance to ensure oversight of current funding mechanisms targeting developing countries? A trilateral cooperation between Canada, India and a third country in the Global South, preferably in Africa, could lead the way for a global discussion on the risks, opportunities and governance of climate intervention research.

Introduction

Climate intervention or geoengineering⁴ is the intentional and deliberate large-scale intervention/manipulation of the Earth’s climate system to counter anthropogenic climate change (Royal Society 2009). Attention to geoengineering as a potential — even necessary — response

3 Many countries do not have a position on climate intervention nor any experience on the topic, but discussions on this topic will become more frequent as several actors are attempting to bring climate intervention governance into the international spotlight.

4 The terms are used interchangeably in this paper.

to climate change has increased dramatically in recent years. Among the most commonly referenced geoengineering methods are carbon dioxide removal (CDR) and SRM. The specific characteristics of geoengineering methods vary widely between, and even within, these categories, as do their presumed potential global impacts, time scales of operation and the governance and legal challenges they pose. Almost all of the SRM research to date has been theoretical, including computer modelling and laboratory studies. The existing research has elicited strikingly different reactions across society. Some argue that SRM, when combined with cuts in greenhouse gas emissions, might prove useful in preventing negative consequences of climate change. Others believe that SRM is just a risky distraction from the central task of cutting greenhouse gas emissions (Corner and Pidgeon 2014).

A focus on geoengineering research governance is important as small-scale experiments, such as SCoPEX (Tollefson 2018) proposed by Harvard University, are now being implemented.⁵ As well, initiatives targeting developing countries to expand capacity in desktop climate intervention research are coming to fruition. Despite all of this action, there has been little attention paid to social science research in the Global South. Important questions have been sidelined: what qualifies as climate intervention research subject to governance; at what point do governance requirements apply; what substantive rules should apply; and who should do the governing (Burger and Gundlach 2018). Discussions about research governance can play an important role in ensuring that any geoengineering research is responsive to societal needs and concerns to the greatest extent possible.

Due to the current lack of informed public awareness, increased efforts are required by policy makers, who are committed to the public's role in the governance process in India and Canada and elsewhere, to evaluate the viability of engaging in research and experimenting with climate intervention techniques or the parameters that should be placed around such actions. This should not be left primarily to Western countries, but rather be discussed as part of an inclusive, deliberative, anticipatory and adaptive governance process that makes

room for stakeholder dialogue and which is able to facilitate fundamentally different interests and value frames of actors (Blok 2014).

In seeking to increase the global dialogue in an inclusive manner with respect to the governance of climate intervention research, this paper asks what role Canada and India can play in this burgeoning field. Recommendations include trilateral engagement with at least one other influential country in the Global South, such as a large African country, as well as taking a systems approach to research governance, as it could serve as a global model for climate governance.

Spurring a Global Policy Discussion

Although the idea of climate intervention may seem to many as dangerous “hubris” (Meyer and Uhle 2015), it is rapidly entering the mainstream climate policy discussions. The discussions around governance thus far, however, have largely been scientific, academic and focused on deployment. They have primarily been framed and led by actors from the Global North, resulting in the claim that “it is a fundamentally interventionist and technocratic strategy as compared to a strategy of stringent emissions reductions to curb the problem of excess atmospheric carbon” (Buck, Gammon and Preston 2013, 7). This view stands even as proponents of climate intervention technologies make it clear that exploring geoengineering is not an either-geoengineering-or-emission-reduction proposition.

The C2G2, hosted by the Carnegie Council for Ethics in International Affairs, seeks to catalyze discussion around effective governance for climate intervention technologies by shifting the conversation from the scientific and research community to the global policy-making arena. They argue that there is a need for a broad inclusive global discussion on how to *govern* the research, the possible testing and the deployment of these emerging technologies. The most vocal counter-argument, however, is that even simple discussion creates a moral hazard problem because it takes resources and attention away from solutions such as decarbonization and behaviour change, which are more challenging to realize (Lin 2013). Other

⁵ See the work on SRM governance from Harvard University at <https://heep.hks.harvard.edu/governance-deployment-solar-geoengineering>.

