ESSAY

THE ROLE OF SCIENCE IN BRIDGING THE CLIMATE DIVIDE IN THE WAKE OF THE 2021 IPCC SIXTH ASSESSMENT REPORT AND THE GLASGOW CLIMATE PACT

*Carolina Arlota**

ABSTRACT

Climate governance is perennially complex, as climate change is the quintessential global collective action problem: it affects those who do not contribute to it while the benefits of climate change mitigation measures are not restricted to those who pursue such a climate-conscious path. Nowadays, climate governance has proven particularly tortuous due to conditionality and equitable concerns informing parties' nationally determined contributions for the mitigation of greenhouse gas emissions under the Paris Agreement on Climate Change. In this scenario, sound scientific evidence, which is defined in this Essay as the evidence that is based on the best scientific assessment available, is of paramount importance to effective climate governance. It provides a common denominator for developing and developed countries alike, with clear parameters for required policies within specific time frames, potentially reducing transaction costs for all involved parties. Accordingly, research on this topic is of academic and practical relevance. As such, this Essay discusses the current challenges that climate governance faces, focusing on the linkages

* Carolina Arlota is a currently a fellow at the Sabin Center for Climate Change Law and an Associate Research Scholar at Columbia Law School. Her contact address is: csa2170@columbia.edu. This Essay is based on her presentation at the International Law Weekend Conference, which was organized by the American Branch of the International Law Association. She presented her research in the panel entitled *Beyond Rocket Science: Assessing the Role of Natural and Social Sciences in Galvanizing Climate Action* (Oct. 21, 2022). The author is thankful for helpful comments by her fellow panelists in the 2022 ILW panel, particularly Professors Myanna Dellinger, Tibisay Morgandi, and Frédéric Sourgens. The author acknowledges the excellent work of the editors of the Fordham International Law Journal. The views presented here are those of the author alone.

between the scientific evidence unveiled in the 2021 IPCC Sixth Assessment Report and the urgent global need for curbing green-house gas ("GHG") emissions from all parties of the UNFCC and its umbrella treaty, namely, the Paris Agreement. This Essay concludes that, in aggregate, the scientific findings provided in the 2021 IPCC Report were significant for overcoming the stalemate that have characterized climate governance. In particular, it was consequential for overcoming the climate divide specifically manifested in previous attempts to implement the market-based and non-marked mechanisms of Article 6 of the Paris Agreement.

I. INTRODUCTION

Climate governance is perennially complex, as climate change is the quintessential global collective action problem. It affects those who do not contribute to it, while the benefits of climate change mitigation measures are not restricted to those who pursue a climate-conscious path.[1] This understanding illustrates the high transaction costs involved in international agreements addressing climate change, where all involved parties have incentives to free ride on the efforts of others.[2] Climate governance has proven particularly tortuous due to conditionality and equitable concerns informing parties' nationally determined contributions ("NDCs") for the mitigation of GHG

1. *See* Carolina Arlota*, The United States Climate Change Policies and COVID-19: Poisoning the Cure,* 41 PACE L. REV. 94, 94–95 (2021). *See also* Daniel C. Esty & Anthony L. I. Moffa, *Why Climate Change Collective Action Has Failed and What Needs to be Done Within and Without the Trade Regime*, 15 J. INT'L ECON. L. 777, 777 (2012) (highlighting the need for policy cooperation and multi-level governance).

