11

Climate Science and Human Rights

Using Attribution Science to Frame Government Mitigation and Adaptation Obligations

MICHAEL BURGER, JESSICA WENTZ, AND DANIEL J. METZGER

11.1 INTRODUCTION

Since 2005, dozens of human rights claims have been brought against governments for their failure to adequately mitigate and adapt to the impacts of climate change.[1] These claims are supported by a growing body of climate change detection and attribution research, which demonstrates that climate change is already occurring, that the harmful impacts are manifest and not merely speculative, and that those impacts can be traced, at least in part, to the government defendant's policies and conduct.

There are several interrelated streams of attribution research, specifically: (i) climate change attribution, which examines how human activities are affecting the global climate system; (ii) impact attribution, which examines how changes in the global climate system affect other interconnected natural and human systems; (iii) extreme event attribution, which examines how changes in the global climate system affect the frequency, magnitude, and other characteristics of extreme events; and (iv) source attribution, which examines the relative contributions of different sectors, activities, and entities to global climate change.

The current body of research shows that anthropogenic climate change is already having pervasive impacts across the world, and there is a robust body of evidence linking human-induced changes in the climate system to broad trends such as global atmospheric and marine warming, slow-onset impacts like sea level rise, and heat-related extreme events. The confidence in attribution findings tends to be lower when examining trends and changes at a

[1] For an overview, see, among others, the chapters by César Rodríguez-Garavito (Chapter 1), Ben Batros and Tessa Khan (Chapter 3), and Jolene Lin and Jacqueline Peel (Chapter 9) in this volume.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

smaller geographic or temporal scale, attributing non-heat extreme events, and attributing specific human injuries to climate change.

We have previously written on how attribution research has been used to support claims of causation, injury, and justiciability across a wide range of different types of litigation.[2] In this chapter, we discuss how parties in recent human rights cases are using this research to frame government mitigation and adaptation obligations. These cases provide a vehicle for exploring two issues not addressed in our previous work, specifically the role of attribution science in supporting, or defending against, claims based on (i) violations of community rights, as compared with individual rights; and (ii) failures to adapt, as compared with failures to mitigate.

11.2 PROTECTING INDIVIDUAL AND COLLECTIVE RIGHTS

Most of the human rights proceedings challenging government inaction on climate change have been initiated by groups of individuals and nongovernmental organizations (NGOs) seeking to enforce government obligations with respect to individual rights, such as the rights to life, health, and private and family life.[3] Some of the most recent proceedings deal specifically with the rights of children and women, as individuals in these groups tend to be more

[2] Michael Burger et al., "The Law and Science of Climate Change Attribution" (2020) 45 *Columbia Journal of Environmental Law* 57.

[3] Recent proceedings initiated by individual plaintiffs include: "Sacchi et al. v. Argentina et al.," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/sacchi-et-al-v-argentina-et-al/> (CRC petition); "La Rose v. Her Majesty the Queen," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/la-rose-v-her-majesty-the-queen/> (children's rights); "Maria Khan v. Federation of Pakistan et al.," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/maria-khan-et-al-v-federation-of-pakistan-et-al> (children's and women's rights); "ENVironnement JEUnesse v. Canada," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/environnement-jeunesse-v-canadian-government/> (children's rights); "Kim Yujin et al. v. South Korea," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/kim-yujin-et-al-v-south-korea/> (children's rights); "Family Farmers and Greenpeace Germany v. Germany," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/family-farmers-and-greenpeace-germany-v-german-government>; "Armando Ferrão Carvalho and Others v. The European Parliament and the Council," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/armando-ferrao-carvalho-and-others-v-the-european-parliament-and-the-council/>; "Future Generations v. Ministry of Environment & Others," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/future-generation-v-ministry-environment-others/>. Recent proceedings initiated by NGOs on behalf of individuals include: *Friends of the Irish Environment* v. *Ireland* [2019] IEHC 747, 748 (H. Ct.) (Ir); "Notre Affaire à Tous and Others v. Total," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/notre-affaire-a-tous-and-others-v-total/>; "Friends of the Earth Germany, Association of Solar Supporters, and Others

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

vulnerable to and disproportionately affected by climate change.[4] For example, in *Sacchi* v. *Argentina*, sixteen children filed a petition alleging that Argentina, Brazil, France, Germany, and Turkey have violated their rights under the UN Convention on the Rights of the Child ("CRC") by failing to implement adequate climate change mitigation and adaptation measures.[5]

Various proceedings have also been initiated on behalf of communities that are adversely affected by climate change.[6] These include, for example, a

v. Germany," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/friends-of-the-earth-germany-association-of-solar-supporters-and-others-v-germany/>.