arguments include the risk of “forum shopping,” a slippery slope from research to deployment, an irrational “lock-in” of a technology, the potential for a “governance trap” and the rise of disruption to international relations, in particular, to the Paris Agreement (Burger and Gundlach 2018).⁶

Engaging the Global South

At this stage, while carbon storage, a form of CDR, is already advancing in countries including Canada and India, there is still plenty of scope to frame the debate on SRM governance at its nascent stage. In fact, SRM is the more contentious set of technologies because of its transboundary effects and the global risks it embodies. Bearing that in mind, there is a concerted effort to frame the narrative around obligations to the “global poor” (Horton and Keith 2016), which involves broader communities from the Global South in the debates (Winickoff, Flegal and Asrat 2015) and assertions that developing countries should be leading the initiatives (Rahman et al. 2018). Supporting such efforts invariably boils down to funding and proper governance and a deeper understanding of whether actors from developing countries have contributed to forming these views. However, the motivations of those who might fund and subsequently deploy geoengineering techniques are potentially of concern; good intentions do not necessarily ensure good or positive outcomes (Parkhill et al. 2013).

Efforts to influence and incentivize countries in the Global South, through funding schemes such as the SRMGI Decimal Fund,⁷ may encourage actors to invest in pathways that lead toward deployment and without consideration for societal implications. The SRMGI’s effort to include and prepare developing countries for inclusion in the discussion of climate engineering governance is laudable, in particular as the initiative is currently the most coordinated attempt in this field toward increasing capacity and engagement

in Africa (SRMGI 2013). The justification for the Decimal Fund is that by engaging the Global South in funded climate engineering modelling experiments, they will be better informed about the experiment’s potential and its impacts on their populations. Thus, they are better able to contribute to the debates at the global level and support the determination of feasibility for large-scale field testing and possible deployment.

The objectives of the Decimal grants are to support science, build capacity for SRM analysis, engage local stakeholders and build links through SRM research, however, due to limited modelling experience in the Global South, grantees must be connected with expert collaborators and work with data generated by existing climate model runs. At the same time, the initial request for proposal stated that “social science research is not supported at this stage.” The largest proportion of the Decimal grants will support junior researchers. Despite positive intentions, the focus on providing funds to less experienced researchers and the lack of a systems approach to developing a strategy for geoengineering research could be counterproductive, based on experiences from development programs in developing countries that were not designed to ensure sustainability and long-term impact. Christopher Potter and Richard Brough (2004) highlight that while there is a lack of capacity in the sector, it is primarily a lack of *system capacity*, i.e. organizational systems and processes linked to too few people are allocated *role capacity*. What is required is to create processes that continue over time that are immune to changes of individual staff and to facilitate the establishment of structures that “institutionalize” these processes and involve a much wider range of stakeholders in “management.”

One of the first published Decimal grant projects, undertaken by the University of Capetown’s African Climate and Development Initiative, will start by examining drought and heat extremes and the atmospheric dynamics that drive them using observations and modelling. This project appears to be the first in the region to explore how SRM might influence damaging climate events and their impact on food security in southern Africa. Herein, these researchers may get the tools to study whether or not plans designed in the Global North will

6 Michael Burger and Justin Gundlach describe each of these in turn. “Forum shopping” arises when an actor seeks to take advantage of the lax oversight imposed by a government in a given jurisdiction. The Slippery Slope argument “warns that even mere research into geoengineering will create institutional momentum, ultimately leading to the deployment of a technology that is untested and perhaps morally objectionable.” For more, see <https://philpapers.org/rec/CALTSS-5>. “Governance trap” relates to poor or non-governance that increases the likelihood of the above mentioned scenarios occurring. For instance, the authority may apply regulatory techniques suited to its core mission, but not to climate engineering.

7 See the SRMGI’s website, www.srmgi.org/decimals-fund/.

affect them, rather than to explore their potential relationship to geoengineering as a viable solution.⁸

A Systems Approach Is Needed

Funding for developing country engagement in geoengineering should, in part, be directed toward the systems required for research governance, including the education required to prepare policy makers in the Global South for increased public attention directed to climate intervention. Funding should also ensure that the systems approach to capacity building, and then research governance, is in place. For current proponents of research into climate intervention technologies and techniques to address the problem of climate change, the topic of climate intervention should indeed be on the international agenda. If this goal is to be achieved, the Global South should be prepared and understand the implications from the perspective of their citizens. A systems approach is necessary, requiring buy-in on a national scale, rather than developing capacity in individual groups of young scientists. This is because there is a very real and increasingly urgent need to answer the key questions surrounding research governance in a coordinated manner (Arnold and Wade 2015).

