

Climate Change in Court

Making Neighbourly Relations in a Warming World

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Figure 1: Saúl Luciano Lliuya in the Andes (Photo: Alexander Luna/Yuraq Janka, used with permission)

‘Whether we win or lose, it doesn’t really matter; I think we already won.’

Peruvian farmer Saúl Luciano Lliuya on the lawsuit against German energy giant RWE,
September 2018

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Abstract

Climate Change in Court: Making Neighbourly Relations in a Warming World

The University of Manchester, School of Social Sciences, Social Anthropology

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Doctor of Philosophy in the Faculty of Humanities, 2020

In a ground-breaking lawsuit, the Peruvian farmer Saúl Luciano Lliuya took the German energy giant RWE to court over its contribution to climate change impacts in the Andes. With support from German climate activists, Saúl seeks to establish a legal precedent to hold greenhouse gas emitters responsible. Based on 20 months of ethnographic fieldwork in the Peruvian Andes, German courts, and at UN Summits, this study traces how the claim configures climate change in terms of neighbourly relations and examines the legal and moral notions of responsibility at stake. Taking analytical inspiration from the legal argumentation, I develop an ethnographic approach to studying climate change that focuses on neighbourly relations. While climate change is an overwhelming process enveloping the entire planet, many people grasp its significance in terms of the relations it creates between those who have polluted the atmosphere and those who now face devastating environmental transformations. The legal conception of neighbourliness provides the analytical cornerstone for an ethnographically grounded understanding of climate change that foregrounds the ethical relations at stake and provides a framework to study power relations and climate politics in action.

While the judicial framework restricts involvement to legally recognised persons such as Saúl and RWE, I show how other potential actors including Andean earth beings might also have a stake in climate change discussions. I unpick how legal arguments about causality strategically deploy scientific evidence. During judicial proceedings, lawyers and judges expressed their awareness that the case concerned much more than the relation between Saúl and RWE. Scientific climate change models become ethically and politically charged as they provide the foundation for causal responsibility arguments. Returning to the Peruvian Andes, I examine how people engage the changing environment as a powerful, sentient force, yet such perspectives are absent from scientific and legal accounts. Finally, I reflect on the implications of this neighbourly approach to climate change for law, climate politics, and anthropological practice.

This thesis contributes to discussions in anthropology, socio-legal studies, and STS concerning climate change, climate litigation, environmental claim-making, and cosmopolitics. Climate litigation provides a valuable opportunity for an ethnographically grounded analysis of social relations in times of global warming. This study highlights the value-laden nature of climate science while also uncovering other knowledges and ways of being at stake in contemporary concerns about climate change.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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Glossary and Acronyms

Germanwatch	German environmental NGO backing the lawsuit between Saúl and RWE
Glacier Authority	Glacier and Lake Evaluation Area (<i>Área de Evaluación de Glaciares y Lagunas</i>); governmental monitoring agency in Huaraz
GLOF	Glacial lake outburst flood
INAIGEM	National Institute for Glaciology and Mountain Ecosystems (<i>Instituto Nacional de Investigación en Glaciares y Ecosistemas de Montaña</i>); governmental research institute in Huaraz
IPCC	Intergovernmental Panel on Climate Change; United Nations body for climate science
NGO	Non-governmental organisation
RWE	Major German energy corporation founded in 1898; known as Rheinisch-Westfälisches Elektrizitätswerk (Rhenish-Westphalian Electricity Works) until 1990
STS	Science and technology studies
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

Key characters

Note: the names of publicly known people have not been changed. This includes several prominent characters with a role in the lawsuit between Saúl and RWE. Other names have been changed to preserve anonymity.

Elías (name changed)	Foreman of the glacial lake safety project at Palcacocha
Fernando (name changed)	Engineer overseeing the glacial lake safety project at Palcacocha
Klaus Milke	Co-founder and former chairman of the board at Germanwatch
Mariano (name changed)	Government-employed engineer involved in glacial lake monitoring in the Cordillera Blanca
Martín (name changed)	Worker at the glacial lake safety project at Palcacocha
Dr. Roda Verheyen	Environmental lawyer representing Saúl Luciano Lliuya
Dr. Rolf Meyer	Head judge in the trial of Luciano Lliuya v. RWE at the Upper State Court in Hamm
Saúl Luciano Lliuya	Plaintiff in the case of Luciano Lliuya v. RWE

[Introduction] *Is that just?*

‘A case like this would not exist in the industrialised world,’ explained Judge Rolf Meyer. He headed a panel of three judges at the Upper State Court in Hamm that was hearing a historic legal case: a Peruvian farmer named Saúl Luciano Lliuya had sued the German energy company RWE over its contribution to climate change impacts in the Andes. RWE had no operations in Peru but had produced a substantial amount of emissions through operating coal-fired power plants in Germany and various other countries for over a century. On the other side of the world, Saúl Luciano Lliuya came from a Quechua-speaking family in the Cordillera Blanca region of the Peruvian Andes. He lived in a community of small-scale farmers that worried about increasingly dramatic changes they witnessed in the mountain environment. Saúl worked as a mountain climbing guide, bringing him into contact with glaciers that were rapidly shrinking. In the long run, many were concerned about water scarcity. In the short term, there could be too much water: glacial retreat had caused mountain lakes to grow, raising the risk of flooding for downstream communities. Saúl owned a house that lay below Lake Palcacocha, which scientists had described as particularly dangerous. In the German courtroom, Saúl sought to hold RWE liable for its contribution to flood risk in Peru and make the company contribute around US\$20,000 to a government project to stabilise the lake.

‘In a place like Germany,’ Judge Meyer stated, ‘this problem would be solved immediately by building a dam or implementing other necessary measures.’ He glanced around the courtroom, a large, bright hall with ceiling-high windows facing a park. To his left sat Saúl with his two lawyers who were delighted that the case appeared to be achieving unexpected success. Saúl followed the proceedings in Spanish via a court-appointed interpreter. Long discussions of legal technicalities had left him confused, yet he was happy that the judges were taking the case seriously. Across from them sat RWE’s legal team – five middle-aged men in dark suits, visibly annoyed by the judge’s statements. Looking on was an audience of about 75 people, primarily climate activists and journalists. It was November 2017, two years after Saúl filed the lawsuit against RWE with support from the German non-governmental organisation (NGO) Germanwatch.

The case had begun with an unlikely encounter: in 2014, following a United Nations (UN) Climate Summit in Lima, a Germanwatch team travelled to the Cordillera Blanca region in the Peruvian Andes. The area has faced accelerated glacial retreat in recent decades, making

it an international climate change hotspot. Saúl had grown increasingly concerned about these changes which threatened to undermine his community's agricultural livelihood. He became familiar with the discourses of global climate change through the media and discussions with foreign mountain climbing tourists. He came to recognise that Peruvians like himself were not to blame for the changes, but rather wealthy countries and large companies that had caused most global greenhouse gas emissions.

Saúl met the group of German climate activists through a mutual friend. They had been part of international efforts to develop legal tools for addressing climate change. Political negotiations at the UN were faltering, and they sought to place pressure on industry and governments to take action. So far, no lawsuit had successfully held a company or country liable for their contribution to climate change. After extended discussions, the German activists offered Saúl the possibility to act on his concerns and make a claim against a major European emitter. In 2015, Saúl first travelled to Germany and submitted the lawsuit against RWE.

Earlier during the hearing in 2017, Judge Meyer elaborated the court's opinion that the case was legally admissible, meaning the court could rule in Saúl's favour if it saw sufficient evidence linking RWE's operations to glacial flood risk in Peru. RWE's lawyers had quickly rebuffed the judge's suggestion for an out-of-court settlement, arguing that this was a matter of precedent. For the climate activists at Germanwatch that had gathered donations to organise the lawsuit, this was a legal test case: could German law be used to hold major corporations liable for their contribution to climate change? Similar cases in other jurisdictions had failed,¹ but climate science was evolving rapidly, improving the evidentiary basis for proving a causal link between emitters and impacts. This case addressed what many see as a significant inequity of climate change: while the majority of emissions has been produced in wealthy countries of the Global North, many of the worst impacts are felt in the Global South where governments have fewer resources to confront them. Bringing this moral dimension to the forefront, Judge Meyer continued with his remarks: 'But in the places in the world where money is scarce, can we leave these people on their own even when we are causing the problem over here? *Is that just?*'

¹ Most notably, *Native Village of Kivalina v. ExxonMobil Corporation, et al.*, a case by an Alaska community against US energy companies concerning the rising sea level, was dismissed in 2009 (Belleville and Kennedy, 2012).

The judge's questioning – *is that just?* – was surprisingly broad given the lawsuit's limited subject matter. Formally, it concerns a relationship between Saúl Luciano Lliuya, one of around 50,000 people living in a flood-prone area in the Peruvian Andes, and RWE, legally constituted as a corporate legal person. At stake was the question whether RWE is partially responsible for glacial lake outburst flood risk affecting Saúl's property. Drawing on a study that quantified historical industrial emissions (Heede, 2014a), the lawsuit alleged that RWE contributed 0.47% to industrial greenhouse gas emissions and should cover 0.47% of the cost for a government project to secure Lake Palcacocha, equating to around US\$20,000. That sum appears symbolic: the legal costs are much higher. The judge's moral deliberations made explicit what all those involved in the legal process already knew: this lawsuit was about much more than a private nuisance claim between Saúl and RWE. It raised fundamental questions about what kinds of social relations are at stake in contemporary concerns about climate change and how moral notions of responsibility should come to bear on those relations. Using the lawsuit as an ethnographic case study, I address the following research question: **through what kinds of relational engagements do people bring moral understandings of responsibility to bear on social concerns about climate change?**

Methodological note

Throughout this thesis, I use 'quotation marks' to indicate verbatim quotes. Quotations from conversations are reconstructed based on subsequent fieldnotes; for these I use *italics* rather than quotation marks. They are as accurate to the best of my memory, but I cannot guarantee verbatim precision.

Climate change as a neighbourhood dispute

'If you cause harm to a neighbour, you have to pay' -Saúl Luciano Lliuya²

In the courtroom, I sat alongside Saúl's legal team listening to the judge's words. My involvement in the case began several years earlier when I worked for the NGO Germanwatch and was part of the group that first met Saúl in 2014. When the legal process began, I coordinated contact between Saúl and his supporters in Germany and contributed

² This quote is from a media interview conducted in 2019.

to the lawsuit's scientific argumentation. Later, for my doctoral studies in Social Anthropology at the University of Manchester, I took an ethnographic approach to investigate the knowledges and notions of responsibility at stake in the claim. I conducted 20 months of fieldwork in the Peruvian Andes, studying people's engagements with the changing environment. I continued to follow the legal process, accompanying Saúl to court hearings and UN summits as an interpreter, advisor, and ethnographer. My involvement in the lawsuit continues to this day as the legal process drags slowly along. This research follows a climate change lawsuit that raises fundamental questions about how people should live in the contemporary world.

Examining the claim from an anthropological perspective, I will not answer the normative questions at stake – whether, for example, RWE and other major emitters should pay for climate change adaptation measures. Rather, I investigate how different normative positions have arisen in the case, how participants in the legal process drew on various perspectives and standpoints, and what implications the claim has beyond the courtroom.

In legal terms, the claim draws a link between Saúl and RWE as neighbours.³ I take inspiration from this and develop a conceptual framework that configures climate change in terms of neighbourly relations. Countless studies in anthropology and related disciplines have examined engagements between neighbours at a local level.⁴ Others have employed the term 'neighbours' to discuss relations between ethnic groups in conflictual contexts such as the Balkans in the 1990s (Haplern and Kideckel, 2000) and Palestine in the early 20th century (Gribetz, 2014). As we might expect, authors in politics and security studies have used the 'neighbour' idiom to examine state relations between adjacent countries.⁵ What all these discussions have in common is that they invoke the term 'neighbour' to talk about relations between people, social groups, and nation-states that are located close to each other.

Other academics have used the term 'neighbour' in a metaphorical sense to posit the centrality of ethical relations between people around the world. Some draw on an influential story from the bible to elaborate a Christian ethics of neighbourliness. In Luke 10:25-37, Jesus

³ In Chapter 1, I examine the legal mechanisms at play in more detail.

⁴ For two illustrative examples, Henig (2012) explores the meaning of neighbourliness in postwar Bosnia while Zabliūtė (2020) shows how health care workers in a poor Delhi neighbourhood employ an 'ethics of neighbourly intimacy'.

⁵ See, for example, Altunışık and Tür (2006) who discuss Syrian-Turkish relations ('From Distant Neighbors to Partners') and Åtland (2010) who explores relations between Russia and nearby countries in relation to the Arctic.

tells his followers that they should love their neighbour as they love themselves. When someone asked who they should count as their neighbour, Jesus responded with the parable of the Good Samaritan: a travelling man was robbed, beaten, and left injured at the roadside. Several people ignored him, until a Samaritan came along who treated the man's injuries and brought him to an inn to recover. According to Jesus, only the Samaritan treated the injured man as a neighbour, and others should do likewise. An edited volume by Hicks and Valeri (2008) entitled 'Global Neighbors' reflects on this story to explore Christian understandings of morality in the globalised economy. For Walker (2008, p. 14), the parable of the Good Samaritan 'redefines and gives new imaginative possibilities to the category of "neighbor"'. By questioning the boundaries of who we consider to be near and far, this allows for an understanding of 'neighbour' that potentially includes all people in the world. In a time of global economic integration and inequality, this moral notion has inspired charitable efforts: in the context of the 2005 'Make Poverty History' campaign, U2 singer Bono argued that all people in the world should treat each other as neighbours (Hicks, 2008). Some authors have drawn on a Christian ethics of neighbourliness to critique neoclassical economics: for example, Van Duzer (2008) argues that the assumption of self-interest inherent to much of contemporary economic theory is contrary to the biblical assertion to love one's neighbour.

While she does not explicitly draw on a Christian ethics, Haugestad (2004) invokes the idea of 'Global Neighbours' to highlight the moral stakes of relations between people in wealthy and poor countries. In a Norwegian context, she explores why many people support a vision of sustainable global development but fail to make consumption choices that promote this vision. For Haugestad, a neighbourly attitude – marked by feelings of care and the desire to help others – could help bridge this gap.⁶ As with the Bible-inspired discussions, the 'global neighbour' idiom has a clear analytical value: it posits the centrality of ethical relations.

How might these discussions inform an anthropological understanding of climate change? The lawsuit between Saúl and RWE applies neighbourhood law to make a nuisance claim. It draws on legal norms that people usually invoke to seek retribution from neighbours for damage or potential harm to their property.⁷ This can involve harms relating to environmental pollution if claimants can prove their neighbour's responsibility. In their

⁶ While critics have pointed to the limits of ethical consumerism as a strategy for addressing the structural inequalities inherent to contemporary global capitalism (e.g. Gunderson, 2014; Wilson, 2016), my aim here is to unpack the 'neighbourly relations' idiom.

⁷ As I elaborate in Chapter 1, the lawsuit invokes Section 1004 of the German Civil Code which allows for claims relating to property interference.

arguments, Saúl's lawyers expand the legal conception of neighbourliness to encompass relations across the planet: as climate change connects RWE and Saúl, it makes them neighbours. While discussions about 'global neighbours' posit an abstract notion that all the world's inhabitants should care for each other, the legal approach defines as neighbours those who are able to act on one another. Neighbourliness emerges out of concrete claims that construct ethically charged relations between legally defined entities – including not only humans, but also corporations.

This legal conception provides the analytical cornerstone for an ethnographically grounded understanding of climate change that foregrounds the ethical relations at stake and provides a framework to study power relations and climate politics in action. A focus on neighbourly relations reconfigures climate change in terms of legally and morally charged engagements between those who emit greenhouse gases and those who face the detrimental consequences of global warming. This involves the study of concrete social engagements manifested in ethical claims about who should take responsibility for the devastating environmental transformations that people are facing around the world. If anthropology is the study of social relations in all their complexity, a neighbourly approach to climate change provides an ethnographic opportunity to investigate the relational engagements at stake in contemporary climate concerns.

This study examines how the lawsuit configures Saúl and RWE as neighbours using legal conceptions and scientific understandings of climatic processes. The analytical focus on neighbourly relations foregrounds moral dynamics – not only in engagements between the plaintiff and defendant, but also in other relations that are at stake in the claim, potentially involving climate activists, policy-makers, and Andean earth beings. I highlight disputes over knowledges and ways of being that underpin legal arguments about relational claim-making. Finally, in the Conclusion, I will discuss this study's potential implications for legal and activist practice, climate change politics, and the discipline of anthropology.

Ahead lies a long journey between Andean mountaintops, German courthouses, UN summit halls, and endless pages of legal documents. To frame discussions in the following chapters, I begin by examining the key conceptual issues that arise from studying the lawsuit. Following that, I elaborate my methodological approach and reflect on my positionality. Finally, I introduce the major sites of research.

The issues at stake

Anthropology and climate change

Climate change is a phenomenon that encompasses the entire planet. How might we approach the issue in anthropology, a discipline grounded in the specificity and detail of ethnographic research? After a brief overview of how others have engaged this question, I will highlight the concepts and approaches that inform this study of climate litigation. In an early anthropological article that addresses climate change as a central theme, Ingold and Kurtilla (2000) trace Sami people's engagement with their environment in northern Finland and follow their encounters with natural scientists. While the scientists sought to study climate change, the authors argue that the Sami were more concerned about changes in weather. The climate is a statistical abstraction that traces long-term weather and atmospheric changes.⁸ Reindeer herders do not feel the climate when walking through snowy forests, argue Ingold and Kurtilla; they experience weather.

However, Simonetti (2019) warns that the scientific distinction between weather and climate is a false dichotomy as people can experience short-term and long-term change, even without scientific abstraction and modelling. For example, long-term histories can be embedded in oral narratives, allowing people to recognise environmental change at longer temporal scales. For Simonetti, the analytical distinction between weather and climate reflects different ways of knowing the environment: on the one hand, experiential knowledge of the environment; on the other hand, abstracted knowledge within a universalising scientific framework. These are often described as local and scientific knowledge, respectively. In her study of native communities' engagement with climate change along the mountainous Alaska-Canada border region, Cruikshank (2005) discusses the difficulty of comparing these two types of knowledge as they emerge from different traditions and practices. While scientists sought to study the environment from a removed, 'objective' perspective, local narratives of environmental change were often linked to moral understandings of the socio-material world. Attempts to systematise 'local knowledge' as input for climate studies ultimately removed the human experience that gave rise to local

⁸ While scientists have modelled the climate over periods ranging from months to millions of years, the classical period of reference is 30 years, as defined by the World Meteorological Organization (IPCC, 2014b, p. 120)

understandings. I follow Cruikshank in her call for an open dialogue between knowledge systems – if we take both scientific and other perspectives seriously, we can broaden public discussions about the stakes of climate change.

Echoing discussions about weather and climate from a Science and Technology Studies (STS) perspective, Sheila Jasanoff (2010) argues that discussions about climate change frequently involve a scalar dissonance: understandings of climate change are often mediated through global scientific facts that are disconnected from many people's value-laden engagement with their environment. In an attempt to connect local concerns with scientific understandings of climate change, activists and social movements are attributing shared value to the planetary environment. Recognising that scientific fact-production happens in the context of normative and cultural understandings of how the world should be, Jasanoff calls on social scientific research to bring human experience back into discussions of climate change.

What does this mean for the anthropological study of climate change? If the ethnographic method allows us to trace people's experiences, how do we study a global atmospheric phenomenon that seems to connect everyone around the world? As climate change has risen on political and social agendas around the world and environments are changing at an increasingly rapid pace, the terms 'weather' and 'climate' are becoming increasingly conflated. In public discourse, we often hear people talking about their experience of climate change. According to Rasmussen (2015, p. 180), who conducted research in the Peruvian Andes, climate change provides villagers with a powerful new vocabulary to express the difficulties of social life and agricultural production. Andeans adapt climate change to their life-worlds, using its terminology to produce and express knowledge on their engagements with a shifting environment. While the notions of 'climate' and 'climate change' emerged out of scientific discourses, they now frame how many people in the world understand local environmental change (Hastrup, 2013a, p. 270). For Callison (2014), climate change is a scientific issue with ethical contours: to come to matter publicly, it must engage with culturally specific values and rationales for public action. Climate change is an inherently anthropological problem as it involves people trying to understand and reconfigure human-atmosphere relations (Whittington, 2016).

My aim, from an ethnographic standpoint, is to study how people try to make sense of these evolving socio-material entanglements. The distinction between phenomenological weather experience and scientific climate depictions is not relevant in the German

courtroom; rather, discussions revolve around what kinds of social relations climate change allows people to make, as well as which ethical and epistemological norms should govern those relations. There is no dispute between scientists talking about climate change and non-experts talking about weather. All those involved in the lawsuit – lawyers, judges, expert witnesses, and Saúl – agree that climate change is the central issue at stake. In Chapter 1, I relate anthropological discussions to the lawsuit's approach which reconfigures climate change in terms of neighbourly relations.

While anthropologists have long studied human-environmental engagements, such studies are now often placed in the context of climate change. In a review of anthropological literature on climate change, Crate (2011) highlights two broad research directions: first, place-based studies have shown how people engage with climate change impacts that disrupt their environmental and cultural contexts. Second, some authors have placed 'climate justice' central stage, reframing environmental justice concerns in terms of climate change and focussing on the global connections at stake in climatic processes. In a more recent review, O'Reilly et al. (2020) highlight additional areas of anthropological study, including scientific knowledge-production about climate change and how political strategies addressing climate change are implemented in practice. Following others who argue that anthropologists can foster knowledge exchange and broaden discussions through presenting other viewpoints (Orlove et al., 2002; Roncoli, 2006), both Crate (2011) and O'Reilly et al. (2020) call for increased interdisciplinary research and public engagement.

According to Krauss (2009), ethnographic study can show how people interpret local events in terms of global warming, giving contextual meaning to the universalising process of climate change. Strauss and Orlove (2003) argue that cultural frameworks shape how people understand weather phenomena and climate change. The authors contend that anthropological study can help us trace the complex relations between human communities and natural environments. Climate change may cause particularly wide-ranging social impacts for indigenous groups living in fragile environments, even disrupting people's cosmological understandings linked to the landscape (Crate and Nuttall, 2009b). Numerous authors have argued that we should contribute ethnographic perspectives to climate change discussions in the natural sciences as well as policy debates about adaptation (Barnes et al., 2013; Crate and Nuttall, 2009b; Roncoli et al., 2009). Taking such an approach, authors have studied the social impacts of climate change at diverse locations including the Peruvian Andes (Bolin, 2009), Papua New Guinea (Jacka, 2009) and the Nepalese Himalayas (Sherpa, 2014).

While the social sciences can complement natural scientific research on global environmental change by highlighting the local socioeconomic circumstances that shape both causes and impacts, Crate and Nuttall (2009a) argue that that social perspectives should also shape the direction and scope of investigations. According to the authors, anthropologists should question the underlying assumptions in natural scientific perspectives, allowing for a more open knowledge dialogue that accounts for alternative views. For Hastrup (2013a), anthropology can not only bear witness to climate change impacts, but also contribute to discussions about scale and how scientific research is framed. Drawing on these discussions, my own research involves a multi-sited approach that connects local concerns in the Andes with international discussions about climate change, justice, and responsibility. Barnes et al. (2013) argue that anthropologists can provide holistic perspectives on the production and circulation of climate change knowledge, showing how scientific conceptions of global warming emerge out of particular institutional cultures, inform local understandings and become entangled in the complex dynamics of power and politics. Building on this, my own work shows how scientific knowledge production engages multiple and sometimes contradictory value systems as people mobilise scientific insights to search for solutions. Baer and Singer (2018) add that anthropological discussions of climate change should address global capitalism and the structures of power and social inequality that have caused and perpetuated global warming. I follow the authors' call to engage with activists and social movements as part of a combined effort towards social and climate justice. Building on anthropological explorations of climate change, the originality of my research lies in showing how the issue is brought to court. In the Conclusion, I will return to the question of what climate change means for anthropology, arguing that scholars should take into account the potential repercussions of their research beyond the academic sphere.