4 See "Sacchi et al. v. Argentina et al.," above note 3; see also "La Rose v. Her Majesty the Queen," above note 3; see also "Maria Khan v. Federation of Pakistan et al.," above note 3; see also "ENVironnement JEUnesse v. Canada," above note 3; see also "Kim Yujin et al. v. South Korea," above note 3.

5 See "Sacchi et al. v. Argentina et al.," above note 3.

6 See, e.g., "Commune de Grande-Synthe v. France," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/commune-de-grande-synthe-v-france/> (case filed by a French municipality on behalf of its residents); see also "Rights of Indigenous People in Addressing Climate-Forced Displacement," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/rights-of-indigenous-people-in-addressing-climate-forced-displacement/> (petition to UN Special Rapporteurs filed by Indigenous communities in the US); "Lho'imggin et al. v. Her Majesty the Queen," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/gagnon-et-al-v-her-majesty-the-queen/> (legal challenge filed by an indigenous group alleging that the Canadian government's approach to climate change has violated their constitutional and human rights); see also "Hearing on Climate Change Before the Inter-American Commission on Human Rights," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/hearing-on-climate-change-before-the-inter-american-commission-on-human-rights/> (on the impacts of climate change on the human rights of Indigenous peoples, women, children, and rural communities); see also "Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations of the Rights of Arctic Athabaskan Peoples Resulting from Rapid Arctic Warming and Melting Caused by Emissions of Black Carbon by Canada," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/petition-inter-american-commission-human-rights-seeking-relief-violations-rights-arctic-athabaskan-peoples-resulting-rapid-arctic-warming-melting-caused-emissions/> (petition alleging that Canada's fragmentary and lax regulations of black carbon emissions threaten the Athabaskan people's human rights, including collective Indigenous rights); see also "Petition To The Inter-American Commission on Human Rights Seeking Relief From Violations Resulting from Global Warming Caused By Acts and Omissions of the United States," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/petition-to-the-inter-american-commission-on-human-rights-seeking-relief-from-violations-resulting-from-global-warming-caused-by-acts-and-omissions-of-the-united-states/> (petition seeking to hold the United States accountable for violations of individual and collective rights of Indigenous peoples arising from contributions to climate change); see also "A Request for an Advisory Opinion from the Inter-American Court of Human Rights Concerning the Interpretation of Article 1(1), 4(1) and 5(1) of the American Convention on Human Rights," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/request-advisory-opinion-inter-american-court-human-rights-concerning-interpretation-article-11-41-51-american-convention-human-rights/>

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

complaint submitted on behalf of five tribes in the United States asking UN Special Rapporteurs to investigate and issue recommendations on the obligations of federal and state governments to address forced displacement as a result of climate change,[7] a Canadian lawsuit filed by members of an Indigenous group alleging that the Canadian government's approach to climate change has violated their constitutional and human rights,[8] and a lawsuit initiated by a French municipality against the French government for its failure to take meaningful action on climate change.[9] While all three proceedings deal with community-level impacts and the obligations of governments with respect to communities, the petition to the UN Special Rapporteurs specifically alleges violations of collective rights of Indigenous communities – specifically those laid out in the UN Declaration on the Rights of Indigenous Peoples, the UN Guiding Principles on Internal Displacement, the Pinheiro Principles, and the Peninsula Principles.[10] In particular, that petition alleges violations of the tribes' collective rights to self-determination, cultural heritage, subsistence and food security, safe drinking water, physical and mental health, and an adequate standard of living.[11]

One potential advantage of community petitions – particularly those based on collective rights – is that it may be easier to prove that climate change is causing damage at the community scale as compared with the individual scale. This is because evidence of attribution tends to be more robust when looking at impacts on a broader geographic and temporal scale, for example, when looking at impacts on Indigenous land holdings and natural resources. Moreover, for extreme events, attribution research has shown that climate change increases the frequency and/or severity of many types of events, but the research is not always able to draw firm conclusions as to whether climate change caused or contributed to a specific event. When dealing with event frequencies and probabilities, the bigger the area and longer the time frame, the larger the climate signal. And when dealing with impacts, the greater the number of people impacted, the easier it is to establish a causal connection to the events.

(discussing the linkages between tribal and Indigenous rights and the right to a clean environment).