The SRMGI has defined such a basic research governance system as the one having resources, information, expertise and methods needed for the control of an activity to advance the potential societal benefits provided by SRM, while managing associated risks.⁹ Such a system is not in place in many countries, and from a climate justice perspective, advancing SRM is irresponsible in the absence of wider public engagement, which may include discussions on SRM's potential risks and process of engagement. Regardless, advancing SRM requires a basic understanding of the varying implications. Global rules around research governance are important: climate intervention research is inevitable, deployment is not. It is important to make institutional arrangements that ensure responsible knowledge creation and action. If done right, such arrangements serve two complementary functions. First, institutional arrangements make it possible for researchers to conduct their research in ways that are transparent, accountable and respectful of societal values. They also ensure that research efforts, considered collectively, are inclusive,

anticipatory and guided by societal needs and concerns. Second, such arrangements can guard against undesirable research pathways and outcomes. The Code of Conduct for Geoengineering Research (Hubert 2017) is a model that provides a starting point and needs to be widely tested.

What Can India and Canada Do?

While a capacity-building focus in a nascent area of science is valuable in itself, when considering the pressing problem of climate change, and the pressing need for access to innovative, clean and sustainable technologies, it is clear that simply funding basic climate engineering modelling will not be effective in supporting climate intervention experimentation. Public dialogue could be more effective and have a greater impact than simply encouraging more modelling experiments with junior researchers in the Global South, even if such activities are welcome because of the exposure to new scientific networks. If, however, this is embraced as part of a suite of national strategies to develop capability in climate governance and coordinated response measures more broadly, while also addressing the existing challenges, then it could move the dial ever so slightly in the right direction for change and impact.

Current funding for engaging the Global South in climate intervention governance discussions does not consider social science or socially oriented research at this stage. This is unfortunate because citizen participation and co-construction of knowledge require an appropriate and thorough study of social science. Canadian and Indian counterparts are encouraged to conduct national policy discussions on geoengineering research and support this same effort in the Global South. Trilateral cooperation between Canada, India and a third country in the Global South, preferably in Africa, could lead the way for a global discussion about the risks, opportunities and governance of climate intervention research. Supporting this effort in the Global South will be beneficial for Canada and India because it will increase strategic information on the similarities between global perspectives of climate intervention, as

⁸ See <https://allafrica.com/stories/201901300255.html>.

⁹ See www.srmgi.org/files2016/02/SRMGI.pdf.

compared to national perspectives, in order to incorporate divergent thinking into the development of techno-environmental policy.

A three-step process is proposed:

1. Engagement with a leading African country to consider what participation in climate intervention research would mean in their context and to develop a view point to engage on the topic at an international level. The three countries will come together for a trilateral dialogue to engage in an exercise and exchange of views about geoengineering potential and risks and to begin a conversation about global research governance through the assessment of current geoengineering research code-of-conduct models (Hubert 2017).
2. Using innovative concepts of stakeholder dialogues¹⁰ to further responsible innovation (Guston and Valdivia 2015), Canadian and Indian counterparts are encouraged to conduct national policy discussions on climate intervention research. As Neil Craik (2017, para. 9) argues, “a national strategy for climate geoengineering research, including dedicated funding, ought to be a central element of Canada’s future climate policy. At the heart of such a strategy should be the recognition that....Public dialogue on geoengineering is especially significant given the broad implications of geoengineering and the high degree of controversy that debates on geoengineering research have already engendered.” Such stakeholder engagement would set the backdrop for discussion that will aim to go beyond technocratic, positivist and linear typologies of research use and toward participative, context-sensitive and iterative models of citizen participation. Participation in the stakeholder dialogue would model behaviour for other actors considering climate intervention research.
3. Awareness, coupled with democratic participatory governance, could lead to certain decision-making actions with long-term implications. This step must be addressed through participation mechanisms that consider the outcomes of societally oriented research. In exploring diverse perspectives

through citizen participation, research to support policy making not only has direct policy impact through considerations such as the systematization of experiences and historical processes, but also impacts broader patterns of socio-political and cultural influence. Following the modelling undertaken in step 2, a side event at the Conference of Parties to the United Nations Framework Convention on Climate Change may be convened to implement a participatory exercise for stakeholders to deliberate on climate intervention research, strategies and deployment. Having tested the process for engagement, Canada, India and the yet-to-be determined country from the Global South would be showing climate leadership.