Deconstructing the norms of knowledge and responsibility

My research traces the legal process between Saúl and RWE ethnographically, highlighting the knowledges and normative values at stake in discussions about climate change. In what way does knowledge embody moral values and contextual meanings? How does the social nature of knowledge shape the scope of relational claims? I draw on critical research in STS that traces the social practices involved in the production of scientific and other knowledges.

STS scholars such as Bruno Latour (1987) have studied scientific knowledge production ethnographically, arguing that institutional norms and traditions shape the kinds of truths that scientists can find. Countering the notion that scientific knowledge is objective and context-free, Wynne (1992) contends that science attains public trust and credibility through complex social negotiations. Scientific knowledge emerges out of localised practices and embodies underlying assumptions about the social order, yet through its institutional form, it removes itself from the local context and asserts universality (Turnbull, 1997). Institutional norms differentiate between scientific and non-scientific 'local' or 'lay' knowledge, even though both emerge out of local contexts in relation to particular value judgements (Wynne, 1998).

Building on these discussions, Jasanoff (2004a) argues that knowledge and social orders arise hand in hand: how we represent the world through knowledge claims is inseparable from the value judgements that shape how we live in the world. In a process of 'co-production', knowledge both emerges through social practices and shapes the possibilities of politics and social organisation; knowledge and social order produce and reinforce each other. 'What we know about the world', contends Jasanoff (2004b, p. 14), 'is intimately linked to our sense of what we can do about it'. In a world marked by uncertainty and ambiguity, co-production stabilises dominant social identities, institutions, and discourses. For Jasanoff, an analytical focus on co-production can help us understand how new sociotechnical concepts such as climate change gain moral and political standing. I take inspiration from the co-production approach to examine how scientific knowledge shapes the scope of social and legal claims about climate change.

Causality and the anthropos

One strain of recent discussions in anthropology and adjacent disciplines explores how scientific knowledge about climate change allows for novel understandings of causality and responsibility by placing humans centre-stage. For Knox (2014), Climate change renders new subjects and objects of political intervention as thinkable and operationable. It reconfigures key concepts including climate, energy, society, and the individual – and reframes relationships between them. The climate has become a 'political material' as people have come to accept a new ontological reality; within this, climate change is a systemic reality in which we all are entangled (Knox, 2015).

This new reality potentially requires novel ways of thinking about responsibility and justice. The term ‘anthropogenic’ frequently arises in discussions about climate change to characterise the degree of human influence on contemporary planetary transformations. Reviewing discussions in anthropology and other disciplines on the anthropogenic, Sayre (2012) questions the analytical value of this term as it builds on an ontological distinction between humanity and nature. Some have characterised recent developments as the ‘Anthropocene’, a new geological epoch marked by human activity. Sayre sees this categorisation as essentially arbitrary, yet it can provide the basis for social and environmental justice arguments. He worries that the term ‘anthropogenic’ may brush over the fact that those who face the worst impacts of climate change have made little contribution to greenhouse gas emissions. Sayre calls for a politics that addresses the specific processes and causal links associated with climate change.

Following Sayre, others have called for a critical anthropological study of the conceptual production and dissemination of the ‘Anthropocene’ (Moore, 2016). Hastrup (2013a) argues that planetary imaginaries such as the ‘Anthropocene’ are powerful: they shape how people see the future and affect social action. For Haraway (2016), the ‘Anthropocene’ invokes a generic universal masculine Anthropos focussed on burning fossil fuels. She urges us to counter human exceptionalism and account for the multispecies interactions at stake in contemporary ecological transformations. Whittington (2016) argues that anthropologists should reject both the ‘Anthropocene’ as a clearly defined temporal epoch as well as the vision of an apocalyptic future as both wash over the complexities of the world’s ecologies. Bearing in mind these conceptual critiques of the Anthropocene, which offers a universal explanation to the issue of causality, I examine in Chapter 3 how specific causal claims are made in the legal process that assert a morally charged relation between Saúl and RWE. I offer an ethnographic approach to causality that traces how scientific knowledges come to bear on legal arguments about climate change liability.

Engaging the law in anthropology

A significant portion of my research focusses on judicial processes. How can an anthropological approach help us understand the broader significance of legal practice? Early legal anthropologists such as Gluckman (1955; 1969) and Bohannan (1969) sought to study and compare legal practices in tribal societies. Researchers wanted to understand how legal

institutions functioned as part of a wider social structure (Nader, 1969). Moving away from this functionalist approach, later studies focussed on how power relations are embedded in and enacted through legal structures (Starr and Collier, 1989). In recent decades, anthropologists have turned their focus to legal processes in the Global North (Moore, 2005). Some studies have also examined international law and transnational legal activism (Freeman and Napier, 2009; Riles, 2006).

According to Goodale (2017, p. 203), the anthropological study of law can show how legal process is shaped by and reinforces moral perspectives and social values. As such, an ethnographic perspective can help us examine how legal practices and concepts shape the way people understand their own position within a broader set of social relations. Merry (2006) describes how the concept of human rights emerged from European philosophical discourses but has become deployed around the world. This involves a 'vernacularization' of human rights as people apply these terms to their contexts in situated social claims. This 'indigenization' gives human rights new meanings when people link them with existing norms and values. I build on this approach to show, in Chapter 1, how Saúl connects global activist understandings of climate justice to his situated concerns about environmental change in the Andes. In Chapter 3, I draw in particular on legal ethnography that traces the production of legal facts and show how these often involve different epistemological standards than scientific knowledge (Latour, 2010). I aim to open a dialogue with research in socio-legal studies about climate change. In a recent review of academic literature on climate litigation, Setzer and Vanhala (2019) state that anthropology offers 'potentially fruitful new directions in understanding the societal relevance of climate change litigation'. My research is a response to that call.

Uncertain engagements in changing socio-material environments

After reviewing how anthropology and related disciplines have approached climate change, scientific knowledge production, and law, I now turn to a more hands-on area of inquiry: how do people engage with changing environments? As glaciers melt and sea levels rise around the world, people are encountering unprecedented dangers to life and livelihoods. In public discussions and scientific narratives, danger is often characterised in terms of risk, which anthropologists have theorised as a social and relational phenomenon. For Douglas and Wildavsky (1982), people's understanding of risk is closely linked to which

social values and knowledges they hold dear. Risk, in this sense, is a cultural issue and risk perception varies significantly between social groups; institutionalised forms of risk assessment inevitably privilege some types of danger above others based on their underlying social assumptions. In later work, Douglas (1992) argues that risk and blame are closely interrelated: narratives of risk and danger often involves understandings of who or what is to blame.

Some studies have focussed on formalised scientific risk assessments. Conventionally, those rely on quantitative models to determine the potential impact an activity or event, such as an oil spill, might have on a particular environment. Rappaport (1996) critiques that such approaches exclude non-quantifiable factors such as values and cultural modes of organisation. Echoing earlier discussions, Rappaport finds that risk is relative to what people value. In a similar vein, Wynne (1998) argues that scientific framings of risk are often reductionist: they simplify broader uncertainties in terms of scientifically measurable factors and neglect social dimensions of risk that do not fit easily into scientific frameworks.

What dangers and risks do Andeans face in times of climate change? How people qualify risk varies in relation to which socio-economic needs and moral values they prioritise. In the Cordillera Blanca, governing authorities have devoted significant attention to glacial lake outburst flood risk which they see as a potential threat to human life and regional economic development. While authorities often attribute this risk to global climate change, scientific researchers have also pointed to state institutions' shortcomings in addressing flood risk (Huggel et al., 2020). In rural areas, many people I spoke to did not see flooding as an important issue. Given a widespread mistrust in urban government officials, some even argued that there was no danger. However, villagers expressed grave concerns about the prospect of water scarcity in a context of accelerated glacier retreat, fearing that this threatened their agricultural livelihood. While those who were familiar with scientific discourses related this to climate change, many people I spoke to attributed responsibility for their predicament to the government's lack of effort to establish water infrastructure and implement other measures to support farmers. Perception of environmental danger can vary significantly in relation to how people engage with the landscape, what types of knowledge they hold dear, and whom they trust to provide reliable information. Discussions about risk are often embedded in scientific terminology and statistical representations of the environment that bear little relation to people's experience of living in the mountains. In Chapter 4, I explore these dynamics in more detail.

In the chapters that follow, I also draw on ethnographic explorations of environmental activism. While some studies have explored why citizens take a stand on environmental issues in Europe (Berglund, 1998) and North America (Callison, 2014), other studies have followed communities' existential struggles over mining-related environmental damage in places such as Peru (Li, 2015; Rasmussen, 2016a) and Ecuador (Sawyer, 2006; Sawyer, 2015).⁹ These latter studies about mining and extractivism offer particularly useful conceptual frameworks for unpicking various knowledges and ways of being at stake in environmental disputes. Sawyer (2015) highlights how activists strategically apply particular scientifically-grounded measurement techniques to make environmental harm legible. I build on this approach in Chapter 3 to show how legal practitioners use scientific tools to frame climate change in a way that foregrounds the contribution of individual companies. I expand these discussions about knowledge and environmental harm by relating them to concerns about global climate change.

Cosmopolitical engagements in the Andes and beyond

What is at stake in concerns about climate change in the Peruvian Andes? Numerous scientific studies have documented the situation, highlighting accelerated glacial retreat (Schauwecker et al., 2014), flood risk (Frey et al., 2018; Somos-Valenzuela et al., 2016) and changes in water availability (Drenkhan et al., 2015). These studies have provided valuable evidence in the legal claim between Saúl and RWE in which lawyers have deployed scientific research to link the company with climate change impacts in Peru. Yet when I conducted ethnographic fieldwork in Peru, I came to realise that more was at stake: many Andeans, including Saúl, engage with mountains and lakes as living beings. They inhabit a sentient landscape that is now undergoing rapid transformations. This involves numerous changes, such as glacial mass loss and flood risk, that can be measured with scientific frameworks. But more than that, climate change has the potential to transform people's cosmological engagement with the landscape in ways that are difficult to ascertain.

How might we understand these cosmological engagements from an anthropological standpoint? Numerous researchers have documented Andean belief systems and ritual

⁹ Numerous recent studies have addressed extractivism in places around the world; I offer merely a selection of references that inform my own work. After writing my undergraduate dissertation on the topic, I originally planned to conduct doctoral research about extractivism in Peru until I became side-tracked by the climate crisis.

practices revolving around relations of reciprocity between humans and non-human beings in the landscape, particularly in the southern Peruvian Andes (Gose, 1994; Harris, 2000; Sallnow, 1987).¹⁰ Writing about a rural community in the southern Cusco region, Allen (1988) argues that Andean people's identity is tied closely to the material environment; the landscape and its features are constant points of physical and spiritual orientation. According to Allen, every person has the responsibility to engage in reciprocal relations with the sentient environment which people understand as *Pachamama*, a powerful sentient force. Drawing on research in a different Cusco community, Harvey (2001) argues that people employ distinct communicative repertoires to engage with the landscape's agency in an effort to ensure that it acts positively towards humans and their endeavours. Like other anthropologists (Allen, 1988; de La Cadena, 2015; Stensrud, 2019a), Harvey documents ritual offerings, characterised as *despachos*, made to ensure productive harvests.

In the northern Peruvian Andes, which has not seen as much coverage in the anthropological literature, such rituals appear less widespread. In her ethnography of Huaraz in the early 1970s, Bode (1989, p. 11) describes some practices that appear less formally ritualised, including locals pouring alcoholic drinks on the ground in libation to the landscape. In his recent research about environmental change in the Cordillera Blanca south of Huaraz, Rasmussen (2015, p. 48) was surprised at the lack of 'typical Andean' practices. Villagers told him that previous generations had made regular ritual offerings to the landscape, but those practices were increasingly rare.

I made similar observations during my fieldwork in the villages near Huaraz. I only met a handful of people who openly discussed making ritual offerings to the environment. As I discuss in Chapter 4, glacial lake workers made offerings to the landscape, characterised as *pagos*, to appease powerful earth beings and prevent a deadly flood. Others engaged in more subtle activities that were seldom verbalised. Like many other mountain climbing guides, Saúl carried a bag of coca on his tours. When he climbed a glacier, he tossed a handful of leaves onto the mountain, hoping this would ensure a safe journey. Chapter 2 further examines the significance of this practice. During my time in the Cordillera Blanca I slowly gained the impression that many people in rural areas seldom talked openly about engaging with the environment's sentient force, at least not with a foreign researcher, yet the landscape seemed to have an important cosmological significance. As I gained trust with my key interlocutors, they began to tell me how they had encountered sentient mountains and

¹⁰ I could provide many references here but limit myself to a handful of emblematic examples.

lakes in their dreams and in uncertain engagements at high altitudes. When I told Saúl at the outset of my fieldwork about anthropological discussions concerning Andean earth beings, he said he also wanted to investigate the topic – he felt unsure about what earth beings are and wanted to know more. I discuss some of our subsequent explorations on the issue in Chapter 2, in which I show how Saúl raised the possibility that earth beings might be an interested party in legal and political deliberations about climate change.

Recent anthropological debates have revolved around how we might characterise people's engagements with sentient environments in the Andes, Amazonia, and elsewhere. Traditionally, ethnographies have described such practices in terms of cultural practice or religious belief (Allen, 1988; Bastien, 1978; Gose, 1994; Mayer, 2002). Writing in the context of the so-called 'ontological turn', some authors have sought to shift attention away from beliefs and rather focus on the prospect that our interlocutors may inhabit other ontological worlds or realities. Drawing on ethnographic research with a rural family in Cusco, de La Cadena (2015) argues that the concept of 'belief' arises from a western philosophical tradition that distinguishes conceptually between nature and culture. According to the latter framework, we all inhabit the same nature, which can be apprehended through scientific study, while people differ in terms of culture, manifested in varying systems of belief. Drawing on other anthropologists associated with the ontological turn (Blaser, 2010; Viveiros de Castro, 2004), de la Cadena proposes a different understanding: rather than sharing the same nature, humans inhabit different ontological realities. As western-educated academics, we may be unable to engage a mountain as a living being. Nevertheless, for many Andeans, mountains are alive. Their realities are partially connected with those that we and others inhabit, yet they are separated by boundaries of incommensurability.¹¹

Embarking on my ethnographic research, I asked myself: do Saúl and his fellow Andeans inhabit ontological realities that are separate to my own? Initially, I was critical of the ontological approach. As has been argued elsewhere (Vigh and Sausdal, 2014), I feared it could essentialise difference and inadvertently reproduce a type of cultural othering we saw in early anthropology focussed on isolated indigenous groups. Engaging with such critiques, authors writing in the ontological vein have defended their approach, with de La Cadena

¹¹ The terminology of 'partial connection' derives from Strathern (2005) who argues that anthropological analysis is inherently partial; analytical holism, from this standpoint, is merely another perspective that asserts universality. A focus on partial connections highlights the epistemological limits of academic inquiry.

(2019) arguing that a recognition of ‘other’ realities is necessary to do justice to our ethnographic interlocutors.

Avoiding the risk of analytical essentialism, I build on approaches which trace the practices that bring particular realities into being. According to de La Cadena (2015, p. 26), sentient mountains are enacted through people’s everyday practices. Drawing on de la Cadena, Stensrud (2019a) describes how Andean villagers in the Arequipa region enact earth beings through ritual action, providing offerings to the landscape in return for water, agricultural fertility, and general well-being. These practices are becoming more important in a time when the environment is changing, and weather patterns are increasingly unpredictable. This focus on enactment – placing relational engagements at the forefront through which earth beings emerge as real – avoids essentialising Andeans as indigenous ‘others’ by highlighting the contingency of ontological realities. Reality, in this sense, is ever emergent; it is made and remade through people’s daily practices.

In my own research, I trace how Saúl and his compatriots enact the sentient landscape through their engagements with the environment. Chapter 4 follows cosmological engagements with the changing environment during infrastructural works addressing the risk of flooding at Lake Palcacocha. In Chapter 2, I trace how Saúl raised these understandings during visits to Germany, introducing a standpoint that is not formally recognised under German law, yet still potentially affected public discussions around the case. Through relational practices, earth beings emerge as neighbours of a different kind: their power and moral force is clear to those who engage them.

Positionality and research approach

Having reviewed the major conceptual issues addressed in this thesis, I now provide an overview of how I conducted my research. I begin with a brief reflection on my positionality and ethical commitments: while my involvement in climate litigation began as a practitioner and activist, I subsequently used this work as a starting point for an ethnographic exploration of climate justice claims. Addressing the scalar difficulties of studying such a broad issue as climate change, I chose a multi-sited approach that followed people’s engagements with climate change in the Peruvian Andes, the legal work involved in pursuing the claim against RWE, and activist efforts at UN climate summits. Introducing my various research sites, I

describe my methodological approach and illustrate the different issues at stake for my interlocutors.

Activism and anthropology

My involvement in the subject matter of climate litigation began as a climate activist. How can anthropologists balance academic research and activism? According to Hastrup et al. (1990), the two are qualitatively different efforts: while anthropology draws legitimacy from scholarship to create knowledge, advocacy relies on moral legitimacy to apply knowledge. As such, ethnographic experiences may lead anthropologists to become activists, yet the rationale for such activism is not ethnographic. For Hastrup et al., advocacy involves an un-academic emotional rhetoric that is appropriate in some circumstances but risks jeopardising anthropology's credibility. Similarly, Merry (2005) argues that research and activism are incommensurate in terms of epistemological principles: while human rights activists tell simple stories with clear villains, anthropologists elucidate more complex circumstances and define social injustice contextually. As such, academic research can inform activist endeavours.

Other anthropologists are more open to combining academic work and advocacy. For Scheper-Hughes (1995), anthropologists should not pretend to act as rational objective observers; rather, anthropology should be morally engaged and committed to an ethic of care. In politically charged situations such as Apartheid South Africa, argues Scheper-Hughes, anthropologists have the duty to take a stand against violence and oppression. Ethnography, according to this approach, creates a space for shared empathy and should serve as 'a tool for critical reflection and for human liberation' (Scheper-Hughes, 1995, p. 418). In a similar vein, Kirsch (2002, p. 178) argues that 'activism is a logical extension of the commitment to reciprocity that underlies the practice of anthropology'. This stance led Kirsch to advocate on behalf of indigenous groups in Papua New Guinea against a mining company that threatened local communities. In contexts marked by significant power imbalance, Kirsch argues that anthropologists should actively support subaltern groups.

Conceptually speaking, I differentiate between my roles as an academic researcher and climate activist. At times, I have taken on both roles simultaneously, as when I accompanied Saúl to court hearings and UN summits. Politically, I am committed to working towards more

equitable solutions to climate change. At the same time, I regard this involvement as a productive site of ethnographic knowledge production. Through observing and participating in an international climate litigation claim, I have gained unusual insight into the dynamics of climate concerns as they emerge between Peru, Germany, and international discussion forums. My position gave me the opportunity to investigate ethnographically the political and moral stakes of a climate litigation claim. My prolonged involvement and political commitment are indispensable for gaining this perspective. While for some anthropologists, such as Scheper-Hughes and Kirsch, ethnographic research led them to become activists, for me, my participation in the cause of climate justice raised my anthropological curiosity and led me to conduct ethnographic research.

A multi-sited study of climate change

Climate change connects people and places across local and global scales. Ethnographically, we can trace how climate change shapes people's understanding of geographic and temporal scales. Chapter 1 explores this in further detail, tracing how the lawsuit between Saúl and RWE is conceptualised in terms of a neighbourly relation that transcends local and global scales. My research approach involves following these relations as they emerge. Building on Marcus (1998), Krauss (2009) calls for a multi-sited ethnographic study of the climate that traces how people come to understand global environmental change as a universal process, and how they localise it in particular places. Elaborating further on this approach, Crate (2011) advocates a socially engaged form of academic practice that she calls 'climate ethnography', which takes a multi-sited approach to connect 'local' and 'global' standpoints. This involves an increased collaboration across disciplinary, geographic, and socioeconomic boundaries to trace how 'global' processes emerge from 'local' settings and understand how people articulate 'global' ideas through their situated knowledge systems. Crate argues that anthropologists should contribute critical ethnographic insights to public discussions about climate change.

Examining climate change as a neighbourhood dispute, I conducted ethnographic research at three primary ethnographic sites: the Cordillera Blanca region of the Peruvian Andes, the legal process between Saúl and RWE in Germany, and several UN climate summits that I attended with Saúl and other climate activists. These sites were interlinked through the production of knowledge and social claims about climate change. In this section, I

introduce each of these sites. To begin, I provide an ethnographic snapshot of the issues at stake in my Peruvian field site.

Climate change in the Cordillera Blanca



Figure 2: The Cordillera Blanca mountain range is located in the northern Peruvian Andes (Image: Wikimedia)¹²

¹² Original source: https://commons.wikimedia.org/wiki/File:Peru_physical_map.svg



Figure 3: The Cordillera Blanca (Image: Google Earth)

Life isn't what it used to be – we worry for our future, said Arturo.

At the age of 61, he was an old man. As he squinted in the midday sunshine, the wrinkles glistened on his face. A baseball cap covered the grey flurry of hair on his head. Standing in rubber boots and a well-worn shirt on a steep field above his house, he grabbed his pickaxe to continue ploughing the soil. Normally Arturo used his bulls to plough the fields, but this terrain was too steep. His entire body ached, but there was work to do.

Arturo was tired. As usual, he had risen that morning at six a.m. He rose several times during the night to check on his cattle in the field outside his house – several neighbours had recently lost their livestock to thieves. His two bulls were still there, but we had heard the dogs barking at night – an indication of strange characters passing by.

Arturo lived in a small village above the city of Huaraz in Peru's Cordillera Blanca mountain range. For several months, I had lived in Arturo's house, working in the fields and eating with the family. *We're poor*, Arturo sometimes said, and their circumstances were typical of many rural families in the region. They grew potatoes, corn, and other crops on their small plots of land. Their house was made of adobe mud bricks that provided insulation during cold nights but let in little light during the day. The women usually cooked over open fires. The whole family worked in the fields – ploughing, planting, and harvesting year-round. Many young men found paid employment elsewhere. Arturo's son worked as a guide for

mountain climbing tourists during the dry season between April and September. Arturo had worked with tourists in his younger years, but now he was old and frail.

Climbing down a ladder that morning, Arturo's well-worn boots lost their grip on the rungs. He crashed on his back and could hardly breathe, but nobody was nearby to help him. Limping over to the kitchen where his wife was preparing potato soup with fresh eggs, he felt a stabbing pain in his rib. Perhaps it was broken, but the doctor was expensive, and someone had to plough the field.

After breakfast that morning, Arturo and I set out with his three bulls and our pickaxes up a steep slope behind his house. He had spent his entire life working in the mountains. In recent years, the environment had been changing. *We used to have green pastures all over for our animals*, Arturo explained while driving the cattle along with a little stick. *Now the animals get sick, so we have to buy medicine. You know, antibiotics. It's not like it used to be.* As I gasped for breath under the morning sun, we reached the top of the hill and found a small patch of grass. Arturo set down his pickaxe to tie the animals' legs to a nearby tree. He spoke to me in Spanish, mixing in phrases in Quechua, a language I was beginning to learn.

Quechua was Arturo's first language. Growing up in the 1960s, he encountered a Peruvian educational system and society that gave little recognition to his native language and made him learn Spanish. Going to school, he had to walk several hours to reach the nearby city of Huaraz. Today, most villagers are bilingual in Quechua and Spanish, mainly speaking Quechua with their families and Spanish in Huaraz. Many young people prefer to speak Spanish among themselves. Quechua speakers continue to face discrimination from Peru's urban elites.