2. *See* MICHAEL J. TREBILCOCK, DEALING WITH LOSERS: THE POLITICAL ECONOMY OF POLICY TRANSITIONS 120 (2014) ("Because the benefits of carbon abatement cannot be restricted to those who contributed to creating them, all parties have an incentive to free-ride.").

emissions under the Paris Agreement on Climate Change.[3] More specifically, least developed and developing nations made several of their reduction targets conditional upon financial support from developed nations under their original NDCs. This poses additional challenges to climate governance, as these requests for financing exceed the US$100 billion originally pledged by developed countries to the Green Climate Fund and still unfulfilled.[4] Accordingly, the Glasgow Climate Pact deserves further investigation,[5] as a trailblazer for progress on contentious issues of climate governance, including the long stalemate regarding Article 6 of the Paris Agreement. In view of such a complexity embedded in climate governance, sound scientific evidence, which is defined in this Essay as information based on the best science and evidence available,[6] is of paramount importance to effective climate governance. As scientific evidence is based on technical assessments, it facilitates the process of setting an agenda for issues to be discussed;[7] it also reduces the potential asymmetry of information among parties once proposals are made public and subject

3. The Paris Agreement on Climate Change is an umbrella treaty to the United Nations Framework Convention on Climate Change ("UNFCCC"). As such, it aims at the reduction of GHG in the context of different capabilities, which this Essay addresses in the next section. National determined contributions ("NDCs") are voluntary targets determined by each country. *See The Paris Agreement: Frequently Asked Questions,* U.N., https://www.un.org/sustainabledevelopment/blog/2016/09/the-paris-agreement-faqs/ [https://perma.cc/S9PU-PTY2] (last visited Apr. 18, 2023).

4. W. Pieter Pauw et al., *Conditional Nationally Determined Contributions in the Paris Agreement: Foothold for Equity or Achilles Heel?*, 4 CLIMATE POL'Y 468, 468–70 (2020). Historical emissions and per capita arguments are mentioned in several NDCs contributions. United Nations Climate Change Conference, *Nationally Determined Contributions Under the Paris Agreement: Synthesis Report by the Secretariat*, U.N. Doc. FCCC/PA/CMA/2021/8, ¶130 (Sep. 17, 2021) ("Many Parties framed fairness consideration within their past, current and future share in global and/or per capita emissions compared with global averages, or in relation to the trends in one or several metrics."). Several Parties also were vocal about the need for technological development and transfer in their NDCs. *See id.* ¶197.

5. *See* Conf. of the Parties Serving as the Meeting of the Parties to the Paris Agreement, *Report of the Conference of the Parties Serving as the Meeting of the Parties to the Paris Agreement on its Second Session, held in Glasgow from 31 October to 12 November 2021*: *Addendum*, U.N. Doc. FCCC/PA/CMA/2021/10/Add.1 (Mar. 8, 2022), https://unfccc.int/sites/default/files/resource/cma2021_10_add1_adv.pdf [https://perma.cc/Q9Z4-P4LH] [hereinafter Glasgow Climate Pact].

6. *See* PATRICIA PARK, INTERNATIONAL LAW FOR ENERGY AND THE ENVIRONMENT 11 (2d ed. 2013).

7. Science, after all, is grounded on objective assessments. *See* Deborah M. Hussey Freeland, *Speaking Science to Law*, 25 GEO. INT'L ENV'T L. REV. 289, 295 (2013).

to general scrutiny.[8] This, in turn, fosters policy debates, while generally avoiding irrational behavior.[9] Science provides a common denominator for developing and developed countries alike,[10] offering clear parameters for implementing required policies within specific timeframes, which reduces transaction costs for all involved parties.[11] It is noteworthy that the Glasgow Climate Pact specifically acknowledges the importance of the Intergovernmental Panel on Climate Change ("IPCC")[12] Sixth Assessment Report.[13] Accordingly, research on the role of science in bridging the climate divide between developed and least developed and developing countries is of academic and practical interest.

This Essay proceeds as follows. Part II contextualizes climate governance focusing on the main climate treaties. Part III discusses the impact of the IPCC Sixth Assessment Report for galvanizing climate action and overcoming the climate divide regarding climate governance. Part IV provides the conclusion.

II. CONTEXTUALIZING CLIMATE GOVERNANCE

A primary goal of the United Nations Framework Convention on Climate Change ("UNFCCC") is the stabilization of GHG emissions.[14] This goal is informed by science, as scientific consensus correlates

8. *See* Carolina Arlota*, How President Trump's War on Science* Undermines *Cost-Benefit Analysis of Climate Policies*, 50 Env't L. Rep. 10999, 11000 (2020).