7 See "Rights of Indigenous People in Addressing Climate-Forced Displacement," above note 6.

8 See "Lho'imggin et al. v. Her Majesty the Queen," above note 6.

9 See "Commune de Grande-Synthe v. France," above note 6.

10 G.A. Res. 61/295, UN Declaration on the Rights of Indigenous Peoples, September 13, 2007.

11 See "Rights of Indigenous People in Addressing Climate-Forced Displacement," above note 6. *Sacchi et al. v. Argentina et al.* also involved alleged violations of the rights of Indigenous youth plaintiffs, but the lawsuit focuses on harms to the individual plaintiffs.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

For example, the IPCC has expressed high- and medium-confidence in research linking climate change to increases in the frequency and severity of wildfires in certain regions,[12] and recent studies have been able to quantify the impacts of climate change on the 2017 wildfire season in Canada[13] and the 2019/2020 wildfire season in Australia.[14] It is arguably more difficult to ascertain the effects of climate change on the characteristics of a specific wildfire and individual harm arising from that fire – there are many confounding factors, such as fire suppression and fuel loading, which complicate the causation analysis at this level of granularity.[15] Thus, an individual claimant may have a tougher time proving that personal injury from a fire, such as loss of property or life, can be attributed to climate change (i.e., that it would not have occurred in the absence of anthropogenic influence on climate). However, an Indigenous community could more readily prove that its collective rights to self-determination and "the conservation and protection of the environment and the productive capacity of their lands or territories and resources"[16] have been adversely affected by a regional increase in wildfire frequency and/or severity over time.

There are ways to overcome downscaling challenges in proceedings that involve individual rights. Many jurisdictions allow NGOs to file petitions on behalf of the public interest or large groups of individuals; and in such proceedings, it is generally sufficient to show that there is actual harm or a genuine threat of harm to the group as a whole without proving harm to any specific individual. For example, in *Urgenda* v. *Netherlands*, a case brought by the NGO Urgenda on behalf of Dutch citizens, the Dutch Supreme Court

[12] See Maximillian Auffhammer et al., "Detection and Attribution of Observed Impacts," in C. B. Fields et al. (eds.), *Climate Change 2014: Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Impacts. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2014), pp. 1005–6.

[13] See M. C. Kirchmeier-Young et al., "Attribution of the Influence of Human-Induced Climate Change on an Extreme Fire Season" (2018) 7 *Earth's Future* 2 (using an event attribution method and a large ensemble of regional climate model simulations, the authors found that the high fire weather/behavior metrics were made two to four times more likely and that anthropogenic climate change increased the area burned by a factor of seven to eleven).

[14] See Greet Jan van Oldenborgh et al., "Attribution of the Australian bushfire risk to anthropogenic climate change" (2021) 21 *Natural Hazards and Earth System Sciences* 941 (finding that the probability of conditions giving rise to fires increased by at least thirty percent since 1900 as a result of anthropogenic climate change).

[15] Confounding factors must be addressed at all levels of attribution research, but it is easier to account for these factors through statistical analysis when looking at impacts on a broader regional and temporal scale.

[16] UN Declaration on the Rights of Indigenous Peoples, above note 10 at art. 29.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

found sufficient evidence of harm where it was "clearly plausible that the current generation of Dutch nationals, in particular but not limited to the younger individuals in this group, will have to deal with the adverse effects of climate change in their lifetime if global emissions of greenhouse gases are not adequately reduced."[17] Petitioners can thus rely on the statistical probability of harm across broad segments of the population to support their claims in such cases.[18]

For proceedings brought on behalf of smaller groups of named individuals, such as the CRC petition, it may be necessary to show that one or more of the named petitioners is harmed or at imminent risk of harm as a result of climate change. The CRC petition focuses on the general impacts of climate change on children, but it also discusses the specific experiences of named petitioners with respect to (i) extreme events such as floods, windstorms, wildfires, heat waves, and droughts; (ii) impacts on "the subsistence way of life" for children from Indigenous tribes; and (iii) increased exposure to diseases such as malaria and dengue fever.[19] This case is similar to that of *Juliana* v. *United States*, where youth plaintiffs alleged that the US government violated their constitutional rights by failing to take adequate action on climate change, citing impacts such as lost income on a family farm, lost income at a ski resort, and asthma attacks from the increased frequency of forest fires.[20] The Ninth Circuit Court of Appeals found that the alleged harms were sufficiently concrete and particularized to survive summary judgment, but it dismissed the case on other grounds, and so there was no decision on the adequacy of the evidence presented to support these claims.[21]

The government respondents in the CRC proceeding have argued that the petitioners only alleged generalized harms and failed to substantiate their

[17] Hoge Raad 13 january 2020 (Urgenda/Netherlands) (Neth.), ¶4.7, <http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/non-us-case-documents/2020/20200113_2015-HAZA-C0900456689_judgment.pdf>.

[18] A similar approach has been used to establish standing in some US cases. See, e.g., *NRDC* v. *EPA*, 464 F.3d 1 (D.C. Cir. 2006) (granting standing to the NRDC as a member organization based on the probability that at least one of its members would be injured by pollution); see also *NRDC* v. *Wheeler*, 955 F.3d 68 (D.C. Cir 2020) (granting standing to NRDC and the state of New York based on the risk of climate-related harm to coastal assets).

[19] See Communication to the UN Committee on the Rights of the Child, *Sacchi et al.* v. *Argentina et al.*, ¶¶5–10, September 23, 2019, <http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/non-us-case-documents/2019/20190923_Not-available_petition-1.pdf>.