It's all changing. It's warmer than it used to be. Arturo pointed to Mount Churup in the distance. Dark patches stood out under a shiny glacier that covered the mountain's peak. *Churup used to be completely white. Now the glacier is disappearing, and we don't know what will become of us in the future.* Year after year, people in the Cordillera Blanca witness mountains losing their white covers. Many, including Arturo, were concerned since they regarded glaciers as a source of water. If the glaciers were gone, what would they drink?

Life in the countryside is hard work, Arturo explained. We laboured on beneath the burning sun, hacking at the dry soil with our pickaxes. Throughout the whole year, there was something to do. Arturo had worked in the fields since he was a child. Back then, his village was a *hacienda* and the feudal system forced him to work for a wealthy landowner. In the

course of the national land reform in 1969-70, his parents acquired several fields that they later divided among the family. With the younger men working in the mountains and the women attending to matters at home, Arturo took charge of preparing the fields.

Past midday, the heat became almost unbearable as we toiled on. During the Andean dry season, the nights are freezing and the days scorching hot under the sun. Sweating and struggling with pain, Arturo worked relentlessly. *Rest up, I advised him. It'll make your injuries worse!*

Arturo paused to observe our progress. We had ploughed around a third of the little field. *Only a little more*, he exclaimed.

Minutes later, we heard a whistle from the house below. Squinting in the sunlight, I made out Rocío, Arturo's wife, waving to us. Arturo threw aside his pickaxe and turned to me – *Time to eat! Later I'll finish with the field.*

We stumbled down the hill and sat down in the kitchen. It was refreshingly cool. After a morning of hard work, Rocío served us healthy portions of rice and beans. She had spent the morning cooking and washing clothes in a little tub. Her hands were rough, attesting to a life of hard labour in the house and in the fields. She too had felt an excruciating ache in her whole body for several months, but unlike her husband, she kept this fact quiet. Months later, when I improved my Quechua and gained more confidence with Rocío, she told me about her lifelong struggles as a wife and mother.

Like Arturo, Rocío could see the glaciers melting and worried about future water supply. For several years, their household had enjoyed the benefits of tap water after government authorities set up a piping system from a nearby mountain spring to supply their part of the village. But as the mountains lost their white caps, those springs began to dry up. The previous year, they had no tap water for several weeks during the dry season. Rocío and her daughter had to walk ten minutes to the nearby Cojup River and carry buckets of water up the steep road for cooking and cleaning. With the rainy season now over, she feared water scarcity. *It's harder for the men to understand*, she later explained to me, *it's us women who really know what it's like when we don't have water. We are the ones who suffer the most.*

Rocío, Arturo, and I ate our meal on little stools by the dying embers of their wood-fired stove. Arturo was one of the village's elected leaders. He had lobbied the local government in Huaraz to establish a more reliable water supply from the Cojup River. The authorities approved a project, and Arturo gathered the village's men to dig a new canal. They worked

for weeks, but the effort was ultimately futile. According to Arturo, the National Park authority refused permission for a water catchment in the river, which emerged from Lake Palcacocha in the National Park. This left the villagers feeling disappointed and abandoned.

We finished lunch and Rocío cleared away our plates. As we made our way back outside, I asked about a large sack of potatoes standing in the kitchen. It went up to my chest and looked heavy. *Are those from the last harvest?*

Yes, Arturo replied. *We used to store them for up to a year, but now the worms start eating them.* Times had changed. The fields produced less than when he was younger, Arturo explained. With the warming weather, new crop diseases began to appear. Climatic conditions determine practices of agricultural production. As conditions change in the context of global warming, people must adapt their practices (Rasmussen, 2015, p. 36). Arturo and his neighbours began using chemical fertilisers and pesticides to ensure better yields. Another farmer remarked to me that their potatoes tasted better without pesticides, but with the chemicals they could produce and sell more at the market.

Farmers were used to a regular cycle of seasons. They usually planted crops with the first rains in September. The rainy season started in full force every November, lasting until around April. June to August were the driest months. The rains determined their agricultural cycle, allowing them to put food on the table. But in recent decades, this began to change. *The rains are no longer that reliable*, Arturo told me. Sometimes they began early; sometimes they came late. Farmers no longer knew when to sow their fields. When the rains came, they often seemed more intense than in previous years. Strong rainfall and hail could damage the crops. With increasingly unreliable rains, Arturo and his neighbours demanded that government authorities improve irrigation infrastructure. Local politicians made ambitious promises during their election campaigns, but few delivered. Life was hard and the future uncertain.

Why were these changes happening? *The Earth is growing old*, an old man in the village later remarked to me. We had entered a new time where the water, soil, and climate were changing. Villagers disagreed about the causes for those changes. Some used moralistic arguments: problems emerged in the environment because people treated each other and the world around them with disrespect. Some pointed to environmental contamination in the local sphere, including plastic bottles that people threw into rivers and mining operations

nearby. Others, especially among the younger generation, spoke in terms of global warming – big industry around the world was causing climate change.¹³

After several brief visits in the preceding years, I arrived to the Cordillera Blanca in January 2017 to conduct 20 months of ethnographic fieldwork. Located in the northern Peruvian Andes, the region is the country's largest glaciated area. Every year, it attracts tourists from around the world to trek its valleys and climb its immense peaks. The area has also hosted numerous Peruvian and foreign scientists who have extensively documented the processes and impacts of climate change in the Peruvian Andes (Mark and Seltzer, 2005; Maussion et al., 2015; Rabatel et al., 2013; Vuille et al., 2008). The Cordillera Blanca has lost around 30% of its glacial cover since 1930 (Schauwecker et al., 2014). A number of recent studies have outlined the hydrosocial risks arising from glacial retreat such as glacial lake outburst floods (GLOFs) (Emmer et al., 2014; Vilímek et al., 2014). On the basis of flood models, researchers point to a particularly high risk of GLOF at Lake Palcacocha which could affect the regional capital of Huaraz (Frey et al., 2018; Somos-Valenzuela et al., 2016).

The Cordillera Blanca is a comparatively young mountain range that started forming around 13 million years ago. Its peaks are distinctly ragged. Glaciers are attached directly to summits and rock walls, making them unstable and prone to breaking off. It contains numerous glacial lakes that threaten to spill over their banks and flood the valleys below. Its towns lie in exceptionally close proximity to large glaciers (Bode, 1989, pp. 4-6).

The region's history in the past five centuries has been shaped by colonial domination. In the 15th century, the Inca Empire expanded from Cusco in the southern Andes and took control of the Cordillera Blanca. The Incas forced people in the region to speak Quechua and eradicated other languages. Contemporary Quechua in the Cordillera Blanca is notably distinct from the Cusco variety in terms of vocabulary and grammar, pointing to a possible influence of now-extinct languages. In the 16th century, Spanish colonisers defeated the Inca Empire and implemented a system of forced labour. Subsequent to Peruvian independence in 1821, a system of large landholdings (*haciendas*) kept rural Andeans working in serf-like conditions to the benefit of the country's elites, who were largely descendants of Spanish colonisers (Bode, 1989, pp. 7-8). A 1969 reform largely moved land ownership into the hands of small-scale farmers (Poole, 2004), yet marginalisation of Quechua-speaking villagers is

¹³ Rasmussen (2015) and Jurt et al. (2015) encountered similar discussions on environmental change and causality in other Cordillera Blanca communities.

ongoing, manifested in discursive deprecation, continuing widespread poverty, and unequal political agency. Since the 15th century, the Cordillera Blanca's original inhabitants have faced persisting domination by Incas, Spaniards and European-descendant rulers of the Peruvian republic (Bode, 1989, p. 8).

Anthropological studies have described a pervading sense of state abandonment in the Peruvian Andes (P. Harvey, 2005; Poole, 2004; Rasmussen, 2015). In the villages above Huaraz, I encountered a widespread feeling that government authorities were not doing enough to fulfil the residents' needs. Roads were often falling apart, and people faced irregular electricity cuts. Locals encountered a state apparatus that appeared unable or unwilling to address their needs. Linked to this is a social imaginary in Peru that higher altitudes are less developed. Accordingly, urban elites regard both people and the environment in the higher mountains as more unruly (Rasmussen, 2015, p. 28).

Some authors have described the rural inhabitants of the Cordillera Blanca as 'indigenous' or 'Indians', contrasting them to a 'mestizo' or mixed urban population. These categories are not only racial, but also manifested in dress and social practice (Bode, 1989). Like Rasmussen (2015, p. 29), I found that villagers rarely use the term 'indigenous' as a reference point. Rather, they might define themselves as farmers (*agricultores*). In broader terms, Peruvian authorities promoted a discursive shift during the land reform in the late 1960s to define Andean villagers as peasants (*campesinos*) rather than with the derogatory and racially charged term '*Indio*' (Bode, 1989, p. 223). For some, the term '*campesino*' now also has a belittling ring to it – I heard few people using the word during my fieldwork.

In the past century, Huaraz has witnessed two major disasters: a flood and an earthquake. On December 13th, 1941, a devastating flood of water, mud, and rock swept through the city of Huaraz. Just after 6 a.m., Lake Palcacocha's natural moraine dam broke and set free around 12 million m³ of water. It washed away the smaller Lake Jircacocha further below and cut through the centre of Huaraz, destroying about a third of the city. The flood left around 1800 people dead (Wegner, 2014).

After the flood, government officials in Huaraz set up a dedicated authority to address glacial lake hazard.¹⁴ Over the years, the Glacier Authority has existed under numerous

¹⁴ In the natural scientific literature on flooding, authors typically differentiate between hazard and risk: while hazard denotes the physical threat of an event such as an avalanche or outburst flood, risk arises when a hazard threatens particular values such as human life or property. In this sense, risk is a combination of physical hazard, values at stake, and the vulnerability for harm to occur (Kron, 2005).

names and administrative formations. Today, it is part of the National Water Authority (ANA) as the 'Glacier and Lake Evaluation Area' (*Área de Evaluación de Glaciares y Lagunas*). Between the 1950s and 70s, the Glacier Authority implemented numerous safety projects at glacial lakes in the Cordillera Blanca, building dams and drainage systems to reduce GLOF hazard. In 1974, authorities completed two concrete dams and a drainage canal at Lake Palcacocha. While glaciers have retreated at unprecedented rates in recent years, Peruvian authorities' capacities to address glacial lake hazard were significantly reduced following cutbacks and privatisations of state-owned utilities in the 1990s and political decentralisation since the 2000s (Carey, 2010). Today, the Glacier Authority only exists as a monitoring agency and the Ancash Regional Government is formally responsible for directing glacial lake safety efforts in cooperation with several other national and local state authorities. Following this institutional fragmentation along with governmental instability and widespread corruption allegations at a regional level, authorities have been slow to respond to increased flood hazard at Palcacocha and other lakes. Chapter 4 explores these dynamics in more depth, highlighting how international discussions about climate change renewed older concerns about flood hazard in the Cordillera Blanca.

On May 31st 1970, Huaraz was hit by a magnitude 7.9 earthquake that destroyed almost the entire city. Most constructions were made of adobe mud bricks and could not withstand the earth's violent forces (Bode, 1989). Thousands lost their lives in the destruction – with a population of around 65,000 at the time, Huaraz counted 20,000 casualties (Bode, 1989, p. 30). Villagers told me that urban areas saw the greatest losses: as on any typical afternoon, most farmers were tending to their fields when the earthquake struck, while numerous city dwellers died in houses or in the narrow streets of Huaraz.

The earthquake caused even greater damage to the small town of Yungay, an hour's drive north of Huaraz. According to a local of Yungay who was a teenager at the time, a massive avalanche came down from Huascarán, the highest mountain in Peru. In less than three minutes, it reached Yungay and buried the entire town under a mass of ice and debris. Some local children only escaped death because they were attending a circus on the outskirts of town. The disaster left around 15,000 people dead (Carey, 2010, p. 130).

After the earthquake, geologists declared Huaraz as unsafe and authorities initially planned to relocate the city. This ultimately failed due to people's resistance – they did not want to leave their home (Bode, 1989, p. 79). As Huaraz was gradually rebuilt in the 1970s, Quechua-speaking farmers from nearby villages in the Cordillera Blanca increasingly sought

to settle in the city. North of Huaraz, between the Paria and Auqui rivers, lay a patch of land that the 1941 flood had devastated and that nobody had sought to resettle. Strewn with boulders, the land was cheap, and provided easy access to education and work opportunities in Huaraz. With no public transportation to the villages at the time, farmers had to walk for hours to reach the city. Villagers began building small mud-brick houses and the area eventually emerged as a district called Nueva Florida. Most retained their homes and agricultural plots in the village, regularly commuting between city and countryside.

According to early settlers who arrived in Nueva Florida around the mid-1970s, local authorities initially sought to prevent construction in the area, which they considered unsafe after the 1941 flood. In addition to Palcacocha, it sat below the lakes Cuchillacocha and Tullpacocha. The settlers refused to give up on their newfound opportunity to live near the city, and eventually officials relented. By the 1980s, the authorities had largely left Nueva Florida to its own devices.¹⁵ Among the settlers were Saúl's parents, who bought land in Nueva Florida in the mid-1980s when Saúl was a small child. This property would later become the subject of Saúl's lawsuit against RWE.

As the district grew, city authorities eventually began to install urban amenities including roads and electricity. The district expanded further after a boom in multinational mining brought labourers from other parts of Peru to Huaraz. Over time, property prices in Nueva Florida increased astronomically. While the m² only cost a few cents US\$ in the 1980s and 90s, prices ranged between 300 and 400 US\$ per m² in 2018. The early settlers made a fruitful investment.

Huaraz authorities' early worries about settling Nueva Florida proved well-founded. Palcacocha grew because of glacial retreat, and by 2009 reached an even greater volume than before the 1941 disaster. If that event repeats itself, the flood wave would wash through Nueva Florida before inundating lower areas in Huaraz.

Born in 1980, Saúl has come of age in a changing landscape. He grew up in a village near Huaraz and went to school in the city. Like most villagers in the area, Quechua was his first language, and he faced discrimination during his years at school. Since his childhood, Saúl enjoyed roaming in the mountainous landscape. Growing up, his father told him stories of guiding foreign tourists to the region's peaks and working at glacial lake infrastructure projects in the 1970s. After finishing school, Saúl studied at the Peruvian Association of

¹⁵ See Huggel et al. (2020) for a discussion of this history.

Mountain Guides, a prestigious local institution that offers a gruelling three-year course to become a licensed mountain climbing guide. After gaining qualification, this offered Saúl and his family a lucrative income during the yearly climbing season between April and September. While he and his family continued to farm the fields around their house, sustaining themselves and selling excess produce at local markets, Saúl's earnings as a mountain guide enabled them to build a house, buy an old Toyota station wagon, and send their oldest child to university. Today, Saúl continues to live in his native village with his wife and two children, a stone's throw from his parents' house where he was born. The family frequently commutes between the village and their house in the Nueva Florida district of Huaraz.

After arriving in the Cordillera Blanca to conduct fieldwork, I settled in a small village neighbouring Saúl's and lived with a local family. It was my deliberate decision to establish my own social network in the area and distance myself to some extent from Saúl. As I discuss in Chapter 1, I knew that some of his neighbours were suspicious about the legal claim. I maintained a room in the nearby city of Huaraz that had the luxury of stable internet access. I spent much of my time accompanying villagers in their daily activities, learning Quechua, and listening to their concerns about the future.

Today, people in the Cordillera Blanca are facing new difficulties in the context of climate change. As glaciers retreat at an accelerated pace, many people, particularly in rural areas, are concerned about future water availability. In scientific terms, glaciers act as water storage devices and are particularly sensitive to climatic changes (Drenkhan et al., 2015). In the Cordillera Blanca, many villages depend on glacial meltwater for irrigation and household use. Farmers' observations of decreasing water availability are backed by scientific studies in the region (Jurt et al., 2015). As in other parts of the Peruvian Andes, villagers around Huaraz have come into contact with scientific discourses on climate change through government authorities, NGOs, and discussions with foreign tourists (Jurt et al., 2015; Rasmussen, 2015; Stensrud, 2016a). Climate change discussions often confirm villagers' observations of radical transformations in their environment, exacerbating their feelings of uncertainty and fear of water scarcity (Stensrud, 2019b, p. 2). Writing about a rural community in the Colca Valley, Stensrud argues that climate change is rapidly and irreversibly transforming people's experience of their environment. Decreasing water availability threatens people's livelihoods, producing uncertainty about the future. For rural Andeans, climate change is a 'lived reality that they struggle to apprehend, negotiate and respond to' (Stensrud, 2016a, p. 77). According to another ethnographic study, locals have pointed out that rains feel colder,

the sun feels hotter, they have difficulty sowing as seasonal rain begins irregularly, frost damages crops and kills animals, pastures are disappearing, children are increasingly falling ill, and glaciers are retreating (Rasmussen, 2016b, pp. 78-79). During my research, I encountered all these same concerns, which people are increasingly expressing in relation to global climate change.

During my time in the Cordillera Blanca, I made frequent visits to Lake Palcacocha. After giving rise to a deadly flood in 1941, it was causing concern once again. Fed by melting glaciers, it had grown dramatically in recent decades, with scientists warning that a potential outburst could cause an even greater disaster (Somos-Valenzuela et al., 2016). If a large avalanche fell into the lake, it could cause a massive flood wave that would devastate the city below. While I was conducting fieldwork, government authorities in Huaraz were making plans to implement flood risk reduction measures at the lake. As a first step, this would involve an early warning system to allow for an evacuation of the danger zone downstream when a flood took place. According to authorities, a flood would take around 45 minutes to reach Huaraz. Officials also planned to build a new dam and drainage system at the lake. In a region plagued by accusations of corruption and political instability, these projects have progressed slowly since scientists raised alarm about renewed lake growth in 2009.

In the interim, authorities directed the installation of ten plastic siphons that continuously pumped water out of the lake. This reduced the water level by several metres, though some scientists I spoke to said that the intervention was largely cosmetic as it hardly reduced the risk of flooding. In the meantime, a small team of men, mostly stemming from nearby villages, monitored the lake day and night. Isolated at a high altitude, they kept in contact with city authorities via a two-way radio. Later, authorities installed an improved communication system that provided spotty internet access. The lake workers performed maintenance on the siphons, ensuring the provisional flood risk infrastructure continued functioning. I spent numerous days and nights accompanying the lake workers on their daily duties. They appeared to be witnessing climate change on the front line, sleeping in a small shack above Palcacocha with a glorious view of the melting glaciers. This ethnography frames Chapter 4 in which I examine the social, political, and ontological relations at stake in infrastructural works at Lake Palcacocha.

The court

My second primary site of ethnographic research was the legal process between Saúl and RWE. This involved participation in court hearings and legal strategy discussions. In Chapter 3, I offer an ethnographic account of how evidence is produced and circulated through legal documents. Saúl first travelled to Germany in November 2015 to file his case at the State Court in Essen. In November 2016, he returned for a hearing at the same court. The case was subsequently dismissed on the grounds that legal causality for climate change impacts could not be established under German law, and Saúl's lawyers appealed in early 2017. In November of that year, Saúl returned to Germany for a hearing at the Upper State Court in Hamm. That hearing provided ample ethnographic material which frames my discussions in Chapters 1, 2, and 3. Accompanying Saúl during visits to Germany for legal hearings, I acted as his guide and interpreter. I was only relieved from these duties when hearings were ongoing as the courts provided their own interpreters.

Since the claim began, I have stood by Saúl to help him understand and navigate the legal process. This has involved more than literal translation between English, German and Spanish – acting as an intermediary between Saúl in Peru and his legal team in Germany, I engaged in conceptual translation of legal and scientific discourses that were unfamiliar to Saúl. In communicating with Saúl's lawyers and backers in Germany, I sought to translate Saúl's concerns for people who lacked an experiential understanding of environmental change in the Andes. This ongoing process of conceptual translation between languages, discourses, and ways of being, provided valuable ethnographic evidence of how people navigate different knowledges and values at stake in discussions about climate change.

UN climate negotiations

International discussions and activist discussions about climate change constitute my final major ethnographic site. Accompanying Saúl, I attended two major UN climate summits (Paris 2015 and Bonn 2017). At these summits, Saúl participated in numerous public events to promote his cause. He also gave countless interviews to worldwide media outlets. As usual, I acted as his guide and interpreter during these events. The November 2017 court hearing took place during that year's climate summit. In Chapter 2, I follow Saúl's participation in a demonstration for climate justice which took place during the summit.

Overview of chapters

Chapter 1, 'Stirring up trouble: Crafting a climate justice lawsuit', traces how the claim between Saúl and RWE emerged and discusses the conceptual and political implications of climate litigation. Ethnographically, I tell the story about how Saúl came to collaborate with German climate activists in a strategic legal claim for climate justice. The chapter provides a detailed overview of the claim's legal argumentation, drawing on discussions in socio-legal studies to place it in a wider context of strategic climate litigation that aims to enact social and political change. I engage with anthropological discussions about climate change and scale to argue that the lawsuit's framing of climate change in terms of neighbourly relations helps make it amenable to ethnographic study. I trace the social practices that assert the link between Saúl and RWE, showing how climate litigation brings ethical notions of responsibility to bear on social relations in the context of global warming.

Chapter 2, 'The politics of personhood: Between corporations and earth beings', traces how Saúl, RWE, and Andean earth beings emerge as potential participants in the claim. The lawsuit makes climate change personal by shifting the political focus from global dynamics to direct relations between human and corporate legal persons. Ethnographically tracing the claimant's journey from the Peruvian Andes to the German courts, this chapter shows how the restrictive legal framework excluded other nonhuman persons such as Andean earth beings that provided motivation for the claim. But despite their formal invisibility, the invocation of earth beings provided public justification for the claim as it garnered international media attention. Both within and beyond formal legal frameworks, nonhuman ecosystem persons can play a role in political discussions about climate change. Building on work in anthropology and socio-legal studies, this chapter argues that paying attention to the politics of personhood in contemporary environmental disputes can highlight the socio-material relations at stake, opening discussions about new forms of political engagement.

The third chapter is entitled 'Causality in the courtroom: Making relations in times of climate change'. It provides an in-depth view on legal discussions about causality in the trial between Saúl and RWE. I trace the legal arguments that draw a causal chain between the plaintiff and defendant to establish a neighbourly relation, and I show how the company's lawyers sought to unmake this relation in court. After providing a theoretical overview about how facts are constructed in the legal context, I examine each step of the alleged causal link:

RWE's contribution to global warming, the relation between global warming and glacial retreat in Peru, and the connection between glacial retreat and the flood risk affecting Saúl's house. A focus on scientific and legal argumentation about causality highlights how knowledge emerges in the courtroom as serviceable truth – in the absence of absolute certainty, judges seek truths that are good enough to adjudicate the case. Causality is a key issue at stake in legal and political discussions about climate change but has seen little explicit attention in anthropology. I argue that an anthropological focus on causality can highlight how social claims about climate change entangle communities, corporations, governments, and nonhuman beings in politically charged socio-material relations.

The fourth and final chapter, 'Glacial politics at Lake Palcacocha', examines what other relations are at stake in people's engagement with the changing environment of the Peruvian Andes, but that are obscured in legal discussions at the German court. This chapter traces historical concerns about glacial retreat in the Cordillera Blanca and shows how authorities have addressed flood risk through infrastructure projects. I define 'glacial politics' as a field of dispute over the knowledges and ways of being at stake in public concerns about glacial retreat. Methodologically, I trace the scientific and relational standards at play in historical and recent infrastructure projects as glacial retreat in the Andes became enmeshed in global discussions about climate change. Following political and public discussions from an ethnographic perspective, I show how Lake Palcacocha emerged as a site of glacial politics with concerns over both flood risk and potential water scarcity. Finally, I build on anthropological discussions about infrastructure and ontology to show how lake workers integrated techno-scientific knowledge practices with relational socio-environmental engagements. I argue that earth beings thus emerge as potential actors in the politics of glacial retreat. My contribution lies in highlighting the broad stakes of glacial politics that entangles diverse ontological standpoints.