9. *See* PARK, *supra* note 6, at 10 (contending that the role of the scientific community is to facilitate the dialectic interaction between those who advance the "business as usual" scenario and those who favor a more environmentally protective approach).

10. *See* David F. Cavers, *Science and the Law Symposium: Introduction,* 63 MICH. L. REV. 1325, 1329 (1965) (arguing that the relationship between science and law should foster cooperation among countries toward the protection of the common good).

11. *See* Arlota, *supra* note 8, at 11000.

12. The Intergovernmental Panel on Climate Change is the United Nations body for assessing the science related to climate change. To this end, it provides periodical assessments on climate change, assisting policymakers around the globe to navigate current and future risks and how best to implement mitigation and adaptation strategies under international climate treaties, such as the UNFCCC and the Paris Agreement. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *About the IPCC*, https://www.ipcc.ch [https://perma.cc/4XJ7-R6KK].

13. Glasgow Climate Pact, *supra* note 5, at 2.

14. *See* The United Nations Framework Convention on Climate Change, art. 23, Sept. 5, 1992, 1771 U.N.T.S. 107 [hereinafter UNFCC]. The UNFCCC entered into force on March 21, 1994. The scientific consensus regarding the existence of climate change and the necessity of mitigation were paramount considerations during UNFCCC negotiations. *See* John Houghton, *Science and International Environmental Policy: The Intergovernmental Panel on Climate Change*, *in* ENV'T L., ECON. AND SUSTAINABLE DEV. 355–57 (Richard Revesz et al. eds., 2001).

climate change with global warming, of which one human-induced cause is the accumulation of GHGs in the atmosphere.[15] One aim of the Paris Agreement, an umbrella treaty to the UNFCCC,[16] is to limit the global increase in mean temperature to well below 2°C (3.6°F) compared to pre-industrial levels.[17] The Paris Agreement is hence essential for climate governance, and is frequently referred to as the only effective institutional path forward to an effective regime of climate governance.[18] Furthermore, the Paris Agreement marks the end of a decade-long stalemate over the full integration of the United States and developing economies into the climate regime.[19]

The Paris Agreement, which is aligned with the modern framework on climate governance, reconciles elements of bottom-up measures, such as NDCs,[20] with the joint efforts of member states to reduce carbon emissions (top-down mechanisms, i.e., from the international order to countries).[21] Importantly, the Paris Agreement

15. Exactly fifty-one years ago a seminal article cautioned that the Earth's temperature would increase by 0.6°C by the end of the 20th century. *See* John Sawyer, *Man-Made Carbon Dioxide and the "Greenhouse" Effect*, 239 NATURE 23, 23–26 (1972). For a while now, the scientific community has overwhelmingly acknowledged the existence of climate change, and that GHG emissions are a primary cause. *See* Richard S. J. Tol, *The Elusive Consensus on Climate Change* 8 (U. Sussex Bus. Sch., Working Paper No. 0319, 2019) (emphasizing that ninety-seven percent of scientific studies point to human activity as the most important factor in climate change since 1950). In the United States, the Environmental Protection Agency ("EPA") states that the combustion of fossil fuels is likely the human activity that contributes most to the concentration of carbon dioxide in the atmosphere. *See* EPA, *Carbon Dioxide Emissions* (Oct. 31, 2018), https://www.epa.gov/ghgemissions/overview-greenhouse-gases#carbon-dioxide [https://perma.cc/DU8N-HCQ7].

16. *See* Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104 [hereinafter Paris Agreement].

17. *Id*., art. 2 ("This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by: (a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.").

18. *See* Mark Cooper, *Governing the Global Commons: The Political Economy of State and Local Action, After the U.S. Flip-Flop on the Paris Agreement*, 118 ENERGY POL'Y 440, 441 (2018).