[20] See *Juliana* v. *United States*, 217 F. Supp. 3d 1224 (D. Or. 2016) (First Amendment Complaint for Declaratory and Injunctive Relief), ¶¶ 23–28, 38, 46.

[21] Note that in *Massachusetts* v. *EPA*, the fact that the state represented the aggregate interests of citizens helped it build a strong case for injury.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

claims of individual injury.[22] (Similar arguments were made by the government defendants in *Juliana*.) This raises an important question about whether and under what circumstances claimants can draw reasonable inferences about individual harm based on regional or community-level impacts. Arguably, such inferences would be more credible where (i) the impact on the individual cannot be fully explained by other factors, and (ii) there are no other tools or data available that would provide stronger proof of the causal nexus between the regional/community-scale impact and individual harm. Consider a petitioner who alleges that her asthma has been exacerbated by the increase in wildfire smoke caused by climate change: she could submit medical documentation of her asthma diagnosis and evidence that wildfires are more frequent due to climate change and then infer that her asthma is (or will be) exacerbated by the wildfire smoke. But her argument would be strengthened if she also submitted medical documentation showing that her asthma was, in fact, exacerbated at the time of the wildfires. Granted, this level of proof is not required in all cases: legal standards and evidentiary requirements will vary depending on the tribunal and claims raised, and it may be unnecessary to prove individual harm with such precision in rights-based cases, particularly those involving communities and the public at large.

Ultimately, there are other factors that may have a greater influence on the evidentiary strength of claims than the question of whether plaintiffs are seeking to defend collective or individual rights. For example, the nature of the alleged injuries is important: an individual that is forced to leave their home due to a long-term trend in sea level rise could potentially establish a more robust causal connection between their injuries and climate change than a community that experienced losses due to a single extreme event. Attribution research is also constantly evolving, particularly with regards to advances in extreme event and impact attribution, and this will likely give greater confidence to statements about attribution of individual harm in future years. Nonetheless, even at this time, many impacts at both the community and individual levels can be attributed to climate change with high confidence, and fairly robust claims can be made about the statistical

[22] The government responses in the CRC proceeding are being kept confidential. Our summary of the governments' arguments are based on the Petitioners' Reply to those arguments; see *UN Committee on the Rights of the Child, Sacchi et al.* v. *Argentina et al.*, Petitioners' Reply to the Admissibility Objections of Brazil, France, and Germany, May 4, 2020, <http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/non-us-case-documents/2020/20200504_Not-available_reply.pdf>.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

probability of harm across large groups, broader geographic areas, and longer time frames.[23]

11.3 ADDRESSING MITIGATION AND ADAPTATION OBLIGATIONS

There are at least two types of government obligations that may be the focus of a human rights petition: (i) the obligation to mitigate GHG emissions and other contributions to climate change and (ii) the obligation to adapt to the impacts of climate change.[24] Almost all of the human rights petitions filed to date have cited government failures to mitigate emissions as the primary basis for legal action.[25] Some of these petitions include allegations of inadequate adaptation measures putting people at risk of harm, but these allegations are typically a small part of the overall case. There are a few petitions where adaptation obligations have featured more prominently alongside mitigation obligations or where they were the sole basis for the legal claim.[26] The US tribal petition to the UN Special Rapporteurs is an example of the latter, as it deals exclusively with the obligations of government actors to address the effects of climate-forced displacement on tribes residing on the coastlines of Louisiana and Alaska.[27]

Both types of claims fall under the same human rights instruments and therefore share common legal elements: petitioners must show that the government has a legal obligation to protect human rights and that it has breached this obligation by undertaking a course of action (or inaction) that has interfered and/or foreseeably will interfere with the petitioners' fundamental rights. Thus, similar to a tort claim, petitioners must prove the existence of

[23] One example of a "high confidence" impact is sea level rise, which clearly poses a risk to coastal property even when accounting for confounding factors such as subsidence and erosion. For a more detailed discussion of impacts and confidence levels, see Burger et al., "The Law and Science of Climate Change Attribution," above note 2 at Part II.

[24] See "Climate Change and Human Rights" (2015) UN Environment Programme.

[25] See, e.g., "Sacchi et al. v. Argentina et al.," above note 3; see also "La Rose v. Her Majesty the Queen," above note 3; see also "Maria Khan v. Federation of Pakistan et al.," above note 3; see also "ENVironnement JEUnesse v. Canada," above note 3; "Family Farmers and Greenpeace Germany v. Germany," above note 3; "Armando Ferrão Carvalho and Others v. The European Parliament and the Council," above note 3; *Friends of the Irish Environment* v. *Ireland*, above note 3; "Notre Affaire à Tous and Others v. Total," above note 3; "Friends of the Earth Germany, Association of Solar Supporters, and Others v. Germany," above note 3; see also "Lho'imggin et al. v. Her Majesty the Queen," above note 6; see "Commune de Grande-Synthe v. France," above note 6.