[Chapter 1] Stirring up trouble: Crafting a climate justice lawsuit



Figure 4: Saúl and Julio Luciano at the courthouse in Essen before filing the lawsuit against RWE, November 2015 (Photo: Germanwatch/Hubert Perschke, used with permission)

On a fateful day in November 2015, Saúl Luciano Lliuya took a historic step by suing the German energy giant RWE for climate justice. Fighting the biting winds, we walked the cold streets up to the courthouse in the German city of Essen. It was Saúl's first trip outside Peru, and he had a purpose: to hold RWE responsible for dramatic changes in his Andean environment. He had travelled with his father Julio, who was remarkably fit at the age of 75. I froze alongside them in my thick winter coat, but the two Peruvians sported only light jackets. *This feels like we're at 5000 metres in the Andes*, remarked Julio when it began to snow.

We trekked to the courthouse alongside a group of activists as a TV crew filmed our progress. I accompanied Saúl as his interpreter. Working with the NGO Germanwatch, I had helped put the lawsuit together. Alongside us walked Roda Verheyen, Saúl's lawyer. At the

age of 43, she had spent most of her adult life fighting for the cause of climate justice. Representing Saúl in the case against RWE was the pinnacle of her career.

Arriving at the courthouse, Saúl and Roda entered the building to submit the lawsuit. I waited outside with a delegation from Germanwatch, the German NGO that supported and raised funds for the claim. We had worked closely with Roda to assemble legal and scientific arguments to hold RWE partially accountable for climatic risk in the Andes. The company had no presence in Peru – the claim concerned its contribution to climate hazard in South America through its greenhouse gas emissions in Europe. In legal terms, the claim asserted that Saúl and RWE were neighbours, applying provisions that are typically applied in neighbourhood disputes to draw a connection between the defendant and plaintiff via global warming. With the lawsuit, Saúl spearheaded the global cause for climate justice. Aside from reducing the risk of flooding that threatened Saúl's house, the people at Germanwatch sought to set a precedent to hold major emitters accountable. This could have massive ramifications for global industry – past emissions could become an economic liability. Germanwatch's goal was to push energy producers towards adopting more sustainable business models in an effort to prevent even more devastating climate change.

Saúl came to the claim from a different standpoint. He felt a profound connection with the mountains in his environment.¹⁶ As glaciers receded, the environment was under threat. His stated aim was to defend the mountains in Peru. After submitting the lawsuit, Saúl spoke to journalists and TV cameras outside the courthouse: 'I'm making this claim because the mountains in Peru are suffering. The glaciers are melting. We haven't caused this problem – it's the big companies like RWE who have caused the pollution. Now they have to take responsibility.'

In this chapter, I take the lawsuit as my point of departure to discuss the conceptual and political implications of climate litigation from an anthropological perspective. The claim draws a neighbourly connection between Saúl and RWE that raises novel analytical and political potentialities for addressing climate change. I show how a focus on neighbourly relations makes climate change amenable to ethnographic study. I trace how the lawsuit emerged as activists and environmental lawyers around the world have increasingly promoted legal mechanisms to address climate change. Reviewing the claim's legal

¹⁶ In Chapter 2, I elaborate in more detail how Saúl engaged the mountains as living beings.

argumentation, I demonstrate how the lawsuit configures Saúl and RWE as neighbours on a warming planet.

An unlikely alliance

I'll do it. I'll do the claim.

It was December 2014. Saúl smiled and looked around the table of his two-story adobe house. I interpreted from Spanish to German for the three representatives of Germanwatch who were finishing their plates of guinea pig and potatoes with red Andean chili sauce. Saúl's wife Lidia had prepared a special meal for an unlikely visit of foreign guests. In their native village of Llupa, we sat at the table with Saúl's father Julio and several other family members.

All right then, said Christoph, the head of Germanwatch, whose words I interpreted into Spanish for the Peruvians. He smiled and looked Saúl into the eyes. *We're going to court!*

In the previous months, we had begun discussions with Saúl's father Julio about organising a climate litigation claim against a major greenhouse gas emitter. Julio owned a house in Huaraz that faced a major risk of flooding from the Palcacocha glacial lake. According to our scientific analysis, this was due to climate change.¹⁷ Julio had expressed interest in making a legal claim, but told us over lunch in the village that he had divided his property among his seven children. To our surprise, Saúl took a leap and offered to make the claim himself. At 34, Saúl was the youngest of his siblings and the only son. Julio looked to him fondly as we agreed to arrange a call with the lawyer in Germany.

Over their respective lifetimes, Julio and Saúl have witnessed dramatic changes in their mountain environment. In 1941, when Julio was one year old, an outburst flood from Lake Palcacocha devastated the city of Huaraz and killed thousands. Living on higher ground in the upstream village, Julio and his family evaded death. Throughout Julio's life, glaciers in the surrounding Cordillera Blanca have retreated dramatically. Since he worked as a mountain climbing guide in the 1970s, glaciers in the region have retreated dramatically. Stepping in his father's footsteps, Saúl became a mountain guide in the early 2000s. Both father and son

¹⁷ The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) highlights glacial retreat in the Cordillera Blanca as a significant climate change impact (IPCC, 2014a, p. 1519). A number of studies point to the link between climate change, glacial retreat, and glacial lake outburst flood risk in the area (Emmer and Cochachin, 2013; Hegglin and Huggel, 2008; Mark and Seltzer, 2005; Vuille et al., 2008).

share a deep concern for glacial retreat. They see glaciers as vital sources of water that enable agricultural livelihoods, and as living beings that are suffering in uncertain times. Their dilemma was that they did not see themselves as responsible for this predicament. Large industry and wealthy countries caused global warming and glacial melting. Yet Julio and Saúl lacked any means of taking action – until a mutual friend brought a small delegation of German climate activists into their village.

Around the world, people face the devastating impacts of climate change. These effects are particularly evident in the Peruvian Andes, where the world's largest concentration of tropical glaciers faces exceptionally high rates of retreat (Vuille et al., 2008), as I discussed in the Introduction. Rural Andeans confront the environmental shifts associated with climate change in a longstanding context of environmental vulnerability and social marginalisation. Faced with dramatic threats to his livelihood and way of life, Saúl came to the international stage in an unprecedented claim for climate justice. He joined forces with German activists who had fought for years to find lasting political solutions for climate change. The legal claim drew a connection between Saúl – in his Andean environment and RWE – with its coal-fired power plants in Europe – as neighbours. This offers an opportunity for reflection on how to study climate change ethnographically. Taking inspiration from the lawsuit's analytical approach, I examine climate change by tracing the legal, scientific, and activist practices through which people assert and contest moral relations in the context of global warming. Addressed through this lens, social and political disputes about climate change address a core issue of anthropological interest: how do people make and break social relations with one another?¹⁸

Social relations in times of climate change: anthropological approaches

As I discussed in the Introduction, recent years have seen a significant growth in anthropological literature on climate change.¹⁹ Numerous studies seek to capture climate change impacts ethnographically. While the natural sciences have extensively studied climate change from a physical perspective, anthropology can show how people engage with these changes. Collaborating with natural scientists, anthropologists can contribute

¹⁸ This point reflects Whittington (2016) who argues that climate change involves discussions about how human-atmosphere relations should be configured.

¹⁹ See Baer and Singer (2018) as well as O'Reilly et al. (2020) for recent overviews.

sociocultural aspects to climate change research (Crate, 2011). Using anthropological methods, researchers have produced local impact studies about farmers' responses to climate change in Burkina Faso (Roncoli et al., 2001), adaptation to sea-level rise in Bangladesh (Finan, 2009), and melting glaciers in the Peruvian Andes (Bolin, 2009), among others. Some anthropologists have collaborated with natural scientists to develop adaptation strategies (e.g. Jurt et al., 2015; Orlove et al., 2002; Roncoli, 2006). I have contributed to interdisciplinary research that seeks to provide policy guidance for loss and damage related to climate change (Motschmann et al., 2020). According to one review, anthropology can offer perspectives on people's cultural belief and experience of the changing environment to climate change discussions (Roncoli et al., 2009).

Going beyond the study of impacts within a natural scientific framework, other anthropologists have studied broader social processes relating to climate change, including disputes over knowledge and political action. An ethnographic perspective allows us to study how knowledge about climate change is constructed, circulated, and contested. This can provide a critical view on how climate change debates are shaped by politics, power dynamics and cultural values (Barnes et al., 2013). Some studies adopt an anthropological perspective to study climate politics at a local (Knox, 2015) and transnational level (Callison, 2014). Others argue that anthropologists should draw on ethnographic insights about people's engagement with climate change to contribute community perspectives for policy discussions (Barnes et al., 2013; Crate, 2011). By working with governments, NGOs, and communities, anthropologists can become involved in political discussions as engaged scholars (Baer and Singer, 2018, p. 142).

What do these perspectives teach us about ethnographic practice? Where might we begin an anthropological study of climate change? A significant difficulty is the issue's vast scale. How might we investigate a 'global' phenomenon such as climate change in a discipline traditionally dedicated to studying people in their 'local' context? A first step may be to unpick the terms 'local' and 'global'.

According to Marilyn Strathern, scaling is a form of social analysis. It simplifies social relations and transnational linkages into distinct categories and designates these with varying degrees of meaning and significance. Scale is a matter of perspective rather than magnitude: adopting a particular analytical scale allows us to perceive certain issues (Strathern, 2005, pp. xiii-xiv). The act of scaling involves imposing a perspective, allowing us to apprehend particular aspects of the environment and social world (Hastrup, 2013b, p.

148). In geographic terms, scale is a tool that shapes our understanding of the world. As an epistemological frame, it discursively orders space to highlight particular hierarchies or connections. A common scalar approach involves an analytical hierarchy between global and local: if we assume that the global perspective is overarching, we can study how individual localities are shaped by global processes (Marston et al., 2005). Traditionally, anthropology has focussed on the 'local'. Moore argues that the concept of the 'local' emerges in opposition to the 'global'. Accordingly, anthropology can approach large-scale processes by studying their local manifestations and effects (Moore, 2004).

Drawing on ethnographic research with climate scientists in the 1990s, Tsing (2005, pp. 101-106) argues that climate change has become the prototypical 'global' environmental issue. The image of globality arises from climate models that depict atmospheric processes across the planet. Constructed at a global scale and feeding on data input from local sites around the world, climate models have shaped public understandings of climate change as a global issue and provide the conceptual basis for finding global political solutions. Some anthropological studies of climate change have built on such a scalar perspective. Crate and Nuttall call for a multidisciplinary research approach to study the causes and impacts of climate change in terms of global transformation (Crate and Nuttall, 2009a). This involves a scalar approach that characterises climate change as a global process with local impacts. If we take a global scaling of climate change at face value, it becomes an all-encompassing process that appears impossible to capture analytically from an anthropological perspective. In these terms, we can only study local manifestations of the broader process. Such a discussion imposes a presupposed notion of wholeness (Moore, 2004, p. 76), implying that we can only fully comprehend climate change through a global perspective; the local, in this sense, is merely an instantiation of the global. From this standpoint, ethnographic study offers a limited perspective on particular local impacts of climate change. In adopting such a framework, argues Tsing (2005, p. 58), we run the risk of falling into a trap whereby we oppose ethnographic particulars to broader global structures. For the human geographers Marston et al. (2005), hierarchical notions of scale that conceptualise the local as part of an overarching global sphere can disempower particular groups and people by relegating them to the local domain.²⁰ My research provides an example of how people have countered this distinction, bring 'local' concerns about climate change into 'global' discussion forums.

²⁰ Similarly, Mackinnon (2011) calls for an analytical focus on scalar politics to show how scalar notions embody and express underlying power relations.

As I elaborated in the Introduction, I follow Krauss (2009) in his suggestion that anthropologists take a multi-sited approach to researching climate change. Engaging with climate change impacts and discussions in different places, we can study how people conceptualise it in terms of a global process with localised impacts. This can lead us to study people's scaling practices – how they engage with concepts such as the global and how this shapes their lives (Moore, 2004, p. 81).²¹ Knox (2015) suggests that we approach climate change via its material processes to study the energy relations it invokes. Rather than opposing local developments to a global phenomenon, we can trace the material and social relations through which climate change emerges and becomes contested. My aim is not to study a 'local' manifestation of climate change, but rather to trace ethnographically how people come to understand climate change as a global process which they engage from within a local context. I follow Tsing's approach of studying ethnographic fragments involved in global connections characterised by uneven frictions (Tsing, 2005). My research follows the frictions that arise in legal engagements over climate change.

A key issue here is that our interlocutors also face the challenge of scale when engaging with climate change. Ethnographically, we can trace the practices through which people try to make sense of news reports about increasing greenhouse gas emissions, political disputes over how to limit the increase in global temperatures, and concerns over rising sea levels. The lawsuit between Saúl and RWE is an attempt to make these processes knowable and socially relevant by configuring climate change in terms of neighbourly relations. Rather than focussing on local impacts or global processes, I take the legal claim as an opportunity to study climate change in terms of the links that people draw between emissions and their consequences. Climate litigation rescales climate change, bringing a global problem to regional or national courts (Setzer and Vanhala, 2019). The claim conceptualises climate change in terms of RWE's emissions from its coal-fired power plants in Europe and resulting climate change impacts in Peru via the process of global atmospheric warming. The legal process produces a connection between Saúl and RWE as neighbours. Taking conceptual inspiration from the lawsuit, my research approach is to trace the social practices that enact this connection. I show how Saúl and his lawyers strategically mobilised legal tools to create a direct relationship between a polluting company and an impacted individual who confront each other as persons with equal standing under the law.²² Characterising climate change in

²¹ In a similar argument, Tsing (2005, p. 58) suggests that anthropologists study 'scale-making projects' through which people come to regard particular issues as local or global.

²² In Chapter 2, I explore further how Saúl and RWE become constituted as legal persons in the judicial process.

terms of neighbourly relations makes it ethnographically amenable: while we might struggle to capture a global process, we can follow specific relational claims. The lawsuit provides an empirical opportunity to study how people invoke ethically charged social relations to make sense of and act on climate change.

Making a climate litigation claim



Figure 5: Saúl at the Upper State Court in Hamm, November 2017. To his left sits Roda Verheyen, his leading lawyer; to his right is the court-appointed interpreter and to her right sits the author (Photo: Alexander Luna/Yuraq Janka, used with permission)

You're the person who travelled the farthest to arrive here, said Judge Meyer as he looked Saúl into the eyes. The judge was presiding over a hearing of the Upper State Court in Hamm in the case of Luciano Lliuya v. RWE. It was November 2017, two years after Saúl initially filed the claim. After the State Court in Essen ruled that the case was not admissible in 2016, Saúl and his lawyers had presented an appeal at the higher court in Hamm. Saúl sat next to his lawyers in a courtroom full of mostly sympathetic spectators. Opposite the plaintiff's table sat RWE's legal team.

Saúl's expression revealed mild shock as the judge addressed him. A court-appointed interpreter sitting next to Saúl quickly relayed him the judges' words. The hearing had only just begun. The day before, Roda had told Saúl it was unlikely that the judges would ask him to speak in court. In her long experience of environmental court trials, the lawyers did most of the talking. This judge took a more informal approach.

Did you have a good trip? How are things in Germany?

Saúl sat up, maintaining eye contact with Judge Meyer, but his expression started to relax. *Good, thank you, the Germans are very nice.* The interpreter repeated his words in German.

The judge began to ask a series of factual questions. I scribbled frantically in my notebook. German law prohibits video and audio recordings during court proceedings, and I hoped to capture the day's events for ethnographic posterity.

What size is your property?

About 100 m², Saúl replied.

Saúl and the interpreter had difficulties understanding each other. At times, she incorrectly interpreted the judges' questions in Spanish and incorrectly interpreted Saúl's answers in German. Despite the difficulties, the judge carried on his conversation with Saúl.

When and how did you acquire the property?

It was my family's property. My father bought it.

As often happened when journalists asked Saúl multiple questions at once, he answered one question and forgot the others. Saúl still appeared nervous, giving short and concise answers. As the discussion continued, he warmed up to the situation.

But when did your father buy it?

Uh, Saúl stuttered, *1979, or maybe 1980, around then.* Saúl's father bought the property in 1984, but Saúl tends to confuse numbers, especially under pressure. Early in the legal process, I had reviewed the property sale contract.

And since 2014 you have owned the house?

Yes. My parents gave it to the children. Now I own it with my wife.

I was surprised that Judge Meyer asked about such simple factual matters. All this information was in the legal briefs that the judges had likely read in great detail. Perhaps he was trying to assess Saúl's character? To test his authenticity? After his discussion with Saúl, the judge went on to read a long statement analysing the claim's legal merits.

What brought Saúl to a German courtroom where he faced an impromptu interrogation about the ownership rights to his house in Peru? How did he come to collaborate with German climate change activists in an emblematic international legal claim? The NGO Germanwatch had spent two decades participating in UN climate summits pushing for sustainable solutions to a global crisis.²³ As politicians made little progress, activists sought new avenues of action, drawing on analysis from legal scholars about potential litigation strategies.²⁴ On other social and environmental issues, legal claims had moved forward debates when politicians and industry failed to take action. It took dozens of lawsuits against tobacco companies over several decades until the industry acknowledged its responsibility for smoking-related health risks (Rabin, 2001). In a similar vein, climate litigation could push for action against global warming. Since the early 2000s, activists and lawyers had discussed the possibility of making legal claims against major emitters. When I joined Germanwatch in the summer of 2014, I found ongoing conversations about possible strategies under German law. There were discussions about claiming protective measures from a large emitter in German courts. Groups from countries such as Nepal had asked Germanwatch to assist in assessing possible legal pathways, but a concrete claim was yet to emerge.

Leading up to the 2014 UN Climate Summit in Peru, Germanwatch employees took interest in the Cordillera Blanca mountain range in the northern Peruvian Andes. This region is emblematic for its exposure to climate change impacts. Numerous studies point to glacial retreat, flood risk and long-term threats to water security (Hegglin and Huggel, 2008; Racoviteanu et al., 2008; Vilímek et al., 2014). However, the people at Germanwatch were unfamiliar with the region and did not speak Spanish. As I had lived in Peru and had academic and personal ties to the country, I joined the team to seek out people in the Andes who shared our concerns about climate change.

²³ The United Nations Framework Convention on Climate Change (UNFCCC) was adopted at the Rio Earth Summit in 1992. The first United Nations Climate Change Conference (Conference of Parties to the UNFCCC) took place in Berlin in 1995.

²⁴ E.g. on the role of subnational litigation for regulating greenhouse gas emissions (Osofsky, 2007b), the relation between climate change and tort law (Kysar, 2011), and the potential for raising public awareness through litigation (Rogers, 2013).

I reached out to an old friend, a Peruvian agricultural engineer who worked with small-scale farmers in animal husbandry projects. Travelling around Huaraz, he struck up a discussion with Saúl's father Julio after a village assembly. At the time, Julio held a position of authority in the village and was concerned about what the ongoing environmental shifts might mean for his community's future livelihood. After an introduction via my friend, we arranged to visit Julio with a team from Germanwatch after the UN Summit in Lima.

After two weeks of intense UN negotiations, I embarked on an eight-hour bus ride to Huaraz with three Germanwatch representatives. They wanted to see how global warming was changing the Andean landscape and meet this farmer who seemed to share their worries. Via phone we had arranged to meet Julio and Saúl. They met us in the city with their rickety old Toyota van. It had seen better days but managed to carry them on the 30-minute journey down an uneven dirt road from their village to Huaraz.

In our first discussions, my colleagues asked Julio and Saúl about their experience of climate change. I acted as an interpreter while father and son elaborated on their concerns that glaciers were disappearing and that their future was uncertain. If the glaciers disappeared, where would they find water for using in the household and irrigating their fields? We pointed to scientific studies that suggested a risk of flooding for Huaraz from Lake Palcacocha (Emmer and Vilimek, 2013; Portocarrero Rodríguez, 2014). Julio and his wife Juliana had bought land in the district of Nueva Florida in the 1980s. Saúl spent part of his childhood living in a small adobe hut in Nueva Florida where he had easier access to school. According to the studies, Nueva Florida could be swept away almost entirely if there were a flood (Somos-Valenzuela et al., 2016). *It's difficult to foresee a disaster like that*, said Julio when we spoke to him during our visit. *Only God knows when it will happen.*

We wanted to visit Palcacocha and see the situation for ourselves. Saúl offered to take us. As a mountain guide, he had often passed by the lake. Saúl and Julio picked us up at our hotel in Huaraz on an early morning in their old van. We drove up the dirt roads past their village to Cojup Valley. From there, we set off on a strenuous 11-kilometre hike up 700 altitude metres over uneven terrain to the lake, which sits at over 4500 metres above sea level. The narrow green valley lay between dark, towering cliffs. We followed a small path past shrubs, small trees, and slender cows grazing on grassland. Alongside our walk ran a small river. *That water comes from Palcacocha*, Saúl remarked. *It's what we drink in Huaraz.* Suffering from altitude sickness, two of my colleagues turned back halfway to the lake and returned to the van where Julio waited patiently. At the age of 74, he stayed behind. With

Saúl and the Germanwatch director Christoph, it took us six hours to reach the end of our journey.

In the early afternoon, we approached the lake's natural moraine dam. It had a massive gap. *In 1941, the moraine dam broke and the water flooded out. That's what destroyed Huaraz*, explained Saúl. By the moraine dam we found a group of stone huts. Light whiffs of smoke came out of a chimney. An old man approached us. Under a wide-brimmed hat, his face showed a wrinkled smile. After a brief exchange with Saúl in Quechua, he spoke to us in Spanish.

Welcome to Palcacocha!

He introduced himself as Elías. As superintendent for the Regional Government's Palcacocha safety works, Elías received few visitors. In his late 70s, he comes from Saúl's village and had spent most of his life working in the mountains. In the following years, Elías would become a friend and principal interlocutor. At the time of our first meeting, he had worked at Palcacocha for over two years.



Figure 6: Lake Palcacocha in October 2017 (Photo: Alexander Luna/Yuraq Janka, used with permission)

Elías guided us through the broken moraine dam along ten large black plastic tubes. *We use these to pump water out of the lake*, he explained as we made our way up. Finally, we reached a concrete dam. High up in the mountains under the burning sun, we struggled to

take the last steps. At the top of the dam, we laid eyes on Lake Palcacocha in all its magnificence. Blue water sparkled in the sunlight under shining white glaciers. Almost two kilometres across and 500 metres wide, it felt massive.

As we approached the water's surface, a distant crash broke through the silent wind. The glacier ice was cracking. Noticing our alarm, Eduardo told us not to worry: *It's just a small avalanche. That happens all the time.* Far away on the glacier I spotted a flurry of falling snow. *You see, this one didn't even reach the lake.* This was a regular occurrence, I came to learn. But according to scientists studying glacial hazard in the area, a large avalanche falling into the lake could lead to waves overtopping Palcacocha's concrete dam, potentially causing a deadly flood in the valley below (Somos-Valenzuela et al., 2016).

After spending an hour by the lake, it was time for us to head down. Walking back through the valley with my colleague from Germanwatch trailing behind, I began chatting with Saúl about his experience with climate change. As a mountain guide, he climbed the melting glaciers year after year. *When I come back to some glaciers this year, they will have retreated by 20 or 30 metres. It's really extreme.* Glaciers provide the region with water, and if there was no more water, what would be left of life? With troubled eyes, he gazed down the distant valley. For Saúl, climate change was an existential threat.