19. *See* Meinhard Doelle, *Assessment of Strengths and Weaknesses, in* PARIS AGREEMENT ON CLIMATE CHANGE: ANALYSIS AND COMMENT. 387 (Daniel Klein et al. eds., 2017).

20. *See* Paris Agreement, *supra* note 16, arts. 3, 4, 6.

21. These bottom-down measures require countries to establish NDCs with more demanding targets than set previously. Each country voluntarily determines its targets, considering its own national priorities, circumstances, and capabilities. *See* Jennifer Morgan et al., *Elements and Ideas for the 2015 Paris Agreement* 12 (World Res. Inst., Working paper,

also engages developing and developed nations alike to reduce their emissions, considering the principle of common but differentiated responsibilities and respective capabilities.[22] This principle addresses the different responsibilities allocated among countries, and is quite controversial as it suggests accountability for current and historical emissions needs to be factored in.[23] Therefore, climate governance faces a major challenge in reconciling the need for immediate and effective reductions of GHGs, while considering that less developed and developing nations have not contributed to the current levels of these gases in the atmosphere to the same extent as developed nations.

III. THE IMPACT OF THE IPCC SIXTH ASSESSMENT REPORT FOR GALVANIZING CLIMATE ACTION AND OVERCOMING THE CLIMATE DIVIDE OF CLIMATE GOVERNANCE

The scientific findings of the IPCC Sixth Assessment Report[24] were essential for gathering support for the enaction of more stringent NDCs across the globe and particularly from low- and medium-income countries ("LMICs"). China and India, for instance, released their (considerably more ambitious) NDCs after the Report.[25] The Report,

2015), https://files.wri.org/d8/s3fs-public/ACT_Elements_Ideas_FullPaper_FINAL.PDF [https://perma.cc/EFD5-J85L].

22. *See* Paris Agreement, *supra* note 16, art. 2 (2) ("This Agreement will be implemented to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances."). This principle is also mentioned in Article 4 when addressing NDCs. The principle also appears in the Paris Agreement's parent treaty, the UNFCCC. *See* UNFCCC, *supra* note 14, art. 3(1) ("The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.").

23. *See* Esty & Moffa, *supra* note 1, at 779.

24. *See* Valérie Masson-Delmotte et al., *Summary for Policymakers in Climate Change 2021: The Physical Science Basis, Contribution of Working Group I to the 6th Assessment Rep.t of the ICPP*, INT'L PANEL ON CLIMATE CHANGE 1, 3 (2021), https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf [https://perma.cc/8ECV-3R6F] [hereinafter IPCC Sixth Assessment Report].

25. Although both countries submitted their updated NDCs after the United Nation's deadline, they each significantly improved their climate targets. *See Countries: China,* CLIMATE ACTION TRACKER (May 19, 2022), https://climateactiontracker.org/countries/china/ [https://perma.cc/REX8-YBTB]. India presented its updated NDC at COP 26. *Countries: India,* CLIMATE ACTION TRACKER (Nov. 1, 2021), https://climateactiontracker.org/climate-target-update-tracker/india/2021-11-01-2/ [https://perma.cc/4LX6-U29Q].

which was the first scientific review since 2013,[26] categorically stated, "[i]t is unequivocal that human influence has warmed the atmosphere, ocean, and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred."[27] It went on to warn, "human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years."[28] According to the IPCC's assessment, which is based on five scenarios constructed around new climate models and projections,[29] global surface temperatures will continue to increase until at least the mid-century under all scenarios considered; anticipated global warming will exceed 1.5°C and 2°C in the 21st century "unless deep reductions of CO_2 and other greenhouse gas emissions occur in the coming decades."[30]

Overall, IPCC's assessments have not been spared from criticism, despite their overwhelming prestige and reputation. There have been claims arguing that the IPCC is a political institution influenced (and, to some, even controlled) by its member states.[31] It is relevant to contextualize these claims. The IPCC has three different working groups: (1) Working Group I, which focuses on the physical science basis of climate change (and, as such, is the object of this Essay); (2) Working Group II, which targets climate change impacts; and (3) Working Group III, which deals with adaptation.[32] Most criticisms address Working Group III and its potential lack of neutrality (and related bias favoring carbon dioxide removal technologies).[33]