As Jane Long, Frank Loy and M. Granger Morgan (2015, 30) have argued, “small-scale experiments are an opportunity for international collaboration. Countries that have worked together on small-scale research and participated in developing governance models will be in a better position to agree how to handle risky research should that time ever come.” Bearing that in mind, research governance is important because, while climate intervention experimentation is inevitable, deployment is not. It is important to make institutional arrangements that ensure responsible knowledge creation and action. Such arrangements can serve two complementary functions. First, they support researchers to conduct their research in ways that are transparent, accountable and respectful of society’s values and to ensure that research efforts, considered collectively, are inclusive, anticipatory and guided by societal needs and concerns. Second, such arrangements can guard against undesirable research pathways and outcomes.

¹⁰ An example of such innovative stakeholder dialogues is the work done by the Consortium for Science Policy Outcomes at Arizona State University. See <https://cspo.org/research/governance-of-geoengineering-research/>.

Works Cited

- Arnold, Ross D. and Jon P. Wade. 2015. "A Definition of Systems Thinking: A Systems Approach." *Procedia Computer Science* 44: 669–78.
- Blok, Vincent. 2014. "Look Who's Talking: Responsible Innovation, the Paradox of Dialogue and the Voice of the Other in Communication and Negotiation Processes." *Journal of Responsible Innovation* 1 (2): 171–90.
- Buck, Holly Jean, Andrea R. Gammon and Christopher J. Preston. 2013. "Gender and Geoengineering." *Hypatia* 29 (3): 651–69. <https://pdfs.semanticscholar.org/e076/34b88ec52c5e97b228cad1033f43e001056f.pdf>.
- Burger, Michael and Justin Gundlach. 2018. "Research Governance." In *Climate Engineering and the Law: Regulation and Liability for Solar Radiation Management and Carbon Dioxide Removal*, edited by Michael B. Gerrard and Tracy Hester, 269–323. Cambridge, UK: Cambridge University Press.
- Corner, Adam and Nick Pidgeon. 2014. "Geoengineering, Climate Change Scepticism and the 'Moral Hazard' Argument: An Experimental Study of UK Public Perceptions." *Philosophical Transactions. Series A, Mathematical, Physical, and Engineering Sciences* 372 (2031). www.ncbi.nlm.nih.gov/pmc/articles/PMC4240956/.
- Craik, Neil. 2017. "The Case for a Climate Geoengineering Strategy." *Policy Options*, December 6. <http://policyoptions.irpp.org/magazines/december-2017/the-case-for-a-climate-geoengineering-strategy/>.
- Guston, David and Walter Valdivia. 2015. *Responsible Innovation: A Primer for Policy Makers*. Brookings Institute, Washington, DC. www.brookings.edu/research/responsible-innovation-a-primer-for-policymakers/.
- Horton, Joshua and David Keith. 2016. "Solar Geoengineering and Obligations to the Global Poor." In *Climate Justice and Geoengineering: Ethics and Policy in the Atmospheric Anthropocene*, edited by Christopher J. Preston, 79–92. London, UK: Rowman & Littlefield.
- Hubert, Anna Marie. 2017. *Code of Conduct for Geoengineering Research*. https://ce-conference.org/system/files/documents/revised_code_of_conduct_for_geoengineering_research_2017.pdf.
- Lin, Albert C. 2013. "Does Geoengineering Present a Moral Hazard?" *Ecology Law Quarterly* 40 (3): 673–712. <https://law.ucdavis.edu/faculty/lin/files/ELQ.MoralHazard.pdf>.
- Long, J. C. S., Frank Loy and M. Granger Morgan. 2015. "Start Research on Climate Engineering." *Nature* 518 (February 5): 29–31.
- Meyer, Kirsten and Christian Uhle. 2015. "Geoengineering and the Accusation of Hubris." THESys Discussion Paper No. 2015-3, Humboldt-Universität zu Berlin, Berlin, Germany. <https://edoc.hu-berlin.de/bitstream/handle/18452/3783/3.pdf?sequence=1>.
- Parkhill, K., Nick Pidgeon, Adam Corner and Naomi Vaughan. 2013. "Deliberation and Responsible Innovation: A Geoengineering Case Study." In *Responsible Innovation*, edited by R. Owen, John Bessant and Maggy Heintz, 219–39. London, UK: Wiley.
- Pasztor, Janos. 2019. "Exciting times! Switzerland, supported by Burkina Faso, Niger, Mali, Micronesia and Mexico submitted a draft resolution on the governance of geoengineering for consideration by UNEA in March!" Twitter, January 21, 6:11 pm. <https://twitter.com/jpasztor/status/1087412480261918721>.
- Potter, Christopher and Richard Brough. 2004. "Systematic Capacity Building: A Hierarchy of Needs." *Health Policy and Planning* 19 (5): 336–45.
- Rahman A. Attiq, Paulo Artaxo, Asfawossen Asrat and Andy Parker. 2018. "Developing Countries Must Lead on Solar Geoengineering Research." *Nature* 556 (April 3): 22–24. www.nature.com/articles/d41586-018-03917-8.
- Royal Society. 2009. *Geoengineering the Climate: Science, Governance and Uncertainty*. RS Policy document 10/09. London, UK: The Royal Society. https://royalsociety.org/~media/Royal_Society_Content/policy/publications/2009/8693.pdf.