[26] See, e.g., "Future Generations v. Ministry of Environment & Others," above note 3; see also "Leghari v. Pakistan," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/ashgar-leghari-v-federation-of-pakistan/>; see also "Rights of Indigenous People in Addressing Climate-Forced Displacement," above note 6.

[27] See "Rights of Indigenous People in Addressing Climate-Forced Displacement," above note 6.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

the obligation, a breach, an actual or prospective injury, and causation.[28] However, the evidence required to support these elements differs considerably depending on which obligation is at stake.[29]

11.3.1 *Failures to Mitigate*

For a failure-to-mitigate claim, petitioners must show that they have been injured or are at imminent risk of injury due to the impacts of climate change and that the defendant (typically a government actor)[30] contributed to that injury because it failed to control GHG emissions at adequate levels or regulate other activities that cause climate change (e.g., deforestation). Such claims implicate the full scope of attribution science:

- Climate change attribution research provides the foundation for these petitions, as it establishes the link between human activities and changes in the earth's climate system.
- Impact and extreme event attribution research establishes the link between petitioner's injury and global climate change.
- Source attribution research establishes the link between the defendant's conduct and global climate change.

The primary role of attribution science in failure-to-mitigate claims involving government defendants is therefore to establish a causal chain between

[28] These elements are closely intertwined and not always treated as separate elements in case documents and decisions (e.g., whether the government has breached its obligation depends on whether its actions will cause injury to human rights). Nonetheless, delineating these elements helps to illustrate how different types of attribution science factor into the resolution of these cases.

[29] Foreseeability of harm may also be treated as a separate element in some cases. In the failure-to-mitigate context, the focus is typically on the objective likelihood of harm at the time of the case (i.e., is there reasonable certainty that the government's failure to control emissions will continue to cause harm if the court does not intervene) and so questions about foreseeability are wrapped up in the analysis of injury and causation. But in the failure-to-adapt context, it may be necessary to show that the government ignored foreseeable risks at some point in the past, in which case the question of foreseeability is separate from the question of whether future harm is probable. See discussion in Section 11.2.

[30] Failure-to-mitigate claims have also been filed against private companies, including several cases involving rights-based claims. See, e.g., "Milieu et al. v. Royal Dutch Shell plc.," Sabin Center For Climate Change Law, <http://climatecasechart.com/non-us-case/milieudefensie-et-al-v-royal-dutch-shell-plc/>; see also "Youth Verdict v. Waratah Coal," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/youth-verdict-v-waratah-coal/>; see also "Citizens' Committee on the Kobe Coal-Fired Power Plant v. Kobe Steel Ltd.," Sabin Center for Climate Change Law, <http://climatecasechart.com/non-us-case/citizens-committee-on-the-kobe-coal-fired-power-plant-v-kobe-steel-ltd-et-al/>.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

government conduct and observed impacts of climate change. However, attribution research can also be used in conjunction with forward-looking climate models and projections to strengthen arguments about the likelihood or foreseeability of future harm.

Petitioners have had some success with these types of claims: to date, there have been three major decisions – in the Netherlands, Pakistan, and Colombia – finding that governments violated human rights by failing to undertake adequate measures for the control of GHG emissions at a national scale.[31] But there are also rights-based petitions that have been dismissed, primarily as a result of concerns about separation of powers and judicial overreach.[32] For some cases that were dismissed due to lack of standing, tribunals questioned the evidentiary basis of claims – for example, finding that petitioners could not establish an adequate causal nexus between the government conduct and harm where there were so many other sources that contributed to climate change – but these decisions were issued prior to a full evidentiary trial and were based on legal principles rather than judicial review of scientific evidence.[33] In fact, despite the dismissals, there is growing evidence of a "judicial consensus on climate science" in which "vast judicial agreement exists on the causes, extent, urgency, and consequences of climate change."[34]

Even with that consensus, petitioners will have to establish government responsibility for climate-related injuries in each case. Source attribution, in particular, may prove complicated. In a failure-to-mitigate case, petitioners must show that government policies are contributing to climate change (e.g., through direct emissions, fossil fuel exports, deforestation, or failure to adequately engage in international climate negotiations) and that this contribution is unreasonable in light of current knowledge on climate change.[35]

[31] See "Future Generations v. Ministry of Environment & Others," above note 3; see also "Leghari v. Pakistan," above note 26; see also *Urgenda*, above note 17.