Nonetheless, the IPCC is widely acknowledged as an authoritative institution, having assisted in defining the complexities of climate science into forms that are tractable for policymakers and

26. *See* Isabelle Gerretsen, *Five Takeaways from the IPCC's 2021 Climate Science Report,* CLIMATE CHANGE NEWS (Sept. 8, 2021), https://www.climatechangenews.com/2021/08/09/five-takeaways-ipccs-2021-climate-science-report/ [https://perma.cc/TKL8-GG6Y].

27. IPCC Sixth Assessment Report, *supra* note 24, at 4.

28. *Id.* at 6.

29. *See id.* at 12–14.

30. *Id.* at 14.

31. *See* Mark Vardy et al., *The Intergovernmental Panel on Climate Change: Challenges and Opportunities*, 42 ANN. REV. ENV. & RES. 55, 59–62 (2017).

32. *See Working Groups,* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (2023), https://www.ipcc.ch/about/ [https://perma.cc/K3FM-7B6A].

33. *See* Silke Beck & Jeroen Oomen, *Imaging the Corridor of Climate Mitigation – What is at Stake in IPCC's Politics of Anticipation*, 123 ENV. SCI. & POL'Y 169, 170 – 76 (2021).

decisionmakers.[34] The IPCC reports also serve as an essential prerequisite for successful climate negotiations.[35] Accordingly, it is unsurprising that the 2021 IPCCC Report findings were seriously considered by member states as well as all others involved in climate negotiations.

The IPCC Sixth Assessment Report made clear that several changes to the climate system will intensify response to increasing global warming. These changes include "increases in the frequency and intensity of hot extremes, marine heatwaves, heavy precipitation, and, in some regions, agricultural and ecological droughts; an increase in the proportion of intense tropical cyclones; and reductions in Arctic sea ice, snow cover, and permafrost."[36] The Report emphasized that in scenarios involving increasing carbon dioxide emissions, land and ocean carbon sinks are projected to be less effective at slowing the accumulation of this major greenhouse gas in the atmosphere.[37] It further noted that many changes due to past and future greenhouse emissions will be irreversible for centuries to millennia, particularly changes in the ocean ice sheets and global sea level.[38] The Report, therefore, was loud and clear in its message: humanity is on the path to irreversible tipping points.

The scientific report contributed to enabling key players to exercise additional pressure on parties heading to the COP 26 in Glasgow.[39] UN Secretary General António Guterres immediately and famously called the Report a "code red for humankind."[40] The active reengagement of the United States in climate policy under the Biden-

34. Vardy, *supra* note 31, at 57 (highlighting that the IPCC won the 2007 Nobel Peace Prize for its efforts to disseminate greater knowledge about anthropogenic climate change and recommendations to counter its adverse impacts).

35. *See id*.

36. Masson-Delmotte et al., *supra* note 24, at 15.

37. *See id.* at 19–21.

38. *See id*.

39. COP 26 was the twenty-sixth conference of the parties of the UNFCCC. It occurred in Glasgow, Scotland, in November of 2021. The United Kingdom was the host. *Delivering the Glassgow Climate Pact*, U.N. CLIMATE CHANGE CONFERENCE UK 2021, https://ukcop26.org/ [https://perma.cc/2QSA-9VGD].

40. UN Secretary-General, *IPCC Report: "Code Red" for Humankind Warns Secretary-General*, U.N. (Aug. 9, 2021), https://news.un.org/en/story/2021/08/1097362 [https://perma.cc/PT2W-UJMU].