SRMGI. 2013. *Governance of Research on Solar Geoengineering: African Perspectives*. Nairobi, Kenya: The African Academy of Sciences. www.srmgi.org/files/2016/02/AAS-SRMGI-Africa-Report.pdf.

Tollefson, Jeff. 2018. "First Sun-Dimming Experiment will Test a Way to Cool Earth." *Nature* 563 (November 27): 613–15.

Winickoff, David E., Jane A. Flegal and Asfawossen Asrat. 2015. "Engaging the Global South on Climate Engineering Research." *Nature Climate Change* 5 (June 24): 627–34. www.nature.com/articles/nclimate2632.

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We are the Centre for International Governance Innovation: an independent, non-partisan think tank with an objective and uniquely global perspective. Our research, opinions and public voice make a difference in today's world by bringing clarity and innovative thinking to global policy making. By working across disciplines and in partnership with the best peers and experts, we are the benchmark for influential research and trusted analysis.

Our research programs focus on governance of the global economy, global security and politics, and international law in collaboration with a range of strategic partners and support from the Government of Canada, the Government of Ontario, as well as founder Jim Balsillie.

À propos du CIGI

Au Centre pour l'innovation dans la gouvernance internationale (CIGI), nous formons un groupe de réflexion indépendant et non partisan doté d'un point de vue objectif et unique de portée mondiale. Nos recherches, nos avis et nos interventions publiques ont des effets réels sur le monde d'aujourd'hui car ils apportent de la clarté et une réflexion novatrice pour l'élaboration des politiques à l'échelle internationale. En raison des travaux accomplis en collaboration et en partenariat avec des pairs et des spécialistes interdisciplinaires des plus compétents, nous sommes devenus une référence grâce à l'influence de nos recherches et à la fiabilité de nos analyses.

Nos programmes de recherche ont trait à la gouvernance dans les domaines suivants : l'économie mondiale, la sécurité et les politiques mondiales, et le droit international, et nous les exécutons avec la collaboration de nombreux partenaires stratégiques et le soutien des gouvernements du Canada et de l'Ontario ainsi que du fondateur du CIGI, Jim Balsillie.

About Gateway House

Gateway House: Indian Council on Global Relations is a foreign policy think tank in Mumbai, India, established to engage India's leading corporations and individuals in debate and scholarship on India's foreign policy and the nation's role in global affairs. Gateway House is independent, non-partisan and membership-based.

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