[32] See Burger et al., "The Law and Science of Climate Change Attribution"; see also Maria L. Banda, "Climate Science in the Courts: A Review of U.S. and International Judicial Pronouncements" (2020) Environmental Law Institute, <https://www.eli.org/sites/default/files/eli-pubs/banda-final-4-21-2020.pdf>; see also "Union of Swiss Senior Women for Climate Protection v. Swiss Federal Council and Others," Sabin Center for Climate Law, <http://climatecasechart.com/non-us-case/union-of-swiss-senior-women-for-climate-protection-v-swiss-federal-parliament/>.

[33] See, e.g., *Juliana*, 217 F. Supp. 3d at 1224; see also "Union of Swiss Senior Women for Climate Protection v. Swiss Federal Council and Others," above note 32; see also "Armando Ferrão Carvalho and Others v. The European Parliament and the Council," above note 3.

[34] See Banda, "Climate Science in the Courts," above note 32 at 2.

[35] See, e.g., *Urgenda*, above note 17 (focusing on emissions and carbon budgets); see also "Leghari v. Pakistan," above note 26 (focusing on the implementation of existing

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

Whether government conduct is "unreasonable" may depend on the historical and projected emissions impact that can be attributed to government policies, whether current policies will generate emission reductions in line with international and/or scientific consensus at the pace at which emissions must be reduced to avert catastrophic climate change (i.e., global and national carbon budgets), whether the government is adhering to international or domestic mitigation commitments, and whether the government is using "all available measures to stop the climate crises."[36]

This raises several questions for parties and tribunals: (i) how does one calculate the emissions attributable to government conduct; (ii) is it reasonable to conclude that any emissions contribution will contribute to human rights violations arising from climate change impacts, or do emissions need to cross some threshold of materiality in order to be linked to impacts;[37] and (iii) how does one ascertain whether the contribution is unreasonable? Source attribution research provides data to help answer these questions – for example, by estimating national emission contributions based on different types of accounting methodologies[38] – but the research cannot provide a definitive answer to normative questions, such as which accounting methodologies are appropriate for use in legal proceedings and what constitutes a "material" or "unreasonable" contribution.[39]

commitments); see also "Sacchi et al. v. Argentina et al.," above note 3 at ¶¶203–36 (illustrating how government obligations can be framed with reference to both domestic emissions and participation in international agreements).

[36] "Sacchi et al. v. Argentina et al.," above note 3 at ¶29. Note that the precise language regarding the government's positive obligation to stop climate change will vary depending on the human rights instrument at issue.

[37] See, e.g, "Sacchi et al. v. Argentina et al.," above note 3 at ¶30. The question of whether emissions impact crosses a threshold of materiality may also appear in cases involving smaller-scale actions, such as specific fossil fuel licensing decisions. See, e.g., *Föreningen Greenpeace Norden* v. *Norway*, 18-060499ASD-BORG/3 at 20 (23.01.2020) (Borgarting Lagmannsrett), <http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/non-us-case-documents/2020/20200123_HR-2020-846-J_judgment.pdf> (dismissing petition that sought to enjoin oil and gas licenses because: "[n]either with respect to emissions from combustion after export is it possible to know what emissions the decision will entail, and in any event these will be marginal from a global perspective."). The question of whether the emissions impact is a "material" or "substantial" contribution to climate change has also arisen in tort cases and rights-based cases involving atmospheric trust claims in the United States. See Burger et al., "The Law and Science of Climate Change Attribution," above note 2 at 201, 229.

[38] Emissions accounting methodologies may vary depending on the accounting timeframe (e.g., historical/cumulative vs. current emissions) and scope (e.g., territorial vs. consumption vs. extraction emissions). See Burger et al., "The Law and Science of Climate Change Attribution," above note 2 at 135.

[39] Source and impact attribution research can be used in conjunction to make arguments about what constitutes a "material" contribution – for example, petitioners could seek to quantify the

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

Source attribution research can also cut both ways, potentially supporting defendants' claims. Most government defendants can point to the fact that emissions attributable to their policies are relatively small in comparison to overall global emissions or the contributions of countries like China and the United States. However, even contributions that appear small when presented as a proportion of global emissions (e.g., 1 percent of global emissions) can nonetheless have a substantial impact on human rights due to the breadth and magnitude of climate change impacts.[40]

Existing case law and interpretations of human rights law also indicate that governments have an obligation to mitigate their contributions to climate change regardless of whether other actors are contributing to the problem. As noted by the petitioners in the CRC proceeding, the International Court of Justice (ICJ) has explicitly rejected the "others do it too" defense, and the International Law Commission (ILC) has issued guidance clarifying that, where multiple states have contributed to an environmental harm, "the responsibility of each participating State is determined individually, on the basis of its own conduct and by reference to its own international obligations."[41]

11.3.2 *Failures to Adapt*

For a failure-to-adapt claim, petitioners must show that they have suffered or will suffer injury due to events that are foreseeable in light of climate change and climate variability and that the government either (i) failed to take reasonable measures to protect petitioners' rights in the face of foreseeable risks (breach of an affirmative obligation) or (ii) undertook a course of action that exacerbated the risks, for example, by increasing the magnitude of

effect of an emissions contribution on sea level rise using existing research – but there is a normative aspect to thresholds of materiality and unreasonableness that is beyond the scope of attribution science.