Harris Administration,[41] as the country is the leading historical polluter,[42] was particularly relevant as it was also science-driven.[43]

In such a context, the momentum provided by the latest IPCC Scientific Report findings was a vital motivator for parties at COP 26 to overcome their long-time stalemate in climate policies. More specifically, the report was crucial for the advancement and ultimately final agreement on the so-called Paris Rulebook on non-market and market-based mechanisms established in the Paris Agreement. These mechanisms, defined in 2015 in Article 6 of the Agreement, were devised to enable cooperation that would result in the transfer of mitigation of emissions from the country that achieved the reduction to the country that will acquire the reduction.[44]

Negotiating the implementation of rules, modalities, and procedures for these market and non-market mechanisms was a major achievement of COP 26 and was put forward in the Glasgow Climate Pact.[45] These mechanisms are expected to significantly foster

41. *See Fact Sheet: Renewed U.S. Leadership in Glasgow raises Ambition to Tackle Climate Crisis,* WHITE HOUSE (Nov. 13, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/13/fact-sheet-renewed-u-s-leadership-in-glasgow-raises-ambition-to-tackle-climate-crisis/ [https://perma.cc/83L7-3XNN] ("On day one at the U.N. Framework Convention on Climate Change Conference of the Parties [COP26], President Joe Biden made clear that Glasgow must raise global ambition during this decisive decade of climate action to preserve our shared future. . . The President and United States have led by the power of example, taking bold steps to reduce emissions and create economic opportunity at home and abroad, while rallying other countries to step up. On his first day in office, President Biden rejoined the Paris Agreement, restored U.S. leadership on the world stage, and reestablished our position to tackle the climate crisis at home and abroad.").

42. A recent study concluded that the United States, as the leading historical emitter, has contributed twenty percent to the current levels of GHGs emissions. *See* Simon Evans, *Analysis: Which Countries are Historically Responsible for Climate Change?*, CARBON BRIEF: CLEAR ON CLIMATE (Oct. 5, 2021), https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/ [https://perma.cc/3YJA-C778].

43. The Biden-Harris administration's involvement in climate policy significantly contrasts with the deregulatory measures pursued under the previous administration domestically and related withdrawal from the Paris Agreement. *See* Jessica Wentz & Michael B. Gerrard, *Persistent Regulations: A Detailed Assessment of the Trump Administration's Efforts to Repeal Federal Climate Protections*, SABIN CTR. FOR CLIMATE CHANGE L. 1 (June 2019) (analyzing President Trump's efforts to repeal federal climate protection); Carolina Arlota*, Does the United States' Withdrawal from the Paris Agreement Pass the Cost-Benefit Analysis Test?*, 41 U. PA. J. INT'L. L. 881, 907−34 (2020) (finding the United States' withdrawal from the Paris Agreement irrational).

44. *See COP26 Outcomes: Market Mechanisms and Non-Market Approaches (Article 6)* (2021), U.N., https://unfccc.int/process-and-meetings/the-paris-agreement/the-glasgow-climate-pact/cop26-outcomes-market-mechanisms-and-non-market-approaches-article-6#eq-1 [https://perma.cc/4UJ2-QY57].

45. *See* Glasgow Climate Pact, *supra* note 5.

cooperation between countries as they can be used in their NDCs.[46] Ultimately, the more developing nations engage in such trading, the more incentive they have to cooperate with each other and with developed nations. Hence, these market mechanisms may create a virtuous cycle and promote additional cooperation under non-market mechanisms.

Nonetheless, a cautionary approach is recommended in evaluating the role of science in Glasgow. It is noteworthy that the causal relation between the release of the IPCC Report and the increased ambition of some key countries in their NDCs would benefit from empirical investigation which are currently missing in the literature. Moreover, COP 26 has been criticized not only due to its exclusion of indigenous peoples and representatives of the Global South, but also of scientists.[47] Consequently, stakeholders' participation was affected with the exclusion of observers. As parties' representatives were also excluded due to pandemic restrictions, the legitimacy of this specific Conference of the Parties of the Paris Agreement (and parties of the UNFCCC) was tainted.