Saúl first met Roda Verheyen, the main lawyer on the case, in a series of Skype calls following our visit to Peru with the Germanwatch team in which they discussed the possibility of taking legal action. They considered various options, including lawsuits at Peruvian, German, and international courts. As Saúl's preferred option was to directly address a major polluter, the discussions came to revolve around a civil law claim against RWE. Roda explained that the chances for legal victory were low, but that if they won, Saúl would be on the front page of every newspaper in the world. Saúl agreed to join us and an international network of activists in a precedent-setting claim for climate justice. This commitment marked a radical change of course for a shy and unassuming man who had lived his life in the global periphery. It took him to German courts and UN summits where he captured the passions of a burgeoning transnational climate justice movement. Saúl had been nervous about speaking at village assemblies but went on to address thousands of people at major climate marches. He would give countless interviews to the world press. His lawsuit reached greater success than Saúl had ever imagined. I accompanied him throughout this process as an interpreter, confidant, fellow activist, and ethnographer. Over the years, Saúl and I have become close friends.

At this point we might ask – who is the author of the claim? Is it Saúl, Germanwatch, or the lawyers? Saúl did not participate in writing legal documents or developing legal strategy; the lawyers handled this with support from the people at Germanwatch. Saúl’s German collaborators sought to enact legal and political change; his most significant motivation was to support the mountains that he witnessed losing their glacial covers year after year. I elaborate more on Saúl’s relation with the mountains in Chapter 2, showing how he engages them as living beings. Saúl and his interlocutors entered into a pragmatic alliance and embraced a shared cause. As the lawsuit gained public attention in Germany and beyond, its collaborative nature faded into the background. Media profiles often focussed on Saúl as a lone man struggling for justice (Jarvis, 2019; Nugent, 2018). Saúl fit into a useful narrative mould: a historically subjugated subject from the Global South – possibly indigenous, though he never referred to himself in those terms – taking on a powerful multinational corporation. This story lent the lawsuit emotive strength; in fact, it inspired me to write a PhD thesis. The legal process drags on as I write these words in late 2020. By now, the lawsuit has come to define much of Saúl’s life. Several documentary film projects about him are currently in production. The claim emerged collaboratively and continues as a collaborative project. Saúl himself expresses this most succinctly – he has always referred to it as ‘our claim’. ‘Who are “we”?’ I once asked him after he used that formulation in a press interview.

‘I say “we” because it’s not just me in this claim,’ He explained. ‘I have friends who are helping me with this claim, so they are also part of this claim.’

Looking back on his fateful decision to participate in the lawsuit in a conversation several years later, Saúl explained that he felt a responsibility to take action over glacial retreat. ‘It’s something that had to be done.’ Referring to his own feelings, Saúl usually spoke in the second person: ‘If you have the opportunity to do it, you should. Were there risks? Of course. But you just felt like you had to do it.’

Bringing climate change to the courts

In the past 15 years, we have witnessed a global proliferation in climate change lawsuits. One database identifies over 1000 cases worldwide (Ganguly et al., 2018, p. 843).²⁵ With his lawsuit, Saúl joined a growing movement of lawyers and activists who are moving climate

²⁵ See <http://climatecasechart.com/> for the full database; a majority of documented cases are in the US.

change from political discussions to the sphere of law. But why bring climate change to the courts?

For the people at Germanwatch, the lawsuit arose from two decades of efforts in fighting climate change. Klaus Milke, co-founder and former chairman of the board at the NGO, had participated in the UN climate negotiation process since the first summit in 1995. For years, he watched governments flounder in their response to climate change. In 1997, he was in Kyoto to see states find consensus on the first major climate change agreement. He felt sad and angry when the United States refused to ratify the Kyoto Protocol and it did not produce the desired effects. In 2009, Klaus was in the room when governments failed to achieve a follow-up agreement in Copenhagen. Member states finally approved the historic Paris Agreement in 2015, yet greenhouse gas emissions continue to rise, and many countries struggle to cope with devastating climate change impacts. Even with the Paris agreement, governments are not yet on a path that will likely lead to significant emissions reductions to prevent major catastrophic climate change impacts (Whittington, 2016).

Saúl's lawyer Roda Verheyen knew Klaus Milke from the early UN Climate Summits in the 1990s where she participated as a campaigner for Friends of the Earth and later with the German government delegation. In the early 2000s, she wrote her PhD thesis about legal liability for climate change (Verheyen, 2005). As Roda and Klaus became frustrated with the slow response to climate change at UN level, they gave increasing thought to the possibility of legal action against major emitters. If politicians failed to act, ordinary citizens could seek legal protections against climate change impacts based on existing legal provisions. This was also the mission of the Climate Justice Programme, an international network that Roda founded in 2002 with the British environmental lawyer Peter Roderick. Climate change litigation often emerges in response to a perceived institutional failure to address climate change (Fisher, 2013). Given unsatisfactory political action, climate litigation can serve as a tool to fill regulatory gaps and as a catalyst for policy change (Peel and Osofsky, 2015, p. 13). What was needed, Roda later said in reflection, was 'a signal from the real world'. Something relevant had to change to push the political process forward.

Climate change as a legal frame of argumentation is a relatively new phenomenon. While many cases address climate change peripherally, a smaller number of claims revolve explicitly around climate change in their legal argumentation (Peel and Osofsky, 2015, p. 5). As a broad and multi-scalar issue in terms of its causes and impacts, climate change raises complex questions when it comes into the courtroom: who can make claims? What should

accountability mean in the context of climate change? Which issues are legally relevant (Fisher et al., 2017, p. 179)? Climate litigation opens the door for addressing climate change and formulating a response within the existing legal order (Fisher, 2013, p. 248). Judges must determine whether issues raised by climate change can be resolved through the legal process (Fisher et al., 2017, p. 183). This also raises significant anthropological issues about responsibility, human-material relations and the production of knowledge. In the chapters that follow, I address these issues in greater depth.

What does climate change litigation hope to achieve? In public narratives surrounding the claim against RWE and other cases, litigation is portrayed within the broader framework of an effort for ‘climate justice’ (Godard, 2017). Klaus and other activists use this term to inject moral, political, and legal dimensions into global discussions of climate change. In their terms, seeking climate justice means promoting political and legal processes to hold major greenhouse gas emitters accountable for climate change and to support those who face the worst impacts. Climate lawsuits often seek to influence law, policy, and corporate behaviour as well as shift public attention. In a broad sense, climate litigation can shape public, political, and corporate incentives for action in relation to climate change (Peel and Osofsky, 2015). Commenting on the practice of climate litigation, Roda also pointed to a more personal dimension that she engages as Saúl’s lawyer: climate justice concerns the potential violation of individual people’s rights. ‘Private law involves balancing the rights of various entities in the real world,’ she explained, ‘and Saúl’s rights should be enforced’.

Saúl and his supporters hope to set a legal precedent that other people affected by climate change could use to hold greenhouse gas emitters liable – i.e., to make polluters pay.²⁶ Legal scholars have highlighted the broader significance of this claim – ‘a finding of liability in *Lliuya v RWE*²⁷ could potentially have far-reaching impacts, notwithstanding the small sum of sought damages involved’ (Ganguly et al., 2018, p. 862). The potential for legal

²⁶ Rooted in the tradition of civil law, court rulings in Germany usually provide normative guidance for future rulings rather than being strictly legally binding as in most common law systems (Von Ungern-Sternberg, 2013). Nevertheless, a ruling in *Luciano Lliuya v. RWE* could constitute a precedent in a broader sense: numerous other countries have similar legal provisions to those applied in the German case, meaning the plaintiff’s legal argumentation could be adapted for similar cases in other jurisdictions (e.g. under English law: Kumar and Frank, 2018).

²⁷ Saúl’s last name is ‘Luciano Lliuya’. Following Spanish naming practices, Luciano is his father’s first last name and Lliuya his mother’s first last name. Misunderstanding this, the State Court in Essen took his last name to be ‘Lliuya’, defining the case as ‘Lliuya against RWE’. This error was subsequently reproduced by the lawyers as well as numerous media outlets and some legal academics. The Upper State Court in Hamm eventually rectified this error and began referring to the case as ‘Luciano Lliuya against RWE’ (Oberlandesgericht Hamm, legal brief from 13 November 2018 [Saúl Ananías Luciano Lliuya ./ RWE AG, Oberlandesgericht Hamm, Az.: I-5 U 15/17], p. 1)

liability could also put pressure on politicians to take definitive action (Frank et al., 2019) – polluting companies may urge policy-makers to address climate change and avoid future litigation.

In addition, litigation can have an impact on financial markets, affecting costs and business risks for large corporate emitters (Peel and Osofsky, 2015, p. 48). Given the increasing number of lawsuits and potential cases, corporations are under increasing pressure to address climate change-related risk. They face potential liability in terms of managing climate risks, misleading investors about climate risks to business, and failure to comply with legal reporting requirements. With this, climate change potentially extends from an externalised public safety risk to an internalised corporate risk (Ganguly et al., 2018, p. 860). According to Alexander El Alaoui, a climate finance analyst who is the Director for Sustainable Investment at the asset management firm Salm-Salm,

both energy corporations and investors are beginning to take into account the potential financial liabilities stemming from greenhouse gas emissions that could arise through future climate litigation cases. Taking note of these concerns, climate litigation against corporate emitters can provide a financial incentive for corporations to reduce emissions and for investors to move their money away from large emitters.

More broadly, climate litigation can also increase media and public attention for climate change. Through judgements in climate change cases, courts can force governments and private corporations to take climate change seriously (Preston, 2016). Legal cases and the surrounding publicity can influence social norms and values relating to climate change (Peel and Osofsky, 2015, p. 49). The case has already led to broad public discussions in Germany and beyond about responsibility and climate change (Collyns, 2015; Endres, 2015; Schwartz, 2016; Seidler, 2015). Adjudication legitimises concerns about climate change when courts authoritatively state relevant facts, regardless of the final outcome (Fisher et al., 2017, p. 198). Even unsuccessful cases can contribute to social change by helping to change people's attitudes (Ganguly et al., 2018, p. 866).²⁸

While many scholars see climate litigation as an important topic to study, most do not see it as a significant method for addressing the problem of climate change (Fisher, 2013, p.

²⁸ In 1980s Indonesia, social activists mobilised the legal system to make claims against the state. While legal action was often unsuccessful, it helped activists mobilise people and gain legitimacy. For the activists, legal victory meant raising consciousness rather than winning in court (Tsing, 2005, p. 220).

239). Some have argued that climate litigation is not an effective strategy to mitigate emissions and address impacts – the international treaty process would be more efficient to this end. Litigation could fill policy and implementation gaps in areas lacking effective governmental regulation (Hsu, 2008). In the long run, Roda argued in her PhD thesis (Verheyen, 2005), the most effective social response to climate change damage is certainly not for all small-scale farmers or property owners like Saúl to take major companies to court.²⁹ Rather, politicians should establish mechanisms to help people like Saúl cope with climate change impacts. To achieve climate justice, argue activists, the main contributors to climate change – both companies and countries – should help pay for adaptation measures and compensate damages (Boom, 2016). Using a potential legal precedent to put pressure on politics, climate litigation is a strategic effort to produce regulatory and social change.

Broadly speaking, we can differentiate between two types of climate litigation: public and private cases. Public litigation involves cases against governments that seek to pressure public institutions into taking action on climate change. Private litigation goes against corporations. It seeks action from private entities, often in relation to climatic risks and damages (Ganguly et al., 2018, p. 843). While activists have already won a small number of public cases,³⁰ private litigation has seen little success as of the time of writing.³¹ Nevertheless, an improved scientific evidentiary basis and shifting legal conceptualisations of climate change have led to some initial favourable rulings (Ganguly et al., 2018, p. 850).

The rise in climate litigation led to a flurry of academic interest (Fisher, 2013). A recent review identified more than 100 English-language academic journal articles about climate litigation in law and social sciences. Initially, academic literature on climate litigation was dominated by legal scholars, focussing on legal arguments, case typologies and regulatory impact (Setzer and Vanhala, 2019). More recently, some socio-legal scholars have opened the discussion to broader issues including time framing in climate litigation (Hilson, 2018) and activist practices (Rogers, 2018). Little research has focussed on impacts of climate litigation beyond the courtroom (Setzer and Vanhala, 2019, p. 12).

²⁹ Among other factors, high legal costs are a barrier for most potential litigants.

³⁰ Most prominently, the Urgenda case in which a climate activist group successfully demanded that the Dutch government increase its greenhouse gas emissions reduction target (Leijten, 2019).

³¹ I interpret private climate litigation in a strict sense to cover cases against corporations that directly address climate change in terms of causal attribution of harms. As of November 2020, no such cases have been successful.

In the anthropological literature, climate litigation is a largely novel issue.³² My chapter on the scalar politics of the lawsuit between Saúl and RWE (Walker-Crawford, Forthcoming) is the first in-depth anthropological publication to study a climate litigation case. In their review of the climate litigation literature, Setzer and Vanhala (2019) argue that sociological and anthropological research can make a significant contribution by helping us understand the broader social relevance of climate change litigation. Social researchers can show how cases emerge out of particular contexts and trace the construction of claims. Responding to this call, I aim to contribute to these discussions with my ethnographic study of climate litigation. I follow recent anthropological approaches to the study of legal process in its broader context. The anthropology of law offers a starting point to address questions about power and social structures (Goodale, 2017, p. 5). Legal ethnography can entail an active involvement in legal processes (Starr and Goodale, 2002, p. 7). My participation in the claim provides me with an unusual perspective on its formation and on the perspectives of those involved.

Making neighbourly relations in the courtroom

Having reviewed the broader context of climate litigation, I now turn to the claim itself. What does the lawsuit demand of RWE? How does it engage legal discussions about climate change and responsibility?

The legal claim that Saúl submitted to the court in November 2015 is a 39-page German document. The first half draws on scientific literature to argue that Saúl's property in Huaraz faces a significant flood hazard from Lake Palcacocha to which RWE made a quantifiable contribution through the process of climate change: the company's power plants burned coal, emitting greenhouse gases which rose into the atmosphere and contributed to global warming which, in turn, caused glaciers to retreat in Peru, leading to an increased risk of flooding.³³ The latter half of the lawsuit involves a highly technical legal discussion that justifies the claim in terms of German law. When Saúl read a Spanish translation, he had trouble following the claim's scientific and legal language. Saúl made little direct contribution to the document's content, nor to his lawyers' future court filings.

³² See Callison (2014) for a semi-ethnographic study of the Inuit Circumpolar Conference's climate change petition to the Inter-American Commission on Human Rights.

³³ I discuss the causal chain further in Chapter 3.

Saúl's lawyer Roda wrote the document in cooperation with Germanwatch employees, including myself. With support from legal colleagues, Roda developed and formulated the lawsuit's legal argumentation. At Germanwatch, we read countless scientific papers on climatic processes, glaciology, and glacial lake outburst floods. As the only Spanish-speaker on the team, I collected Peruvian government reports and media articles about the situation at Palcacocha. After compiling this information according to legal requirements, we helped Roda write the legal text that she and Saúl later filed at the courthouse. Along with the 39-page lawsuit, they submitted a much larger stack of attachments that included scientific studies, Peruvian government documents, and the deed to Saúl's property.

The lawsuit between Saúl and RWE is an effort to hold a major greenhouse gas emitter accountable for its contribution to climate change impacts. In legal terms, Saúl's lawyers argue that the German energy producer RWE has caused a nuisance to Saúl's property in Huaraz. The plaintiff and defendant are configured as neighbours. Besides looking at the threat of flooding to Saúl's house, the lawsuit is also a test case: can German law be used to prove legal liability when two conflict parties are on different continents and the hazard occurs via global atmospheric processes? Climate litigation cases can lead judges to reconsider fundamental legal categories (Kysar, 2011). Faced with the challenge of climate change, this lawsuit urges German courts to expand their understanding of legal liability and neighbourly relations.

Climate litigation cases often arise out of litigative potential – some legal frameworks offer better opportunities for making claims (Osofsky, 2005, p. 1802). The claim against RWE arose out of combined legal and scientific potential. While Roda and her colleagues had developed possible strategies under German law to establish climate change liability, the large number of existing scientific studies about climate change and flood risk in the Cordillera Blanca region made it possible to identify a concrete problem affecting Saúl's property.

According to the lawsuit,³⁴ RWE's emissions contributed to the concentration of CO₂ and other greenhouse gases in the world's atmosphere. These gases insulate the planet by retaining a larger portion of solar energy, thereby producing the greenhouse effect and global warming. Following scientific studies, this has led to glacial retreat around the world (IPCC, 2014c). In Peru, the lawsuit says, Andean glaciers have melted at a particularly fast

³⁴ Rechtsanwälte Günther, lawsuit from 24 November 2015 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15)

rate. As a result, glacial lakes such as Palcacocha have grown in volume, increasing the risk of a glacial lake outburst flood. The lake sits above the city of Huaraz in the Cordillera Blanca mountain range. As discussed in the Introduction, Palcacocha already produced a catastrophic glacial lake outburst flood in 1941 that killed thousands (Wegner, 2014). Several smaller floods have occurred at Palcacocha and other Cordillera Blanca lakes in more recent decades (Emmer et al., 2014).³⁵

Lake Palcacocha has grown dramatically in recent years, from around 0.5 million m³ in 1974 to over 17 million m³ in 2009 (Portocarrero Rodríguez, 2014). In the city of Huaraz, Saúl owns a house that sits in the path of a potential outburst flood from Palcacocha. Saúl spends most of his time in his village, around 30 minutes' drive from Huaraz in the Cordillera Blanca. His village house and fields lie outside of the danger zone. Saúl and his family live in the Huaraz house when they have commitments in the city. During the university semester, Saúl's son stays in the house to attend classes.

Citing flood models from Texas University scientists, Saúl's lawyers stated that a glacial lake outburst flood from Palcacocha threatened to destroy his house.³⁶ Saúl's lawyers argued that RWE and other greenhouse gas emitters are partially responsible for this flood risk.

To remove the risk to Saúl's property, and to the city of Huaraz, the Regional Government planned to build a new dam and drainage system at Palcacocha. Authorities valued this project at around US\$4 million. The lawsuit did not seek this entire sum from RWE, but only a partial payment in accordance with its alleged contribution to greenhouse gas emissions and climate change. According to the Carbon Majors Report which quantified industrial emissions and linked them to individual companies (Heede, 2014a; Heede, 2014b), RWE is responsible for 0.47% of industrial emissions between 1751 and 2010. Following this, the lawsuit demands that the company pay 0.47% of US\$ 4 million to the Regional Government toward the Palcacocha safety project. That amounts to around US\$ 20,000.

To draw the causal link, the lawsuit asserts a neighbourly relation between Saúl and RWE in accordance with Section 1004 of the German Civil Code:

Claim for removal and injunction

³⁵ See Chapter 3 for a more in-depth discussion of the scientific argumentation.

³⁶ See Somos-Valenzuela et al. (2016) for a summary of the flood modelling study.

If the ownership is interfered with by means other than removal or retention of possession, the owner may require the disturber to remove the interference.³⁷

German lawmakers first passed this law in 1900 as a general nuisance provision. Lawyers have typically used it to resolve neighbourhood conflicts. If one (legally constituted) person causes harm or risk of harm to another person's property, the latter person can sue the former, citing Section 1004, and demand that they remove the interference. This legal norm is a key provision under German law for regulating relations among neighbours.

Roda, Saúl's lawyer, often draws on a simple analogy to explain her legal approach:

Imagine if your neighbour has a wall that divides their property with yours. The wall is old, and the bricks are loose, so you're afraid it could fall onto your property and damage your house. If that happened, you could sue your neighbour for damages. But you would rather not wait. You don't want to live with the uncertainty – when will the wall fall over? So, you sue your neighbour over the hazard, citing Section 1004. You force them to remove the problem. In this case, make them fix the wall. In Saúl's case, remove the flood hazard.

In legal terms, she argues that Saúl and RWE are neighbours. This builds on other cases that have addressed local environmental harms such as noise and smell pollution via Section 1004.³⁸

In subsequent legal arguments, the lawyers cited historical German jurisprudence³⁹ that defined neighbourly relations in broad terms: accordingly, the neighbourhood is as large as potentially harmful effects can reach.⁴⁰ Following this legal logic, any greenhouse gas emitter is a potential neighbour to someone who faces climate change impacts. The 'neighbourhood' encompasses the entire planet. Through invoking a neighbourly relation, Section 1004 could

³⁷ Authorised translation from the German Ministry of Justice and Consumer Protection (Bundesamt Für Justiz, 2013b)

³⁸ E.g. regarding noise pollution from industrial production (BGH, 06.07.2001 - V ZR 246/00), garden frogs (BGH, 20.11.1992 - V ZR 82/91), and live rock music (BGH, 26.09.2003 - V ZR 41/03); smell pollution from restaurants (AG Brandenburg, 20.10.2003 - 32 C 538/01); livestock production (OLG Celle, 26.11.2008 - 4 U 91/08), and cigarette smoking (BGH, 16.01.2015 - V ZR 110/14). Crucially, all these claims are effectively disputes between neighbours. The lawyer Wilhelm Frank, who has advised Roda and Germanwatch on the lawsuit, first proposed the possibility of applying Section 1004 for a climate change lawsuit in a 2010 article in a German law journal (Frank, 2010).

³⁹ RGZ 167, 14, 24 (Reichsgericht in Zivilsachen [Reich Civil Court])

⁴⁰ Rechtsanwälte Günther, legal brief from 11 July 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), p. 15

be applied at a German court for claims relating to harm caused anywhere in the world – as long as the defendant was legally situated in Germany.⁴¹

RWE's lawyers disagreed with Roda's understanding of Section 1004. In their first response to the lawsuit, they argued that 'German civil law provides no basis for liability in cases of potential interference by "all against all" due to global climate change'.⁴² According to their interpretation of the law, Section 1004 was not applicable to climate change cases – and even if it were, they questioned the causal link between RWE's emissions and specific climate change impacts in Peru.⁴³ They disagreed with the articulation of a neighbourly relation between Saúl and RWE.

Courts face a significant challenge when they apply old legal doctrines – that were formulated before contemporary concerns with climate change – to the complex and multi-scalar problem of global warming (Osofsky, 2007a, p. 248). German lawmakers drafted Section 1004 in the late 19th century, many years before greenhouse gases and climate change became known as a major concern. Nevertheless, environmental concerns may have been on their minds in the context of early industrial pollution. Roda was able to draw on an old legal text explaining the motives for the Civil Law Statute which asserted that neighbours are not only those who can see or hear each other.⁴⁴

At the court hearing in November 2017, Judge Meyer of the Upper State Court in Hamm went into great detail summarising Saúl's legal claims. Then he quoted the official commentary accompanying the law that Saúl's lawyers had cited in legal submissions:

Some types of effects cannot be kept within specific boundaries. We live at the bottom of a sea of air. This circumstance necessarily means that human action extends into the distance. [...] If the permission or prohibition of such an immission⁴⁵ is to be determined, one must not only consider the relationship of neighbour to neighbour; rather, the scope

⁴¹ Surprisingly, the issue of international jurisdiction – in terms that the case concerned an alleged property interference occurring in another country – has not been a significant matter of dispute in the legal process.

⁴² Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), pp. 42-43

⁴³ In their legal briefs and oral arguments, RWE's lawyers did not deny the existence of anthropogenic climate change. Rather, they argued that the processes of climate change were too complex to draw a causal claim in terms of legal liability between an emitter and a specific impact. I explore RWE's legal argumentation in more depth in Chapter 3.

⁴⁴ The lawyer Wilhelm Frank who advises Roda and Germanwatch for the lawsuit discovered the text through library research on historic legal documents.

⁴⁵ In German law, 'immission' refers to the effects on an incoming emission to a property or living organism in terms of air, ground, or water pollution (Ule et al., 2014).

of the owner's right can be made to bear on all people. [...] Someone who causes or spreads imponderabilia must know that these go their own way. Their propagation across the border can be attributed to them as a consequence of their action (Mugdan, 1899, p. 146, my translation)

'Prophetic phrases,' Judge Meyer said. At the lower court in Essen, the judges had dismissed Roda's argumentation, ruling that Section 1004 could not be applied to enact a neighbourly relation in the context of climate change. At the appeals court in Hamm, the judges were now expressing their disagreement with the previous ruling; much to the surprise, it appeared, of RWE's lawyers. On the plaintiff's side, Roda became ever more excited. Saúl understood little of the legal discussion despite support from a court-appointed interpreter but began to comprehend that the hearing was going well when Roda gave him looks of joy and squeezed his hand. She and her colleagues had found success in applying an old law to climate change, drawing on a long-forgotten prophetic legal interpretation.