[40] E.g., the Dutch government was found to have breached human rights obligations due to emissions impacts in *Urgenda*, and the Netherlands' share of global cumulative CO_2 emissions was 0.72 percent as of 2017. See Hannah Ritchie and Max Roser, "CO_2 and Greenhouse Gas Emissions," Our World in Data, <https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions>. Moreover, the emissions at issue in the case were only a proportion of total national emissions (specifically, those attributable to the government's failure to implement a policy aimed at reducing emissions 25 percent over 1990 levels by 2020).

[41] See International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, with Commentaries, art. 47 at 124–25; cmt 8 at 129 (2001); see also *Case Concerning Certain Phosphate Lands in Nauru* (Nauru v. Austl.), 1992 I.C.J. 240, 258-59, 262 (June 26).

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

harmful impacts or increasing exposure to risk (breach of a negative obligation).[42]

In some cases, petitioners may raise both types of claims. For example, the US tribal petition to the UN Special Rapporteurs alleges that the US government and the state governments of Louisiana and Alaska violated the collective and individual rights of Indigenous tribes by (i) undertaking maladaptive activities that contributed to coastal erosion, land loss, and flooding along the coastlines where the tribes reside, thus exacerbating the effects of sea level rise and extreme storms; and (ii) failing to take affirmative measures to protect the tribes from sea level rise, extreme storms, and land loss and, in particular, failing to implement a "relocation governance framework" for these tribes.[43] Because petitioners do not need to prove that the government defendant caused or contributed to climate change in a failure-to-adapt case, the causation analysis is quite different from that in failure-to-mitigate cases. Petitioners need not grapple with questions about source attribution or related defenses. Instead, the focus is on the reasonableness of the government's response to climate change (or lack thereof), which is based, at least in part, on the foreseeability of climate impacts.[44]

The causation analysis also differs in failure-to-adapt claims because petitioners do not need to prove that the specific event or impact giving rise to their injury was actually caused by climate change. It should be sufficient to show that the type of impact or event was or is a foreseeable consequence of climate change.[45]

While the causation analysis in failure-to-adapt cases is somewhat simplified, source attribution research may still factor into these cases as a defense. Specifically, defendants may argue that human activities giving rise to climate change are the proximate cause of the injury and that a government cannot be held liable for failing to prevent harm caused by others. However, as discussed below, human rights case law suggests that government defendants have obligations to prevent known risks associated with both natural and man-made disasters, and so the fact that other parties are also responsible for creating hazards that interfere with human rights does not relieve

[42] See "Climate Change and Human Rights," above note 24 at §§1.2, 2.2.(b)(i), & 2.2.(b)(v).

[43] See "Rights of Indigenous People in Addressing Climate-Forced Displacement," above note 6.

[44] Examples of other factors relevant to this determination include the cost, efficacy, and feasibility of undertaking the adaptation measures sought by petitioners.

[45] See discussion of ECtHR cases above (showing that governments have an obligation to prepare for foreseeable hazards, including climatological events, regardless of whether such events can be definitively linked to climate change).

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

governments of their obligations to take reasonable measures to address that interference.

There is some precedent for failure-to-adapt claims in human rights case law. The European Court of Human Rights (ECtHR) has issued several decisions that provide some insight on the nature of a state's positive obligation to protect the right to life in the context of natural disasters. In *Budayeva and Others* v. *Russia*, the ECtHR determined that Russian authorities had violated the right to life when those authorities knew that there was a risk of a mudslide but did not implement land planning and emergency relief policies or adequately inform the public about the risk, and eight citizens died as a result of the mudslide.[46] Similarly, in *Kolyadenko* v. *Russia*, the ECtHR determined that Russian authorities violated the rights to life, respect for private and family life, and protection of property when they released a large amount of water from a reservoir during an exceptionally heavy rain event, thus causing a flash flood immediately downstream of the reservoir.[47] Notably, the court did not find that authorities were negligent in their operation of the dam at the time of the flood – rather, the problem was that the government authorities (i) knew for many years that such an event was foreseeable and failed to take action to mitigate the risk, (ii) failed to adopt planning restrictions and take other necessary steps to protect people living downstream of the reservoir, and (iii) did not take all possible measures to alert residents of the risks prior to or during the storm.