On strictly scientific-based developments, the overall assessment of COP 26 and the Glasgow Climate Pact is mixed. IPCC findings have been used to call for action phasing out fossil fuels while also enabling its continued exploitation.[48] On the bright side of COP 26, many countries made "net-zero" commitments, recognizing the necessity of reducing GHG emissions faster and agreeing to report on progress annually and an agreement was made, namely, the Glasgow Climate Pact itself.[49]

In addition, for the first time in a COP text, parties agreed to start reducing coal-fired power (unabated coal, i.e., without carbon capture) and to begin eliminating subsidies on other fossil fuels.[50] On the other end of the spectrum, due to objections from India and China, a commitment to "phase out" coal was modified to "phase down."[51]

---

46. *See* U.N., *supra* note 44.

47. *See* Ehsan Masood & Jeff Tollefson, "*COP26 hasn't solved the problem:" Scientists react to UN Climate Deal*, NATURE NEWS (Nov. 14, 2021).

48. *See* WIM CARTON, *Carbon Unicorns and Fossil Futures: Whose Emission Reduction Pathways is the IPCC Performing? in* HAS IT COME TO THIS? THE PROMISES AND PERILS OF GEOENGINEERING ON THE BRINK 34, 38–39 (J. P. Sapinski et al. eds., 2021) (underscoring that IPCC findings also come with political judgments).

49. *See* Masood & Tollefson, *supra* note 47.

50. *See id.*

51. *Id.*

High-income countries aimed at a total phase-out of coal, whereas LMICs forced the compromise, contending that alternative energy resources do not yet exist in several parts of the world.[52]

In light of this climate divide, the scientific community may significantly advance the debate, informing and mobilizing public opinion as well as stakeholders, who then pressure their governments to bridge the gap between LMICs and high-income countries. For example, the scientific community can clarify that unabated coal still generates pollution. It can also highlight the absence of an agreed definition or measure of "net-zero." Given the absence of a "net-zero" definition, it is virtually impossible to know how effective "net-zero" pledges will be in stopping global warming.[53] Moreover, there is no unequivocal definition of climate finance. As developed countries provide approximately US$80 billion annually in climate finance to LMICs, "the lack of an agreed definition means the funds are dominated by loans and include elements such as development assistance (for example, funding for schools and clean water), which do not directly reduce carbon emissions."[54] The scientific community, especially economists, may also underscore that.

Considering such premises, the use of scientific evidence presents a conundrum for developing nations. These nations find themselves obliged—under international law and in light of the current level of GHG saturation—to meaningfully reduce their GHG emissions while being unwilling to curb their own path towards development and economic growth due to environmental and climate related concerns.[55] Stating it differently: they do not want to incur potentially costly

52. *See id*.

53. *See id*.

54. *Id.*

55. UNFCCC, *supra* note 14, art. 3. Under the principle of common but shared responsibilities, the UNFCCC acknowledges that Non-Annex I Parties (i.e., developing nations) have environmental and economic justifications for a more lenient treatment. *See* UNFCCC, *supra* note 14; *see also* Larry Parker & John Blodgett, *Greenhouse Gas Emissions: Perspectives on the Top 20 Emitters and Developed Versus Developing Nations,* CONG. RSCH SERV. 1, 6-8 (2008), https://www.everycrsreport.com/files/20080131_RL32721_5b892386a6b6769ffb8ce002c87971f69829b381.pdf [https://perma.cc/J47S-WE3T] ("[T]he development being pursued by the non-Annex I nations depends importantly on expanded use of energy, including fossil fuels, which are the main source of carbon dioxide, the dominant greenhouse gas. From this perspective, a logic for the differing treatment of the two groups is that the developed, Annex I countries can afford to control emissions because they have achieved a relatively high standard of living, while the developing nations have the right and should have the opportunity to expand energy use as necessary for their economic development.").

actions or refrain for accessing polluting energy sources such as coal, for instance.[56]

Therefore, on the one hand, science conveys the urgent need for more stringent GHG emissions reductions from all parties to climate agreements, regardless of their stage of development and despite developing nations not being responsible for the current levels of GHG saturation in the atmosphere.[57] Extrapolating these findings, a related argument would be that as developing nations will bear the impact of climate change disproportionally, they would have a direct and immediate interest in issuing their own more stringent NDCs. On the other hand, scientific evidence may be particularly beneficial to developing nations because it increases scrutiny of all countries' NDCs and historical GHG emissions while highlighting the severe consequences of the lack of financial and technical resources to invest in adaptation.