By their nature, legal structures are meant to be universally applicable within a particular jurisdiction. This allows for strategic legal creativity: The claim against RWE stretches Section 1004 across a planetary scale, using it to hold a major industrial polluter accountable for climate change impacts. With surprising foresight, 19th century German lawmakers recognised that we are all connected by a 'sea of air'. Pollutant imponderabilia can produce impacts across borders. While lawyers had previously applied Section 1004 to cases of local interference and pollution, the lawsuit draws on its drafters' original motivations and applies it to global climate change. Building on Section 1004, the claim reconfigures climate change as an engagement between neighbours.

Neighbourhood tensions in the Andes and beyond

Saúl's claim of a neighbourly relation with RWE caused reverberations around the world – many seemed to see him as a hero of climate justice. Among Saúl's neighbours in his Andean village, the claim raised suspicion. Early on, he anticipated that there could be trouble. In November 2015, the day he submitted the lawsuit in Germany, he was scheduled to participate in a press conference to explain why he had made the claim. As we stood beside the journalists arranging their cameras and microphones, he whispered to me with an ironic grin: *I probably shouldn't go back home. The people probably won't react very well*

to this. He worried that they would not understand why he had travelled to Germany and made a legal claim about climate change. In their misunderstanding, some would become suspicious. Before returning home, Saúl asked us to print all the scientific evidence so that he could show it to his neighbours. It was a stack of over 100 pages, primarily consisting of English-language academic journal papers. Few people in his village spoke English. When I visited Saúl over a year later, the papers lay dusty and discarded in a corner of his house. He had not shown them to anyone.



Figure 7: Saúl on the cover of the Peruvian daily newspaper *La República*, 30 March 2018. The tagline reads: 'Peruvian wins first round against German corporation'

Saúl's neighbours wondered how he could gain such unexpected prominence. In 2014, he was a farmer and mountain guide who lived in the village with his wife and two children. He and his family tended to the fields and cared for their animals. Starting in March 2015 when Roda sent an initial claim to RWE, his name periodically appeared in the Peruvian and international press following important legal events. In March 2018, a major Peruvian newspaper ran a headline story about Saúl with his image on the front page. Knowing that plane tickets and lawyers are expensive, some questioned how he could make the claim. At

the lawsuit's outset, the directors of Germanwatch made a legal commitment to cover all costs associated with Saúl's lawsuit.⁴⁶ The NGO raised funds from other organisations and private donors to cover legal costs, travel expenses, and organise a public relations strategy for the lawsuit. Saúl incurred few direct expenses. Germanwatch ensured that the court and lawyers received their fees. They booked his flights for him.

When I began conducting ethnographic research in the area where Saúl lives, I found that while many people did not understand why Saúl had made a legal claim in Germany, many of those I spoke to had the feeling that he was doing something wrong. When I first moved in with a local family in a village neighbouring Saúl's, we sat around a table in their adobe house eating potato soup on a cold evening. Chatting with one of my hosts, I mentioned that I knew Saúl. *Saúl is a crook*, he exclaimed. *The people say that Saúl is making money from Lake Palcacocha*. I explained that Saúl was suing a German energy company about climate change because the big industries had caused the glaciers to melt with their pollution. Rather than profiting himself, Saúl was trying to attain funds that would benefit the community. My host accepted the explanation; I still wonder to what extent he saw me with suspicion at that point. Only later, once I gained more trust with my host family, did I tell them about my full involvement in the claim.

Saúl did not explain to many people what he was doing. He lacked the charisma and oratory skills that allow others to hold dramatic speeches and draw people onto their side. He did not like addressing tense village assemblies. His neighbours found out about the claim primarily through gossip. Some younger people read about it on Facebook. Rumours abounded – many said that Saúl was making large sums of money in Germany through an unethical claim. Some expressed concern that Saúl might be selling Lake Palcacocha to the Germans. Though Saúl tried to explain his cause to those who asked him directly, many found it difficult to follow his reasoning. Why would Saúl go to Germany over a lake in their mountains? What did their changing Andean environment have to do with anyone else in the world?

Saúl and his neighbours have a strong sense that their environment is changing, but this arises out of their experience rather than through reading scientific publications. From my first day of living in the Andes, my interlocutors frequently discussed their concerns about melting glaciers, changing rain patterns, and water scarcity. Only some people referred to

⁴⁶ Formally, the Stiftung Zukunftsfähigkeit (Foundation for Sustainability) made this commitment. The Foundation is associated with Germanwatch and provides the NGO with financial backing.

this as climate change (*cambio climático* in Spanish), a term they picked up from friends, the media, or tourists. Climate change has no equivalent in Quechua – for many of the Andean villagers I spent time with, it was a foreign concept.

After a panel discussion on climate action before the 2017 UN Climate Summit in Germany, Saúl explained that he had trouble keeping up with his fellow panellists. They had discussed climate change impacts and policy using complex technical language. In contrast, Saúl told the audience that he felt sad to see the glaciers above his village melting. This brought him to sue RWE in Germany. ‘We talk about the same thing,’ Saúl later told me, ‘but on different terms.’ The lawsuit was embedded in a statistical understanding of climate change that bore little relation to villagers’ perspectives. Their knowledge about the environment stems from their experience of watching nearby mountains slowly lose their white caps. Many young men work as mountain climbing guides and witness year after year how glaciers became smaller. While most villagers lack scientific terminology, they draw on a variety of concepts in Quechua and Spanish to describe glacial retreat. They see glaciers as an important source of water and are concerned about water scarcity as glaciers disappear. In addition, many talk about mountains as living beings that are suffering as they lose their glacial cover. Villagers see glacial retreat as an existential threat. Compared to the threat of water scarcity, flood hazard is a lesser concern. While the lawsuit is concerned with establishing causality and responsibility retroactively, many villagers I spoke to rather look to the future and wonder how they might continue to make a life for themselves. The legal claim offered little concrete support to those who worry about the viability of agriculture for the next generation.

Many also questioned authorities’ assertions about the flood hazard at Lake Palcacocha, arguing that this was a pretext to steal public funds through infrastructure projects. I encountered a pervading mistrust of state authorities among villagers in the rural areas around Huaraz.⁴⁷ Most people simply assumed that government officials were corrupt and were sceptical of anything they said. Some had similar sentiments about NGOs – one interlocutor explained to me that a foreigner who ran a hotel in the countryside had established an NGO and took foreign funds to feed the local children, but actually kept all the money for himself. I was not able to verify whether this claim was true, but the rumour was powerful and likely shaped some people’s perception of Saúl’s activities. Moreover,

⁴⁷ Rasmussen (2015) describes a similar sentiment in his ethnography about environmental change in a nearby area south of Huaraz.

neighbourly relations were often contentious. Village assemblies were frequently tense affairs as people argued over how to divide access to community canals and how much they should pay for shared infrastructure services.

Saúl returned home in December 2015 after submitting his claim. In the following months, he and his family began renovations on their house in the flood hazard zone. The old adobe hut that his parents had built years ago would hardly withstand a deadly flood wave. Working with the extended family, they tore it down and built a three-story red brick house. Saúl used money he had earned as a mountain guide, but his neighbours speculated that he must have gained a significant financial advantage through his lawsuit and visit to Germany. Few confronted him directly, he later told me, but rumours abounded about his supposed newfound fortune.

While the lawsuit brought Saúl into a neighbourly relation with RWE, it also caused him significant tension with his neighbours in the Andes. At a village level, relations among neighbours were often marked by suspicion and rivalry. The assertion that a German energy company and Peruvian farmer might be neighbours was a legal argument, yet it also reflected Saúl's understanding of neighbourliness. By making RWE his neighbour, he drew it into a contentious ethical relation. While Andeans argued over the local distribution of power and authority in village assemblies, the lawsuit enabled Saúl to question the power dynamics between himself and the RWE – or more broadly, between those who face the worst impacts of global warming and polluting companies – in international discussions about climate change.

Conclusion: The power of neighbourliness

On 30th June 2017, the Upper State Court in Hamm made a historic preliminary ruling in favour of Saúl. Reflecting their oral comments in the hearing earlier that month, the judges found that the lawsuit was admissible – it had a solid legal foundation. They saw the possibility for a precedent under German law if evidence could be found to prove a causal link between RWE's emissions and glacial lake flood risk to Saúl's house in Peru (Frank, 2017). That day, RWE's stock declined by almost two percent, reducing its stock market value by over €100 million (Ariva, 2020). In clear financial terms, climate litigation had begun to threaten the fossil fuel industry.

In this chapter, I have argued that the claim offers novel analytical and political potentialities for approaching climate change. With its focus on neighbourly relations, it provides an opportunity for capturing how people configure climate change in terms of ethically charged social relations spanning the planet. In the context of climate justice activism, climate change becomes graspable in terms of specific relationships between emitters, such as RWE, and those who face potential harm, like Saúl. Tracing the social practices that enact these connections, I offer an ethnographic snapshot of climate change conceptualised in terms of ethically charged relations. Saúl faced misunderstanding and suspicion in his own village upon returning home from Germany; from his perspective; RWE became another contentious neighbour.

From this case study, I derive an analytical approach for conceptualising climate change from an anthropological standpoint. Studying climate change in terms of neighbourly relations highlights how people come to understand global warming in terms of ethically charged relations between those who appear to cause the problem and those who appear to suffer the consequences. This highlights the power relations at stake in social, political, and legal discussions about climate change. As Saúl's experience in his village shows, neighbourly tensions can revolve around whose voices count and how resources should be divided. If neighbours are those who can potentially cause harm to each other, we might say that all people, corporations, and state institutions in the world are potential neighbours. Nevertheless, neighbours only become neighbours through ethical claims that assert a concrete relation between clearly defined beings or entities. My approach is to follow these claims as they emerge.

Climate change is a 'causal and moral narrative' that connects people and socio-environmental changes around the world. The notion of human responsibility potentially brings all people into the discussion (Hulme, 2010a, p. 268). According to Tsing, 'heterogeneous and unequal encounters can lead to new arrangements of culture and power' (Tsing, 2005, p. 5). The lawsuit against RWE began as an unusual collaboration between a Peruvian farmer and mountain guide and a group of German climate change activists. At the outset, the lawyers saw very slim chances for an outright legal victory. *Maybe ten per cent at most*, Roda told Saúl in an early discussion over Skype. *We are up against a majority of legal opinion and also have to communicate a lot of science to the court*. As of 2020, the lawsuit has achieved much more attention and success than any of the participants had imagined. After all, it concerned more than just one German company and flood risk in

Peru. 'It could have been anyone,' Saúl once told a journalist when asked why he chose RWE. 'When we're done with them, maybe we'll sue another company. Who's next on the list?'

[Chapter 2] The politics of personhood: Between corporations and earth beings



Figure 8: Saúl speaking to the press following his court hearing in Hamm, November 2017. To his left stands his lawyer Roda Verheyen; to his right is the author, Germanwatch co-founder Klaus Milke, and Germanwatch political director Christoph Bals (Photo: Alexander Luna/Yuraq Janka, used with permission)

The November 2017 court hearing took almost three hours before ending with an unexpected success for Saúl and his supporters. Heated discussions erupted as RWE's lawyers raised numerous objections to the judges' opinion. Walking out of the courtroom after it ended, Saúl and his lawyers felt exuberant. They assembled in front of a crowd of journalists and TV cameras to give a statement. I found my place behind Saúl to act as his interpreter. Standing in the courthouse lobby, I felt a buzz of excitement in the air. Saúl's lawyer was the first to speak: 'Today, this court made legal history.' This was a groundbreaking move for holding greenhouse gas emitters liable, she explained. Then it was Saúl's turn.

‘Today, the mountains have won.’ Speaking in Spanish, Saúl’s words shot through the building. I followed with a quick consecutive interpretation in German. ‘The lakes are the tears of the mountains. Today, justice heard the mountains crying.’⁴⁸

Glancing around the crowd, I saw many members of the audience close to tears. Saúl’s words carried a heavy emotive weight. I could hardly believe what I was hearing – I had never heard such poetic words from Saúl. Later that evening, Saúl explained how thoughts had raced through his head as he left the courtroom. ‘I thought briefly, “Yes, we did it!”’ In his mind, he pictured the mountains in Peru – the mountains that had pushed him to take a stand in the German courtroom. For this cause, he had travelled the world and faced his fear of public attention. Saúl is not a tall man – the cameras and journalists stared down at him. He thought about a story that his grandparents had told him about how the lakes formed in the Andes. ‘It was something...something that occurred to me quickly. I didn’t plan it; I didn’t think that would happen; I just remembered the stories about the mountains.’ With that, Saúl brought an entirely foreign type of person into play, one that has no standing or even existence in the formal legal process. Nevertheless, his statement appeared to resonate with public audiences. Later that day, several German TV channels broadcast his words to millions of viewers on the evening news.

The court’s decision led to a flurry of media reports around the world. In Germany, it prompted prominent commentaries on TV news programmes calling for greenhouse gas emitters to be held accountable in relation to climate change. Numerous journalists and documentary filmmakers visited Saúl in Peru. Discussions emerged in Germany and beyond about who should take responsibility for climate change and how politics could respond to the challenge. The claim propelled an unassuming Saúl to international stardom, making him ‘a modern David’ taking on the Goliath of RWE, according to a profile in TIME Magazine (Nugent, 2018).

Saúl’s invocation of Andean mountain beings raises a significant conceptual question: who has a stake in the claim? How does the legal framework establish and bring together different types of persons, and who else lurks at the margins? Anthropologists have long been concerned with how personhood is constituted within networks of social relations (Carsten, 2004; Strathern, 1988). More recently, corporate personhood has emerged as a topic of anthropological interest – as a widespread legal concept, it underpins the workings

⁴⁸ ‘Hoy ganaron las montañas. Las lagunas son las lágrimas de las montañas. Hoy, la justicia escuchó las montañas llorando.’

of contemporary neoliberal capitalism (Kirsch, 2014). This chapter brings these perspectives into discussion with recent conceptual deliberations on cosmopolitics that call for the recognition of Andean earth beings and other potential realities (de La Cadena, 2015).

If anthropologists should take indigenous claims about environmental personhood seriously, what can be made of corporate personhood? Both the assertions that corporations are legal persons and that ecosystems are living beings constitute significant ontological claims – meaning they reflect a particular understanding about the nature of reality. Addressing these standpoints as they emerge and become entangled ethnographically, I trace the claims and practices that enact different entities and draw them into webs of social exchange as they come to bear on the politics of personhood. I define ‘politics of personhood’ as the disputes over which actors have a relational and moral stake in social, political, and environmental engagements.

Tracing the construction of personhood in the claim between Saúl and RWE, I argue that both the company and Andean mountain beings are made real when people socially enact and engage them. Rather than questioning corporate personhood through invoking ecosystem personhood as environmental activists have done in other domains (Fitz-Henry, 2018), Saúl and his lawyers deliberately addressed RWE as a legal person responsible for its past behaviour. The entire claim hinged on the idea that RWE could be held liable as a single entity in relation to emissions produced in numerous coal-fired power plants operating across Europe over the past century. Saúl and his supporters did not just accept the ontological notion of corporate personhood, they actively participated in the (re-)making of RWE as a legal person by claiming a neighbourly relation. The claim draws RWE into a socio-material web of relations that constitutes the company as a self-contained being and connects it to Saúl via climate change. Through the legal framework, Saúl and his lawyers brought a normative understanding of responsibility and justice to bear on that relation. The claim reproduced RWE and Saúl as particular types of persons. When Saúl brought up earth beings with his words outside the courtroom, he introduced the possibility that other persons or beings might also be entangled in these normatively charged socio-material relations. Tracing these engagements ethnographically, I show how corporate persons and mountain beings are socially constituted when people evoke ethically charged relations with them.

Personhood in anthropology and law

Personhood has been a longstanding topic of interest in anthropology since Mauss first argued in a 1938 lecture that personhood is a social phenomenon (Mauss, 1985). In her classic study of social relations in Melanesia, Strathern famously said that personhood is socially constituted, contrasting a western conception of individuality to dividually conceived Melanesian persons. In the latter context, persons are seen as a site of relationships that produce them (1988, p. 107).⁴⁹ In a similar vein, Wagner (1991) describes personhood in the Melanesian context as 'fractal': personhood emerges from the sum of their relations with others. These discussions of Melanesian personhood later became central to the study of kinship in anthropology as researchers began to interrogate 'Western' and 'Euro-American' conceptions of personhood and relationality (Edwards and Strathern, 2000; Strathern, 1999). The ethics of biotechnology emerged as a particular focus (e.g. Edwards, 2005; Konrad, 1998). For example, Carsten (2004) draws on Strathern's analysis of socially constituted personhood in Melanesia to interrogate British public discussions about reproductive technologies and ancestry. She finds that 'close kin ties are intrinsic to the social constitution of persons' (2004, p. 83). While she contends that discussions in western contexts often evoke a notion of the person as a bounded individual, particularly in legal and philosophical discourses, Carsten argues that relational notions of personhood are equally present (2004, p. 97).

From these discussions about kinship in Melanesia, Britain, and beyond, I employ an anthropological sensibility to interrogate how personhood is constituted and contested in social practice. Building on the work of Michel Foucault (1982; 1988), the social researchers Cruikshank (1993) and Rose (1996) highlight how power relations and authoritative practices shape the way people come to understand themselves as particular types of persons. Historically, personhood has been a frequent subject of political and legal deliberation. In a US context, Stone (1972, p. 451) traces disputes over whether foreigners, women, African-Americans, Native Americans, and unborn foetuses should be considered legal persons. Building on anthropological discussions of kinship in Melanesia and beyond, I adopt a relational approach to personhood in this chapter to discuss claims that corporations and

⁴⁹ Strathern derives the terminology of 'dividual' personhood from an early study by Marriott (1976) about personhood in India.

Andean earth beings are persons, placing them in webs of relational responsibility with other people.

The notion that corporations are persons is a longstanding legal doctrine in many countries, allowing corporations to enter into contracts and face legal claims while protecting investors from personal financial liability (Blair, 2013). In German jurisprudence, a legal person is an organisation that exists independently of its members and directors. It acquires rights and duties and can participate in judicial proceedings as a legal subject. As capitalist corporations gained increasing social significance during industrialisation in the 19th century, they gradually came to be recognised as legal persons (Raiser, 1999). Following a similar historical trajectory, US jurisprudence formally recognized corporations as legal persons in the late 1800s, with ongoing disputes over the specific rights and responsibilities that corporate personhood entails (Johnson, 2012).

Recent anthropological literature has analysed the social implications of corporate personhood, particularly after a controversial US Supreme Court ruling in 2010 that granted free speech rights to corporations, allowing them to make unlimited financial contributions to political campaigns.⁵⁰ According to Kirsch, corporate personhood is a wide-ranging metaphor that shapes how we think about both corporations and human persons. While numerous people and activities are often associated with a particular corporate entity, the notion of personhood imbues corporations with agency and accountability (Kirsch, 2014). For Welker (2014, p. 2), the idea of the corporation as a coherent actor reflects an individualist liberal model of subjectivity that defines humans as rational, self-interested actors. This makes it possible to identify the corporation as an intentional subject, though in practice, the boundaries of the corporate person are often unclear. Elaborating a similar line of argument, Bashkow (2014) sees corporate personhood as an illusion – an artificial being brought into the world through socio-legal construction. Nevertheless, for many lawyers and legal scholars, the corporate person is ‘an organic social reality’ (Blumberg, 1990, p. 50).⁵¹ Suggesting that corporations are ‘inherently unstable and indeterminate, multiply authored, always in flux, and comprising both material and immaterial parts’, Welker (2014, p. 3) proposes an analytical focus on the social practices that enact corporations.

⁵⁰ This was the case of *Citizens United v. Federal Election Commission*, 558 U.S. (2010). In contrast, a 2011 ruling denied privacy rights to corporations (*Federal Communications Commission v. AT&T* [562 U.S. (2011)]).

⁵¹ Blair (2013) elaborates further on this issue, tracing a historical move in US jurisprudence: while in the early 19th century most legal scholars and practitioners regarded corporations as ‘artificial persons’, by the 20th century the view became dominant that corporations are ‘real entities’.

The notion that corporations are persons, able to act of their own accord, certainly appears paradoxical. It has become the subject of widespread critique, particularly from activists seeking to curtail corporate power. In a recent study, Fitz-Henry (2018) traces US environmentalists' efforts to promote legal rights for nature. Activists sought to destabilise corporate personhood by bringing other potential persons into play, arguing that ecosystems should have more rights than corporations. For Fitz-Henry, this activism brings ontological questions about personhood into US legal and political discussions. At the same time, new legal movements have emerged that advocate granting rights to ecosystems. In a seminal essay, Stone (1972) argued that if humans and corporations are considered legal persons with various specified rights, then natural environments should be protected under similar provisions. Decades later, such demands have now found official recognition in several countries. In 2017, the New Zealand government recognized Mount Taranaki as a 'legal personality', acknowledging Māori claims to recognize the mountain as a being in its own right (Roy, 2017). In 2019, the High Court of Bangladesh ruled that all rivers in the country are living beings with legal rights (Samuel, 2019).

Acknowledging ontological otherness

Indigenous conceptions about sentient environments have also been the subject of recent anthropological discussions. Following the 'ontological turn', authors have argued that we, as researchers, should take our interlocutors seriously when they make ontological claims that exceed our own understanding of reality. Much of this approach has focused on the ontological standpoints of indigenous peoples and other subjugated groups. For example, anthropologists have shown how people attribute personhood to animals and plants in Amazonia (Viveiros de Castro, 2012) and palm trees in West Papua (Chao, 2018), or how Andean mountain beings appeared as potential participants in Peruvian mining conflicts (Li, 2015).

Recent research in the Peruvian Andes has foregrounded the social significance of 'earth beings' which refer to mountains, lakes, and other environmental features that people engage as living beings (de La Cadena, 2015). In an ethnographic account of a water provision project in the southern Peruvian Andes, Stensrud (2016b) describes ritualistic engagements with the sentient environment as 'world-making practices' that relationally bring into existence other-than-human beings. When rural farmers make a tribute payment to the

Andean landscape, she argues, they enact it as a sentient being by drawing it into a social relationship.

Earth beings have gained significant public attention in disputes over mining which disrupts landscapes and ways of life that involve regular engagement with the environment. According to Li, multiple socionatural worlds can come to the forefront in mining conflicts when industry and state actors engage with Andean farmers and activists (Li, 2013, p. 400). For Marisol de La Cadena (2010), Andean practices involving earth beings have the potential to rupture contemporary politics-as-usual. She argues that modern politics is based on the ontological distinction between humanity and nature. While politics involves relations among people, science provides the tools to understand nature. From this perspective, nature has no political agency; it can only enter political discussions through scientific description. As such, earth beings have no place in modern politics. They can enter modern politics if they are moved into the realm of cultural belief, making them a representation of nature. However, this denies their ontological existence for Andeans – earth beings in this conception are not representations, but manifested in people’s engagements with them (de La Cadena, 2015, p. 99).

Recent disputes over mining in the Andes open up extraordinary political conflicts: as protestors bring earth beings into public discussions – claiming to defend a sentient environment from the destruction associated with mineral extraction – they inadvertently question the modern distinction between nature and humanity. Building on Stengers (2005), de la Cadena argues that earth beings practices call for a cosmopolitics that acknowledges ontological difference and allows for discussion across these boundaries (de La Cadena, 2015, p. 282).