There are also a number of human rights decisions affirming that governments have a positive obligation to protect citizens from other environmental hazards that threaten human rights, including wholly man-made hazards. For example, in *Öneryildiz* v. *Turkey*, the ECtHR found that the government of Turkey had violated the rights to life and property arising from a methane explosion at a landfill when governmental authorities knew of the risk of explosion but failed to issue any regulations or take measures to mitigate that risk.[48]

These ECtHR decisions show that human rights law imposes positive obligations on governments to mitigate risks as well as negative obligations not to infringe upon human rights.

[46] See *Budayeva and Others* v. *Russia*, App. Nos. 15339/02, 21155/02, 20058/02, 11673/02 and 1543/02, Eur. Ct. H.R. (March 20, 2008).

[47] See *Kolyadenko and Others* v. *Russia*, Eur. Ct. H.R. (Judgment, February 28, 2012), <https://hudoc.echr.coe.int/sites/eng/pages/search.aspx?i=001-109283>.

[48] See *Öneryildiz* v. *Turkey*, Eur. Ct. H.R. (Judgment, 2004) at 1, <https://hudoc.echr.coe.int/fre#{%22itemid%22:[%22003-1204313-1251361%22]}>.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

There are also now two decisions in Colombia and Pakistan in which courts have found that governments have an obligation to undertake adaptation measures in order to protect fundamental human rights, such as the rights to life and environmental welfare.[49] In addition, the Inter-American Court on Human Rights (IACHR) has held that governments have a positive obligation to prevent foreseeable environmental harms arising from their conduct, which could provide a basis for relief where governments undertake maladaptive measures that increase environmental risks associated with climate change.[50] Thus, although the overall body of case law on adaptation obligations and human rights is relatively small, there is reason to be optimistic about the justiciability and outcomes of future cases.

One common element in the ECtHR disaster cases was that the human rights violations were rooted in governmental failures to address foreseeable risks. The governments were aware (or should have been aware) of the likelihood of the disaster occurring as well as the likelihood that people would be exposed to harm as a result of the disaster. Thus, in the failure-to-adapt context, petitioners may need to show that both the climate event and the resulting injury were foreseeable. One potential complication here is that there may be contexts in which unforeseeable injuries arise from foreseeable climate impacts due to confounding factors. The tribal petition addresses confounding factors by characterizing the unlawful government conduct broadly, as encompassing both federal and state maladaptive planning decisions (e.g., those pertaining to oil and gas development on coastlines) and failures to take affirmative adaptation measures.[51]

Such questions about the foreseeability of past injury will not feature prominently in all adaptation cases. Where petitioners are primarily challenging the inadequacy of national adaptation policies and seeking improvement to or implementation of those policies as the primary remedy, it is unnecessary for a tribunal to determine whether a particular climate-related risk was foreseeable to the government based on information that was available at some point in the past. Rather, the relevant inquiry is whether future harm is likely to occur as a result of the policy failure – a question that relates primarily to the causation and injury analysis.

[49] See "Future Generations v. Ministry of Environment & Others," above note 3; see also "Leghari v. Pakistan," above note 26.

[50] See *The Environment & Human Rights*, Advisory Opinion OC-23/17, Inter-Am. Ct. H.R. (ser. A), No. 23, <http://www.corteidh.or.cr/docs/opiniones/seriea_23_esp.pdf>.

[51] See "Rights of Indigenous People in Addressing Climate-Forced Displacement," above note 6.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015

In sum: attribution research is relevant to failure-to-adapt claims insofar as it can be used to evaluate (i) whether the impacts of climate change pose a "reasonably foreseeable" risk to human rights, necessitating a proactive government response to safeguard those rights; and (ii) whether prior government actions, such as decisions about coastal planning or flood management, were maladaptive because they failed to account for this reasonably foreseeable risk. However, attribution research likely will not feature as prominently in these cases as in failure-to-mitigate cases due to the greater focus on source attribution and contributions to climate change as the basis of government responsibility. Also, in failure-to-adapt cases involving governments' positive obligations to plan for future climate impacts, forward-looking climate projections may play a bigger role in establishing the foreseeability of harm.

11.4 CONCLUSION

Attribution research plays an integral role in the development and interpretation of legal claims involving human rights, government obligations, and climate change. As detailed in this chapter, the overall body of research is already fairly robust and capable of supporting claims brought on behalf of both communities and individuals, as well as claims related to both mitigation and adaptation obligations. There are still gaps and limitations in the research, but it does not appear that scientific constraints have posed or will pose a major impediment to rights-based litigation. The body of case law is still relatively small, and many petitions are currently underway. Scientific debates may factor more prominently in future trials, particularly those involving the rights of small groups of individuals as opposed to communities or the public interest at large, and novel scientific questions may arise in both the failure-to-mitigate and failure-to-adapt contexts. At the same time, the scope of the research is expanding, and the techniques used are being refined. We can expect that the evidentiary basis for rights-based climate litigation will become increasingly robust in the years to come.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 18 Nov 2026 at 01:57:04, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009106214.015