At first glance, such a conundrum may appear to contradict the general assumption that science reduces transaction costs for climate governance. However, closer scrutiny shows that, as presented above, climate change is a collective action problem, so even if all developing nations significantly reduced their own GHG emissions, they would still need developed nations to do the same (and fast), as GHGs do not respect physical boundaries. Scientific evidence discussed in the Report underscores this.[58] Following this line of reasoning as well as the most updated literature, science also shows that economic development goes hand in hand with environmental protection under specific conditions fostering sustainable development, particularly the Kuznets Curve.[59]

In addition, equitable considerations must be considered. As discussed, the principle of common but differentiated responsibilities, mentioned in both the UNFCCC and the Paris Agreement,[60] is a vector

56. *See, e.g.*, Parker & Blodgett, *supra* note 55, at 8–11.

57. *See generally,* Masson-Delmotte et al., *supra* note 24.

58. *See* Glasgow Climate Pact, *supra* note 5, at 2-3.

59. The concept of the Environmental Kuznets Curve ("EKC") holds that "in a first phase of economic development (at low- income levels) increasing economic development led to increasing environmental degradation. However, there is a certain turning point . . . where income levels have increased to such a point that a demand for higher environmental quality emerges and where hence increased economic welfare leads to increased environmental improvements." MICHAEL G. FAURE & ROY A. PARTAIN, ENVIRONMENTAL LAW AND ECONOMICS 293–94 (Cambridge Univ. Press 2019).

60. *See* UNFCCC, *supra* note 14, art. 3(1); Paris Agreement, *supra* note 16, art. 2 (2).

for climate governance. Science clearly shows that the developed world, particularly the United States and many EU countries, have contributed far more than the developing world to the current levels of GHG saturation.[61] These findings were also crucial for highlighting the debate about climate justice and the related need for climate justice manifested under climate reparations. Although no agreement on this topic was reached during COP 26, it paved the way for COP 27 and its unprecedent achievement regarding climate reparations.[62]

IV. CONCLUSION

As the Glasgow Climate Pact highlighted the importance of the scientific findings of the IPCC Sixth Assessment Report for Policymaking, the role of scientific evidence is expected to increase even more. This is good news for climate governance and should foster cooperation and agreement among developing and developed countries. Overcoming the previous deadlock between developing and developed countries regarding the mechanisms of Article 6 of the Paris Agreement is evidence of such future trajectory. Accordingly, this Essay concludes that the cumulative scientific findings provided in the latest IPCC Assessment Report were significant in overcoming the stalemate that has characterized the climate divide as specifically manifested in previous attempts to implement the market-based and non-market mechanisms of Article 6 of the Paris Agreement. These scientific findings also motivated key discussions that paved the way for an agreement on the contentious issue of climate reparations that was recently implemented in COP 27. Thus, the scientific evidence shared in the IPCC Sixth Assessment Report were essential for setting the agenda and parameters for discussion, which led Parties to overcome long stalemates. Ultimately, this Report led to more effective climate governance.

61. *See, e.g.,* Parker & Blodgett, *supra* note 55, at 7–10.

62. COP 27 was the twenty-seventh conference of the parties of the UNFCCC. It occurred in November 2022, in Sharm el-Sheikh. The Government of the Arab Republic of Egypt was the host. *See* COP 27, https://cop27.eg/#/ [https://perma.cc/6WQX-MNWY] (last visited Apr. 27, 2023).