Elaborating further on this perspective, Bold suggests that we move toward a cosmopolitics of climate change that expands politics beyond the realm of purely human relations, allowing for the presence of other forms of existence such as Andean earth beings. This can allow us to take into account communities with other cosmological standpoints. Unlike science, she argues, these standpoints offer mythological perspectives that can construct moral narratives connecting the realms of nature and culture. Climate change, in this sense, is an opportunity for cosmological conversation as people encounter it around the world (Bold, 2019). In a similar vein, de la Cadena calls for an ontological opening: we should question our analytical approaches to allow for alternative ways of being. She argues that we must recognise the limits of our own understanding as our interlocutors may engage

in ways of being that are beyond our own (de La Cadena, 2019, p. 29). Cosmopolitical dialogue involves conversation between partially connected ontological worlds. Earth beings are part of Andean peoples' worlds, but not part of the modern worlds that most anthropologists inhabit (de La Cadena, 2015) – or, for that matter, German judges and lawyers.

In the remainder of this chapter, I bring socio-legal deliberations about personhood into dialogue with recent anthropological debates about sentient environments. Bearing in mind these perspectives, I explore ethnographically how Saúl, RWE, and Andean earth beings emerged as (potential) participants in legal proceedings and in public discussions surrounding the claim.

Personhood under German law

When Saúl first visited Germany in 2015 to submit the lawsuit, we took him to see the RWE headquarters that is located near the courthouse in the city of Essen. As Saúl glanced up toward the imposing skyscraper of glass and steel, I said to him, *It's them you're suing.*

Really? Saúl grinned. *Don't scare me!* It was his first physical confrontation with the company. Until that point, it had only existed to him as an idea; a potential target of litigation discussed on transatlantic Skype calls with German activist lawyers. Later that day, after filing the lawsuit at the courthouse, we visited a nearby open-pit coal mine operated by RWE. Saúl stood in awe, gazing at the massive hole in the earth's surface that extended almost as far as the eye could see. To Saúl, he later explained to me, it felt like he was taking on something powerful.

Saúl's claim arose within the German legal system which set tight boundaries on who could make claims, whom a claimant could approach and what they could demand. Saúl participated in the lawsuit because he felt the responsibility to act on behalf of Andean mountains facing devastating transformation. As I explained in Chapter 1, the claim asserts a neighbourly relation between Saúl and RWE as natural and legal persons. The lawsuit rests on Section 1004 of the German Civil Code, a general nuisance provision that allows for claims about property interference.

How did Saúl and RWE emerge as neighbours in the legal process? At the outset, Saúl's lawyers had to provide documentary evidence proving their existence. The claim says that

‘Mr. Luciano Lliuya is a natural person’,⁵² attaching a copy of his national identity card. An excerpt from the commercial register served the same purpose for RWE. To establish the company’s liability, the claim states:

Greenhouse gas emissions are primarily emitted by the defendant’s subsidiary companies, particularly as a necessary consequence of coal-fired power generation. These emissions are to be attributed to the defendant juridical person as the parent company, particularly because the construction and operation of the power plants is not determined by the subsidiaries but occurs based on the defendant parent company’s direction.⁵³

With this, the lawyers tied greenhouse gas emissions produced at numerous power plants across widespread locations to RWE. Configured as a legal person, RWE acquired an identity that was independent from its founders, owners, and employees. Lacking the individualistic confines of a human body, corporations exist as relationally constituted persons. RWE became enmeshed in social relations that made it an agent subject to potential legal claims over its activities. Drawing on scientific research about climatic processes and glacial lake outburst flood risk in the Peruvian Andes, the lawyers sought to draw a causal link of liability between Saúl and RWE.⁵⁴

In ontological terms, the lawsuit enacted RWE as a person, engaging it as an independent entity subject to legal rights and obligations. In response to this engagement, lawyers represented by RWE filed lengthy legal replies in the company’s defence. In legal hearings, judges addressed both Saúl and RWE as judicial parties with standing under the law. Studying these interactions from a critical socio-legal standpoint, it could be argued that the lawyers and judges were reproducing a legal fiction that fetishizes the corporation. Nevertheless, even to Saúl the company felt real and powerful when he walked by the towering headquarter building on his way to file the lawsuit in Essen. Saúl and his interlocutors engaged RWE strategically – the company served as a symbolic placeholder for the global polluting industries. As such, the legal claim made both Saúl and RWE as particular types of persons, bringing them together as potential neighbours.

⁵² Rechtsanwälte Günther, lawsuit from 24 November 2015 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), p. 3; all translations from legal documents are by the author from German.

⁵³ Rechtsanwälte Günther, lawsuit from 24 November 2015 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), p. 2

⁵⁴ Chapter 3 explores the issue of causality in greater detail.

While the lawsuit was successful in drawing an ethically charged relation between Saúl and RWE, what can we make of Saúl's reference to the sentient Andean environment? The judicial framework does not grant standing to earth beings, and they find no mention in the legal documents. According to the ontological politics of personhood enshrined in German law, RWE is a legal person susceptible to judicial claims from other recognised persons – such as Saúl – while sentient landscapes do not exist. Nevertheless, Saúl met an enthusiastic and emotive response when he spoke of earth beings in the courthouse lobby. His words appealed to widespread conceptions about Andean indigeneity. In the following sections, I trace relational engagements that brought Andean earth beings to the fore in Peru and Germany.

Engaging earth beings in the Andes

On a cold, dark morning in July 2017, I accompanied Saúl in climbing Mount Vallunaraju, overlooking the city of Huaraz. After sleeping in a tent at the foot of the glacier, we rose before dawn and set off. Attached to each other by rope, we held ice picks under thick gloves and wore crampons on our boots to walk on the ice.

It was pitch-dark as we set off from the base camp. We wore headlamps to see. *This entire area – the campsite – was covered by the glacier just a few years ago*, Saúl explained. Every year that he climbed the mountains, he found the glaciers to have receded by a few more metres. As we made our way onto the ice, the initial incline was relatively easy. It felt like walking up a snowy hill as the freezing wind hit my face. Then Saúl, ahead of me, stopped walking. As I made my way up to stand beside him, he removed his gloves and pulled a little plastic bag out of jacket pocket, leaving the ice pick dangling by a sling on his wrist. From the bag, he pulled out a handful of coca leaves and tossed them on the ground. *For the mountain*, he exclaimed.

As I explained in the Introduction, Andean practices that invoke sentient earth beings have been widely documented in anthropological literature (e.g. Allen, 1988; de La Cadena, 2015; Stensrud, 2016a). For many Andeans, engagement with powerful earth beings is a part of daily life. While ritualistic practices often appeared in subtle ways in the area where I conducted research⁵⁵ – as when Saúl casually paid tribute to the mountain during our climb

⁵⁵ Rasmussen (2015) describes a similar dynamic in the nearby Recuay province.

– they seemed to play a significant role for many people I met. Particularly in rural Quechua-speaking areas, people told me stories about powerful mountain and lake beings that gave life to farmers by providing water and fertility yet could respond violently when treated with disrespect.⁵⁶

Saúl was uncertain about the precise nature of the environment's sentience. 'A mountain is a geological formation,' he later explained to me, 'but another perspective is that the mountains nurture us. They used to be considered as gods – something to fear.' Lying in his tent at night during climbing tours, Saúl sometimes encountered the mountain he was about to summit in his dreams – in the form of a person who talked to him. He also had experiences that were difficult to explain – on one tour, he woke up at night to the sound of voices and footsteps. Looking outside his tent, there was nobody to be seen. 'I don't know; it's difficult to say with certainty,' Saúl explained, 'but something is there.' It may defy explanation, yet the significance was clear: 'For me, the mountain is someone who gives you everything.' A feeling of responsibility toward the Andean landscape was among the most profound reasons that motivated Saúl's participation in the lawsuit against RWE. Mountains are neighbours of a different sort – their power is unquestioned in Saúl's engagement with them.

On another occasion during my fieldwork, I chatted with a group of villagers about how the environment was changing. An old man adjusted his wide-brimmed hat and surveyed the horizon. *What will happen to the mountain when the glacier disappears? I don't know – maybe it will die. A few years ago the mountains were all white, now look! The peaks are becoming dark.* We sat by a small pasture in a village far above Huaraz in the Cordillera Blanca. I was visiting the village with Elías, the 83-year-old man who oversaw safety works at Palcacocha. Under the burning mid-morning sun, the villagers expressed concern about potential water scarcity and increasingly strong hailstorms that threatened their harvests. To move the discussion toward the sentient Andean environment, I asked whether they engaged in any customs such as offerings to the mountains. Such practices were not common anymore, the old man replied; perhaps that was part of the problem. *The mountains are living beings, just like you and me, we have to respect them.*

Stories about sentient mountains are passed down through the generations. Some speak of glacial lakes as enchanted places that can bewitch unassuming wanderers. The Quechua term for a snow-covered mountain is *raju*. The language lacks a clear distinction between a

⁵⁶ In Chapter 4, I explore these engagements in further detail to show how earth beings become entangled in Peruvian glacial politics.

glacier and the mountain below, pointing to the value and significance of a mountain being as a whole. What might become of mountain beings when their glaciers disappear?

Driving back down to Huaraz later that day, I turned to Elías. With deep wrinkles on his face, he gazed out at the mountain landscape he called home. Working at Palcacocha, he made monthly offerings to the earth and lake beings to keep them happy. Only that, he asserted, would prevent a devastating avalanche and flood. On cold nights in a little shack by the lake, the beings spoke to Elías and demanded coca leaves, food, and drink. Elías considered it his responsibility to maintain positive relations with the landscape and its beings.⁵⁷

What do you think, Elías? I asked as he turned to look at me. *What will become of the mountains when the glaciers melt off?*

Elías paused to ponder the question, glancing past me towards the snow-capped peaks in the distance. *The mountains are hurting, that's clear. But I think they will be OK.* He looked me in the eyes. *The Earth, the mountains, they're powerful. They always find a way.*

Another villager from the area outlined his own theory of how the mountains were changing – they had become calmer. *They used to be chúkaro*, he explained, using a Quechua term usually used to describe wild animals.⁵⁸ *The mountains were more dangerous. But now that tourists come and climb the mountains every year, they've become tame.* People may not fear the mountains the way they used to, yet the landscape claimed lives every year in mountain climbing accidents. Some locals traced these deaths to a lack of respect for the mountains.

The environment was changing in uncertain ways, yet many rural villagers I encountered in the Cordillera Blanca could feel its potency. 'It's something quite intimate,' Saúl once explained to me. 'When you're growing up, your parents tell you stories about powerful mountains and enchanted lakes, things like that. For example, they say that you shouldn't throw away food that you produce – it means the food will cry.' According to Saúl, the environment's sentience is self-evident for most villagers. 'It's something you know – because you've lived all your life in those surroundings.'

Through their relational engagements, Saúl and his compatriots enact the mountains as powerful sentient beings. In fact, his own sense of self – of who he was and what

⁵⁷ Chapter 4 explores these practices in further detail.

⁵⁸ Bode translates this term as 'raw nature' (Bode, 1989, p. 148).

responsibilities he had in relation to the world around him – emerged in relation to the Andean socio-material environment that comprised both the people in his village and the sentient landscape. Much like the lawsuit involved a relational assertion that made Saúl and RWE as human and legal persons, Saúl and the mountains became constituted as relational beings through his engagement with the landscape. But just as the legal invocation of RWE was a deliberate move to allow for a politically charged claim, sentient landscapes can also emerge strategically within the framework of activism. I explore this ethnographically in the following section.

Strategic indigeneity

On a sunny day in early November 2017, days before the yearly UN Climate Summit began in Bonn and around a week before the court hearing in Hamm, Saúl stood on a stage in front of a crowd of 20,000 cheering protestors. It was a large turnout for a demonstration demanding immediate action on climate change from the world's governments. Many locals were particularly concerned about RWE's expanding coalmines in the region which had recently displaced a village and forest. In an act of civil disobedience, some had even entered the open-pit mines and climbed RWE's giant diggers. Today, they joined with a crowd of foreign activists who had travelled to Germany for the UN Summit.

'Since I was a small child, I could see changes in the mountains. Glaciers are retreating very quickly.' Standing beside Saúl at the podium, I consecutively interpreted his Spanish words into English. 'We are very worried about the water, but this is something that we haven't caused. This was caused by the big companies that burn coal and petroleum. That's why I've sued the company RWE to make them responsible.'

A roar swept through the crowd. For many of the activists in the audience, Saúl was a climate justice hero they could finally see in the flesh. He was a small man with a puffy red jacket, but his words carried significant weight.

'We have the obligation, the responsibility to protect our Pachamama, which is the mother Earth, in the Andes.' The audience cheered even louder. Saúl had to wait for the crowd to quiet down before he could continue. His words resonated with many who saw him as an indigenous activist who likely had a special tie to the landscape he inhabited – the

Pachamama. Yet I interpreted this to the audience – using the widely recognisable ‘Pachamama’ in English – with surprise. I had never heard Saúl use the word publicly.

‘Pachamama’ is a key term in multiple varieties of the Quechua language, including that spoken in the former Inca capital of Cusco. It translates roughly as ‘mother earth’, but often encapsulates a broader understanding of the Earth as a life-giving force, embedded within Andean cosmologies (Allen, 1988; Gose, 1994; Stensrud, 2019a). However, the term is not widely used in the Cordillera Blanca. The latter region’s variety of Quechua differs significantly from those spoken elsewhere, particularly in terms of vocabulary. ‘Pachamama’ could translate into the local language as ‘mama patsa’, yet I do not recall hearing that term during 20 months of fieldwork in the region. For Saúl, Pachamama was a foreign term that he strategically chose to apply to gain public resonance during his speech at the climate march in Bonn.

With this, Saúl followed in the footsteps of other Andean environmental activists who have purposefully deployed notions of indigeneity. At a mining conflict in the Peruvian city of Cajamarca, north of Huaraz, protests achieved a new public dimension when activists began to describe the mountain under threat as sacred, using the word ‘Apu’. This Quechua term, often used to describe agentive mountains, is common in other parts of Peru, but not in Cajamarca where few people speak Quechua. While this terminology reflected locals’ understanding of the mountain as an agentive being, it invoked popular imaginations of indigeneity that spoke to journalists and international activists. Some proponents of the mining project argued that this characterisation of the mountain as an Apu was fraudulent, but Fabiana Li contends that a binary opposition between ‘authentic’ indigenous tradition and invented conceptions is misguided. Even if locals had not commonly used the term Apu, this conception opened political discussions to understandings that saw the landscape as agentive (Li, 2015, p. 122). According to one local activist, Apu was a useful translation as the term had wider resonance, even if people in Cajamarca did not traditionally use it (Li, 2015, p. 142).

After the demonstration in Bonn, I asked Saúl why he used the term ‘Pachamama’. ‘It’s a nice concept,’ he replied. ‘I understand that Pachamama is mother earth.’ Yet growing up in the rural Cordillera Blanca, he had heard a different set of stories. ‘My mother always told me, “There’s the sun, our father, and there’s our mother, the moon.” But I don’t remember her telling me anything about Pachamama. So I had the concept of the sun god and of the moon as the mother.’ When he was thinking about his speech that morning over breakfast,

he wanted to find something that would resonate more with the audience. ‘Pachamama has already become widely known and so they can understand it.’ Saúl realised that many saw him as an indigenous climate activist. That positionality – of the Andean David facing the industrial Goliath – legitimised and strengthened his public image. At the demonstration, he drew on an Andean conception that was foreign to his own cosmological framework yet served to support his public standing. ‘So you borrowed the term?’ I asked.

‘Exactly – because it was convenient and made sense.’

In the Cajamarca mining conflict, the mountain under question emerged in multiple forms – as an Apu, a source of water, and gold depository. This involved complex translations between epistemological and ontological frameworks and allowed for diverse collaborations between locals and urban political activists (Li, 2015, p. 142). In a similar sense, the legal claim against RWE emerged out of a collaboration between Saúl and German activists in which the Andean mountains appeared in multiple forms – as both scientific objects of study and agentive beings. This potentially opens the door for a greater social recognition of other-than-human beings.

In legal disputes over environmental issues, alternative ontological standpoints can appear in conjunction with more traditional judicial and political perspectives. Gregg Hetherington describes a series of legal cases in Paraguay where a different conception of the landscape came to the forefront. Paraguayan campesinos were involved in longstanding confrontations with Brazilian soybean farmers. Campesinos faced displacement by the powerful soybean industry, leading in some cases to campesinos’ deaths. The ensuing criminal trials attracted widespread media attention. In this context, campesinos argued not only that soybean farmers were responsible, but that the soybeans themselves had killed campesinos – they had an agency of their own. While some initially dismissed the ‘killer soybean’ narrative as this alternative standpoint did not fit well into mainstream political ontology, it emerged as a powerful argument in public discussions. The lawsuits did not formally implicate soybeans as actors, but helped solidify the view that soybeans could take responsibility (Hetherington, 2013). In a similar vein, the fact that the German court took Saúl’s lawsuit seriously lent authoritative force to his statements outside the courtroom. As Saúl became a publicly recognisable figure, his legal success can potentially provide public legitimacy to the conception that earth beings and other nonhuman persons have a stake in legal and political discussions about climate change.

Conclusion: Mobilising personhood for legal and political change

Late at night after the court hearing in Germany, after celebrating an unexpected legal milestone and giving interviews to media outlets around the world, I asked Saúl what he would do once he returned home. He said he would explain to his family that they achieved a significant precedent to stop big industry from polluting the environment. But he would also talk to Churup, the mountain above his village. He sighed. ‘I’ll arrive and look up to Mount Churup.’ His eyes watered and a single teardrop rolled down his face. ‘I’ll look up to Mount Churup, and I’ll say: “Now I’m back here – and we made it.”’

The lawsuit to hold a major greenhouse gas emitter liable for contributing to climate change would likely take years to conclude, yet it had already found great success in drawing public attention to glacial retreat in Peru and the responsibility of polluting corporations. ‘I think we already won,’ Saúl later told me.

Saúl engaged both RWE and the Andean landscape by asserting moral relationships with them. These engagements constituted ontological claims about who has a stake in contemporary political concerns about climate change. This chapter draws analytical attention to the politics of personhood, highlighting how RWE and the Andean mountains emerged as distinct beings through claims about relational responsibility. Through these engagements, Saúl also emerged as a particular type of subject – both to public audiences and himself. Speaking outside the courtroom, he was an indigenous activist seeking redress from industrial polluters. Offering coca to the mountain during a climbing tour, he was a rural Andean trying to enact a positive relation with the powerful sentient landscape.

While Saúl introduced earth beings to large audiences through public statements and interviews, it remains ambiguous to what extent people might accept the possibility that nonhuman ecosystem persons could have a stake in climate politics, or if they merely saw Saúl’s words as an anecdotal manifestation of his cultural heritage. Nevertheless, Saúl’s assertions contribute to growing claims that legal and political systems should account for ecosystems in their own right. The lawsuit invokes a neighbourly relation between Saúl and RWE as morally responsible persons. This potentially raises the impetus that climate politics should account for such relations and opens the possibility that other nonhuman persons might also have a stake in these discussions. How might such a ‘cosmopolitical dialogue’ (de La Cadena, 2015) emerge in practice? Might the present proliferation of environmental litigation claims lead to a more open politics of personhood in legal and political

deliberations? How could we grasp such an opening analytically? While some jurisdictions have begun to recognize ecosystems as beings with legal rights, judicial systems usually place strict limits in terms of who can participate and what kinds of claims can be made. Exploring what role sentient ecosystems might play beside corporate persons in law, politics, and public discussions, I end this chapter with two analytical reflections.

First, if legal systems acknowledge ontological difference and attempt a cosmopolitical dialogue, what might be the terms of these discussions? What sort of rights could be granted to ecosystem persons, and how can they make themselves heard in systems that revolve around documents and oral statements? While RWE's lawyers formally spoke for the company in court, Saúl did not claim to represent the Andean mountains. He drew motivation from the desire to support them, yet earth beings seem to defy the possibility of judicial representation. Cosmopolitical dialogue can acknowledge different ontological claims, including corporate and ecosystem personhood, but further conceptual work may be needed to develop frameworks that allow this dialogue to bear fruit. A starting point might be the recognition that environmental damage can entail more than property damage – it can involve harm to human and nonhuman persons.

Second, my discussion shows that ecosystem persons may play a role in social claims even when they have no formal standing. The invocation of earth beings and other nonhuman persons can provide symbolic justification for legal and political claims as public audiences around the world become increasingly sympathetic to ideas about ecosystem agency. This may allow for a cosmopolitical dialogue that bypasses technical discussions about which legal frameworks should be applied to mountains and rivers. Rather, this can bolster demands for political action that considers ecosystems as political actors alongside human persons and corporations. Activists and lawyers have resorted to climate litigation as strategic action to broaden public discussions and push for new avenues of engagement. Climate change may not be resolved in the courts – its future may entail solutions at a political level. In the long run, personhood may be less of a legal and more of a political and ethical question.

Transposing legal understandings about corporate and ecosystem personhood to political deliberations, future discussions may offer an increased focus on the diverse relationships among humans and non-humans at stake in a rapidly changing world. The politics of personhood stands at a crossroads: will there be a further marginalisation of the people and ecosystems who face the worst impacts of climate change, or will political

structures emerge that compel corporations to take responsibility to support ecosystems under threat of destruction? Whatever happens, analytical attention to the politics of personhood will help us understand the social disputes over who can participate in shaping the future.

[Chapter 3] Causality in the courtroom: Making relations in times of climate change

Now we come to the really interesting part, exclaimed Judge Rolf Meyer as he looked up from his notes across the courtroom audience. During the hearing in November 2017 at the Upper State Court in Hamm, he had explained in complex legal detail why Saúl Luciano Lliuya's claim against RWE was admissible in court. In legal principle, the court found, it was possible for Saúl to hold the company liable for its contribution to climate change impacts in Peru, and to demand that RWE contribute financially to infrastructural measures that would reduce the risk of flooding affecting Saúl's house in the Andes. This came as a great surprise to many in the courtroom. Looking across at RWE's lawyers from my seat at the plaintiff's table, I thought I saw expressions of fear on their faces.

Judge Meyer continued: *RWE has argued that climate change requires political solutions. Political solutions are desirable, but irrelevant for the question of liability.* Elaborating on the legal framework for establishing liability, he explained that the court now sought to determine whether RWE had caused an indirect nuisance to Saúl's property through its greenhouse gas emissions via the process of global climate change. At the heart of the lawsuit was the issue of causality: would the risk of flooding to Saúl's house be lower without RWE's emissions? *Here*, the judge explained, *that may be the case.*

The RWE representatives had entered the courtroom exuding confidence through their strong stature. Roda Verheyen, Saúl's lawyer, had told him to keep his back straight and look self-assured – he had nothing to hide and had done nothing wrong. Now, the five RWE lawyers began to sink into themselves, becoming ever smaller in their seats. Some of them wrote rapidly on their notepads and avoided looking up. Others kept touching their faces. On the plaintiff's side, Saúl's lawyers exuded quiet delight. Saúl later told me that he could feel the excitement in the room.

Without going into the evidentiary phase, Judge Meyer continued, *we cannot exclude the possibility that RWE has contributed to the problem.* The judges would require advice from court-appointed scientific experts to evaluate the alleged causal link between RWE's emissions and the risk of flooding to Saúl's house. RWE's head lawyer held his head in his hands. When the judge later gave the floor to Roda, she was visibly overwhelmed: *You have left me speechless*, she said.

For many onlookers, the hearing felt monumental. Speaking to the press afterwards, Roda described it as a historic moment. For the first time anywhere in the world, a court had declared admissible a claim to hold a polluting company liable for its contribution to climate change impacts. In legal terms, the judges found, this claim was possible – but to win, they would require evidentiary proof of a causal chain linking RWE and Saúl. The case constituted an attempt to draw a neighbourly relationship between defendant and plaintiff founded on scientific insights about climate change. In a subsequent ruling, the judges set the legal standard for establishing causation: the court sought ‘scientifically verifiable facts’ to determine whether Saúl’s property in Huaraz faced a ‘serious threat of danger’ that constituted a ‘serious threat of impairment’ caused partially by RWE via global warming. There must be a ‘sufficient probability that damage will occur within a foreseeable timeframe’.⁵⁹

RWE’s lawyers vehemently denied the possibility of establishing a causal link between the company and Saúl, questioning scientific evidence presented by the plaintiff. Yet throughout the legal proceedings, a key set of facts remained undisputed: all those involved agreed that climate change was an anthropogenic problem that required public attention. Undoubtedly, the company had produced greenhouse gas emissions through its operation of coal-fired power plants. Nevertheless, RWE’s lawyers rejected the lawsuit in legal briefs and courtroom statements on two foundational levels: in normative terms, polluters should not be held liable for the indirect and unintended potential consequences of their emissions. In epistemological terms, they denied that it was possible to draw a causal link between RWE’s emissions and an alleged risk of flooding affecting Saúl’s property.

Tracing causal responsibility for climate change is not merely a scientific question of measurement and modelling but concerns the norms that should govern relations between people, institutions, and environments on a warming planet. Ethically charged neighbourly relations are enacted through claims about causality. Tracing how normative understandings come to bear on epistemological disputes about causality, this chapter examines how legal practitioners on both sides deployed scientific evidence to establish and contest causation. Saúl’s lawyers sought to construct an evidentiary chain that brought him into a neighbourly relationship with the polluting company. I show how different types of evidence came to

⁵⁹ Oberlandesgericht Hamm, ruling of the 5th Civil Senate from 23rd August 2018 (Saúl Ananías Luciano Lliuya ./ RWE AG, Az.: I-5 U 15/17). As above, translations from German legal documents are by the author.

count in the legal proceedings while the possibilities of producing evidence were influenced by broader relations of power that shape the generation of knowledge about climate change.

I begin this chapter with a theoretically informed discussion about legal causation and fact production. Showing how this works in practice, I trace ethnographically the arguments over causality in the dispute between Saúl and RWE. Saúl's legal team sought to prove that the company had caused a nuisance to Saúl by contributing to a 'serious threat of impairment' affecting his property.⁶⁰ At the appellate stage,⁶¹ Saúl's lawyers presented evidence that linked him to RWE through a complex causal chain: first, RWE produced greenhouse gas emissions through coal firing that contributed to global warming. Second, Global warming led to glacial retreat in Peru. Third, Glacial retreat in the Andes led to an increased risk of flooding affecting Saúl's property. For each of these steps, lawyers argued over whether a link could be established and what kinds of evidence should count. An examination of the causal chain highlights how neighbourly relations are enacted in legal practice, entangling human and corporate persons in ethically charged relations.

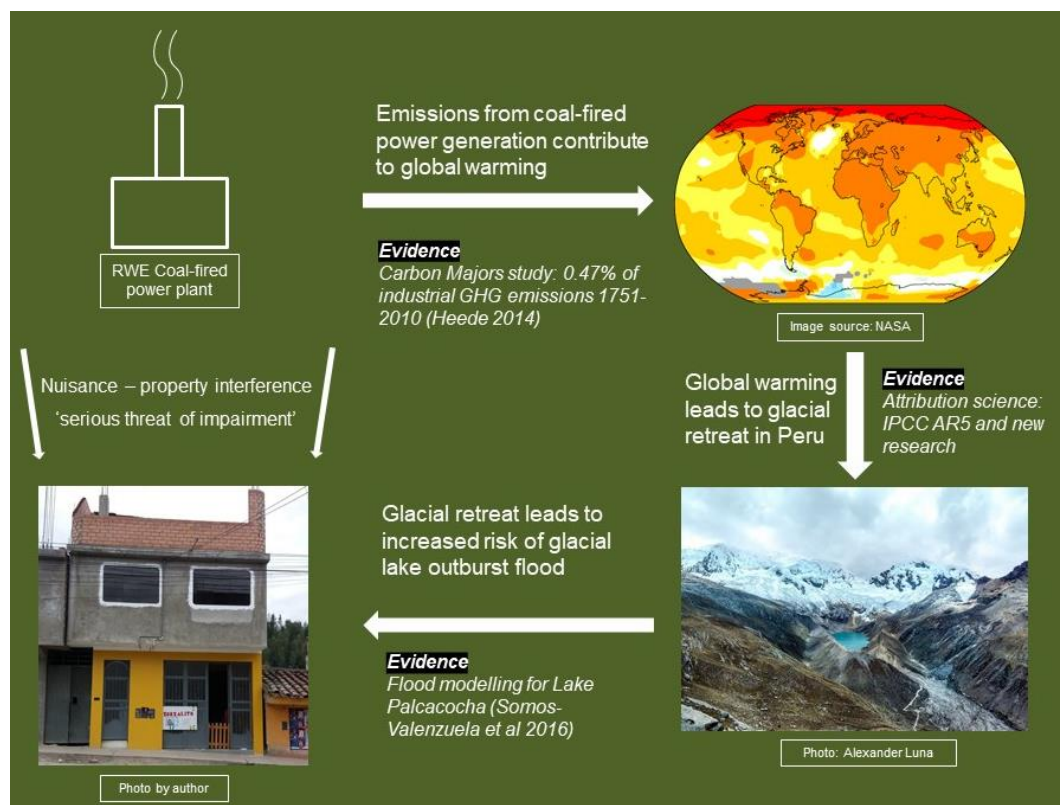


Figure 9: The causal chain depicting the neighbourly connection between RWE and Saúl (Diagram by author)

⁶⁰ Oberlandesgericht Hamm, ruling of the 5th Civil Senate from 23rd August 2018 (Saúl Ananías Luciano Lliuya ./ RWE AG, Az.: I-5 U 15/17)

⁶¹ Rechtsanwälte Günther, legal brief from 23 February 2017 (Saúl Ananías Luciano Lliuya ./ RWE AG, Oberlandesgericht Hamm, Az.: I-5 U 15/17), pp. 16-17

Theoretical foundations: making knowledge in the courtroom

To determine whether there was a causal relation between RWE and Saúl, the judges overseeing the case had to clarify the facts. Some facts appeared straightforward, such as the size of Saúl's property and the year it entered his possession. Most facts in the legal process were disputed – was there an immediate danger to Saúl's property? Can RWE's contribution to glacial retreat in Peru be determined? In deciding on the facts, the judges had to balance competing truths with legal principles of adjudication and morality. Their role tasked them with deciding which truths were most serviceable to resolve the question of causality.

Factual claims in the lawsuit were linked to broader concerns about climate change and human responsibility. Using the lawsuit between Saúl and RWE as a starting point, I cover theoretical perspectives on how normative and epistemological values come to bear on legal fact production, relating evidentiary principles under German law to academic discussions on legal knowledge. I show how factual claims often relate to social and ethical conceptions of how socio-environmental relations are – or should be – organised. Recognising that all facts are partial to the context of their emergence, I argue that different actors in the lawsuit sought to deploy serviceable truths to prove or disprove causation. These truths had to be good enough to reach evidentiary expectations within and outside the courtroom, emerging hand in hand with social and political claims about climate change.

Causality in the law: tracing responsibility

The legal proceedings at the German court revolved around the question of whether RWE had partially caused a risk of flooding to Saúl's property. Causality is a fundamental issue at the intersection of philosophy, science, and law (Verheyen, 2015, p. 161) with a long trajectory of academic theorisation going back to Ancient Greek thinkers such as Aristotle (Falcon, 2019). Following their respective definitions in the Oxford English Dictionary, I understand 'causality' as the relationship between cause and effect (Oxford English Dictionary, 2020a) and 'causation' as the act of causing or producing an effect (Oxford English Dictionary, 2020b). In the context of climate change, causality thus refers to the relationship between emissions and impacts – or, more broadly, between those producing the emissions

and those who face the impacts – while causation denotes the specific socio-material processes through which emissions cause impacts.

How do lawyers approach causality and causation? In environmental law cases, the causal attribution of human conduct to a particular outcome is often a core issue. To establish liability, lawyers must prove that a specific legal actor – be it a human person or corporation - acted in such a way that it contributed causally to a specific harm (or risk of harm) affecting another legal actor (Verheyen, 2015, p. 163). The lawsuit between Saúl and RWE is a civil dispute over liability for potential harm. In such cases, legal frameworks typically define causation in terms of the ‘but for’ test: X caused Y if, but for X, Y would not have occurred (Young et al., 2004, p. 509).⁶² For example: person A drops their heavy bag on person B’s foot, causing one of their toes to break. Person A is causally responsible: but for dropping the bag, person B’s toe would not be broken. In climate change cases, causation is much more complex, potentially involving a causal chain that extends across the planet’s surface and atmosphere. Causation, in that case, is cumulative: it involves multiple causal parties (Verheyen, 2015, pp. 163-164).

The judicial notion of causation, underpinned with scientific evidence, allowed Saúl’s lawyers to construct a legal and social relationship between a human person and corporate entity that transcended space and time: the two legal parties were located on different continents, and the lawsuit concerned RWE’s greenhouse gas emissions since before Saúl was born. In the legal documents, arguments relating to causality appear academic and abstract, drawing on scientific data about global climatic processes. Nevertheless, the legal claim was successful in creating a direct relationship between two disparate legal parties, instantiated in the courtroom confrontation between Saúl and RWE’s lawyers. Legal causation arguments linking RWE to flood risk in Peru gave Saúl and his supporters an opportunity to make a broader social statement about causality and climate change: that relations between polluters and those who faced the worst impacts of global warming should be a key issue in social and political discussions.

To understand how legal practitioners developed arguments about causation during the proceedings, I provide an overview of the scientific and legal norms at stake. Factual claims about causation emerged in relation to broader concerns about climate change. To make facts count in the courtroom, lawyers must navigate scientific and legal frameworks of

⁶² The ‘but for’ test is often also referred to by its Latin name: *conditio sine qua non* (Verheyen, 2015, p. 163).

knowledge. Finally, judges grapple with contradictory factual claims presented by opposing legal parties. To illustrate these processes, I begin with a defining statement at the beginning of the lawsuit:

‘[The claimant’s] property is acutely threatened by glacial retreat, which is occurring as a direct consequence of climate change with increasing speed and magnitude.’⁶³

This factual claim, which Roda, Saúl’s lawyer, placed prominently in an initial summary of her legal reasoning, includes several key assertions:

1. Saúl is a living person;
2. He legally owns a residential property;
3. This property is situated geographically in a place that leaves it exposed to an acute threat of flooding;
4. This acute threat of flooding is a consequence of glacial retreat;
5. Glacial retreat is increasing in speed and magnitude;
6. This increased glacial retreat is a consequence of global anthropogenic climate change.

Implicit to the final claim is the assertion, which Roda expands on in the following paragraph, that the defendant has contributed to anthropogenic climate change with its emissions. For each of these factual claims, the lawsuit includes further substantiation and evidence. In the legal process, these six knowledge claims were subject to varying degrees of contention. Claims 1 and 2 are among the few that RWE’s lawyers did not seek to counter, though even those required evidentiary substantiation. While these claims are specific to the lawsuit’s judicial framing – supporting the position that RWE is partially responsible in legal terms for Saúl’s predicament and should contribute financially to adaptation measures – they emerge in relation to broader considerations among concerned citizens, activists, and lawyers about the social meaning and ethical implications of climate change.

⁶³ Rechtsanwälte Günther, lawsuit from 24 November 2015 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), p. 2

Social concerns in the courtroom

Law differs from science in that it requires clear definitions of true and false (Latour, 2010, p. x). During the legal proceedings at the Upper State Court in Hamm, the judges had to determine whether RWE contributed causally to a ‘serious threat of impairment’ affecting Saúl’s property. Scientific inquiry is usually open-ended – scientific facts are potentially subject to future revision. Legal proceedings, on the other hand, usually need to establish the facts to allow for a judicial verdict (Jasanoff, 2005, p. 552).⁶⁴ Judges seek to make a decision so that they can close the file (Latour, 2010, p. 211). If the judges in Hamm found there was no serious risk to Saúl’s house, the case was over. Legal decision-makers⁶⁵ make the final decision about what becomes legal fact – and which arguments fail to meet the threshold.

When judges decide which facts are true, they actively participate in the process of legal knowledge production. In a legal sense, science does not provide facts; judges must measure scientific insights with the legal yardstick. Setting the framework for truth, ‘the law actively constructs the scientific facts that it presumes to “find”’ (Jasanoff, 2007, p. 776). The legal process produces new knowledge. My aim in this chapter is to trace ethnographically how lawyers for Saúl and RWE sought to validate competing factual claims as legal truths.

Factual claims in climate litigation cases often emerge alongside normative concerns about climate change and social justice. The broader issues at stake became clear at Saúl’s court hearing in November 2017 when Judge Meyer suggested that the plaintiff and defendant might seek a settlement out of court. After all, the lawsuit was over 20,000€, a fraction of the mounting cost for legal proceedings and scientific studies. *No*, replied RWE’s head lawyer. *This is a matter of precedent*. For both parties, this suit concerned much more than a potential causal relation between Saúl and RWE. The scientific facts were incidental for a broader argument about climate change and responsibility. Saúl and his supporters sought to make a massive legal leap and hold a greenhouse gas emitter accountable for its contribution to global warming. Courts seek to establish the facts of a case to provide the basis for judgement (Latour, 2010, p. 215). Legal argumentation involves storytelling: lawyers devise narratives of causation to hold a party liable or absolve their clients from responsibility

⁶⁴ It should be noted that legally established facts may be subsequently disputed or revised during appeals or other related proceedings.

⁶⁵ This refers to judges as well as juries in jury-based systems.

(Jasanoff, 2006, p. 339; Jasanoff, 2007, p. 776). Saúl's lawsuit constitutes an attempt to hold RWE responsible for its contribution to flood hazard in Huaraz, and to set a global precedent for climate justice.

This claim follows a growing trajectory of climate change lawsuits in which knowledge claims are linked to normative concerns. Many of these cases have drawn significant public and media attention, turning courtrooms into platforms for activists to make social and political arguments about climate justice. In a prominent case tried at a British court in 2008, six Greenpeace activists accused of causing criminal interference at the Kingsnorth coal-fired power station in southern England successfully justified their actions with reference to global warming (Hayes, 2013). The court heard witness statements from scientific experts who drew a link between global climate change and local greenhouse gas emissions linked to the power plant, leading to the activists' acquittal. In a socio-legal analysis of the trial, Hayes (2013) argues that expert knowledge claims in this case were linked to broader narratives of climate change and social justice, providing social and political justification for illegal actions. In the courtroom setting, knowledge and socio-political claims about climate change emerged hand in hand.

Reviewing academic discussions about climate litigation from a socio-legal perspective, Fisher (2013, p. 242) identifies a fascination with climate claims among some scholars for their potential to legitimise broader social concerns about climate change, making it appear more 'real'. In their respective discussions of litigation and climate change knowledge, both Hayes and Fisher invoke the work of the STS scholar Sheila Jasanoff who developed a theoretical framework for understanding the relation between knowledge and normative social concerns. For Jasanoff (2004a), knowledge claims emerge hand in hand with conceptions about how the world is and toward what kinds of social relations we should strive. She defines this perspective as the 'idiom of co-production', highlighting how knowledge and social life are co-constitutive. This points to how science shapes the possibilities of politics and social action, while the latter two also influence the scope of scientific research. Science and society emerge hand in hand – knowledge and the social order produce and reinforce each other (Jasanoff, 2004b, p. 17). For example, the academic publications that Saúl's lawyers cited to draw a causal link between climate change and glacial retreat in Peru emerged out of scientists' concern with the processes and impacts of climate change. This concern, in turn, is also a response to policy-makers' demands on science to improve the knowledge framework for developing political responses to climate change (Hulme, 2010b). STS and socio-legal scholars have drawn on Jasanoff's framework of

co-production to highlight the centrality of social relations in the production of knowledge. This reflects a long-standing concern in anthropology about the relationality of knowledge.⁶⁶ Bearing in mind that knowledge is a value-imbued social product, we can recognise that factual claims in climate litigation lawsuits often emerge in relation to normative concerns about how contemporary societies should engage with climate change.

Scientific and legal facts

Having discussed how normative concerns come to bear on legal knowledge claims, I now dive deeper into the process of legal knowledge production. In legal proceedings between Saúl and RWE, the opposing lawyers presented contradictory sets of evidentiary facts that emerged in line with broader political aims. Faced with this confusing array of knowledges, the judges had to decide on the facts. Law, like science, is a regime of truth production: its institutional aim is to discern justified claims from false assertions (Latour, 2010, p. x). Judges require facts to make legitimate rulings. In this framework, individual facts are tools that contribute to the legal system's overarching goal of producing justice (Jasanoff, 2005, p. S51).

For both science and law, the perceived absence of truth threatens their institutional legitimacy (Jasanoff, 2005, p. S51). I was part of the team that formulated 39 pages of arguments which Saúl submitted to the court in 2015. This involved more than simply copying scientific facts into legal texts. To turn scientific knowledge into legal fact, we had to measure it up to legal standards. For the court to rule in Saúl's favour, he had to prove that RWE was partially responsible for a climatic hazard to his property. In the legal process, lawyers seek to establish a narrative of responsibility underpinned by hard facts.

Since industrialisation, legal scholars and practitioners have held the view that scientific knowledge is one of the most reliable types of evidence for legal disputes (Jasanoff, 2006, p. 330). Nevertheless, science and law often involve different standards of truth. While science strives to produce universally valid knowledge, law produces knowledge that is relevant within the confines of a particular legal case and jurisdiction. Often, legal processes involve different conceptions of facticity and truth than those required for scientific knowledge.

⁶⁶ See, for example, Ingold (2000); Strathern (2018).

What counts as a fact in a court of law may not count as a fact for science, and vice versa (Jasanoff, 2007, p. 762).

Scientific knowledge enters the courtroom not as bare facts or truth, but as evidence. Lawyers must present scientific knowledge in a format that fits the epistemological standards of law (Jasanoff, 2006, p. 329). According to Von Schnitzler (2014, p. 340), law is dependent on non-legal knowledges and epistemologies which often enter legal cases through scientific evidence. This can set the parameters for the issue the court seeks to resolve, showing the court what is relevant and where it can intervene. While legal provisions set parameters for truth-finding in the courtroom, this process is often informed by scientific experts who are called as witnesses.

Given underlying scientific uncertainties about climatic processes, the truth was far from straightforward in the lawsuit between Saúl and RWE. Since the case began in 2015, lawyers on both sides have engaged in an extended exchange of legal briefs containing legal and scientific arguments. For each party, the goal was to present strong scientific claims that the judges would accept as true and relevant, turning them into legal facts. Faced with different scientific methodologies and contradictory claims, judges cannot simply take scientific knowledge at face value and transpose it into legal proceedings (Jasanoff, 2005, p. S54). They must make an informed decision in accordance with the legal norms within their jurisdiction. In the following section, I elaborate on the epistemological standards of law in the German courtroom and highlight how judges navigate competing truth claims in a context of scientific uncertainty.

Decision-making in the legal fray: finding serviceable truths

What determines the parameters of truth in the courtroom? In Germany, judges enjoy a high degree of autonomy in legal decision-making. Section 286 of the German Code of Civil Procedure sets the parameters of evidence for German courts, regulating how judges should determine whether evidentiary facts are true or untrue:

The court is to decide, at its discretion and conviction, and taking account of the entire content of the hearings and the results obtained by evidence being taken, if any, whether an allegation as to fact is to be deemed true or untrue. The judgment is to set out the

reasons informing the conviction of the judges. (Bundesamt Für Justiz, 2013a; emphasis added)

Accordingly, German judges have significant leeway in deciding on the facts of a case. While other legislation places bounds on evidentiary permissibility and standards in particular circumstances, judges can weigh up different types of evidence and need not ascribe exclusively, for example, to a natural scientific framework of truth (Prutting, 2016, § 286).

Nevertheless, disputes over scientific facts lie at the heart of the case between Saúl and RWE. Scientific facts enter the courtroom as evidence, made to fit into the epistemological standards of law. We must recognise, argues Jasanoff (2015) in this context, that neither science nor law can offer infallible knowledge. Acknowledging that knowledge claims arise in relation to broader social concerns, we can accept the limits of any assertion to truth. Rather, states Jasanoff, legal decision-makers should admit ‘serviceable truths’ that are sufficient to resolve a particular matter, given the confines of what we can know.

German jurisprudence has recognised this situated validity of knowledge. A judicial precedent⁶⁷ in 1970 specified the evidentiary guidance for judges set out in Section 286 of the Code of Civil Procedure. The Federal Court of Justice, one of the highest German courts, ruled the following:

‘In cases of uncertainty, the judge can and must make do with a degree of certainty that is *serviceable* to practical life; that silences doubters without excluding them entirely’⁶⁸ (emphasis added)

This influential ruling exemplifies the need for German judges to seek out serviceable truths to aid their decision-making. Rather than striving toward absolute truth, the epistemological framework of German law sets the guidelines for judges to establish truths

⁶⁷ As I noted in Chapter 1, judicial verdicts in Germany, rooted in a civil law system, are not usually considered to be a formal source of law, as they are in common law systems where precedents have a great importance. Nevertheless, judges frequently seek normative guidance in past judicial verdicts (Von Ungern-Sternberg, 2013). In legal arguments during proceedings in Luciano Lliuya v. RWE, lawyers on both sides extensively cited past judicial rulings to justify their legal argumentation.

⁶⁸ BGH ruling from 17.02.1970 (III ZR 139/67), translated by author; the German term ‘brauchbar’ is translated as ‘serviceable’ (https://archive.fo/20120906040226/http://www.ejura-examensexpress.de/online-kurs/entsch_show_neu.php). This decision emerged from the case of a woman who claimed to be Anastasia, daughter of the last Russian Czar, who was reportedly murdered with her family in the aftermath of the Russian Revolution. The woman in question claimed she had secretly escaped Russia and settled in Germany where she sought to acquire a portion of the Czar family’s inheritance in Germany. Judges dismissed the case on the grounds that she had not provided sufficient serviceable evidence to prove her alleged identity.

that are good enough for ruling on the issue at hand. Arguing within this framework, lawyers for Saúl and RWE have sought to convince the judges with serviceable truths that either affirm or deny a causal link between the company and climate change impacts in Peru. In the legal arguments, factual statements became entangled with social concerns about responsibility and justice. At each stage of the legal process, participants have presented claims to truth that support their standpoint, seeking to make their arguments count in the context at hand. Whether in the setting of court hearings or public discussions, the conflict parties and their lawyers put forward serviceable truths and strove to achieve situated epistemological validity.

Having provided a theoretical overview on causality and proof within the legal framework, the remainder of this chapter will examine how lawyers sought to make (and unmake) a causal link between RWE and Saúl. In a journal article published shortly before the lawsuit was filed, Saúl's lawyer Roda Verheyen (2015) established the conceptual groundwork. In claims over loss and damage associated with climate change, plaintiffs must overcome three hurdles to establish legal causation: first, they need to choose a specific defendant among the multitude of global polluters and determine their individual contribution. Second, plaintiffs must establish general causation by linking a specific change or event to anthropogenic climate change. Third and finally, they must establish specific causation by linking a specific loss to the change or event. How is this manifested in legal practice? Saúl's lawyers constructed a causal chain connecting RWE's activities to Saúl's property in Peru. As a first step, they identified RWE as the defendant and sought to determine how much it had contributed to global warming through its greenhouse gas emissions. Second, the lawyers sought to establish general causation by linking glacial retreat in the Peruvian Andes to anthropogenic climate change based on insights from climate science. Finally, to establish specific causation, they drew on local studies about flood risk to argue that glacial retreat had exposed Saúl's house to serious potential harm. In the following sections, I analyse how lawyers on both sides sought to make and deny a causal relationship between RWE and Saúl in relation to each of these steps.

Step one: RWE's contribution to climate change

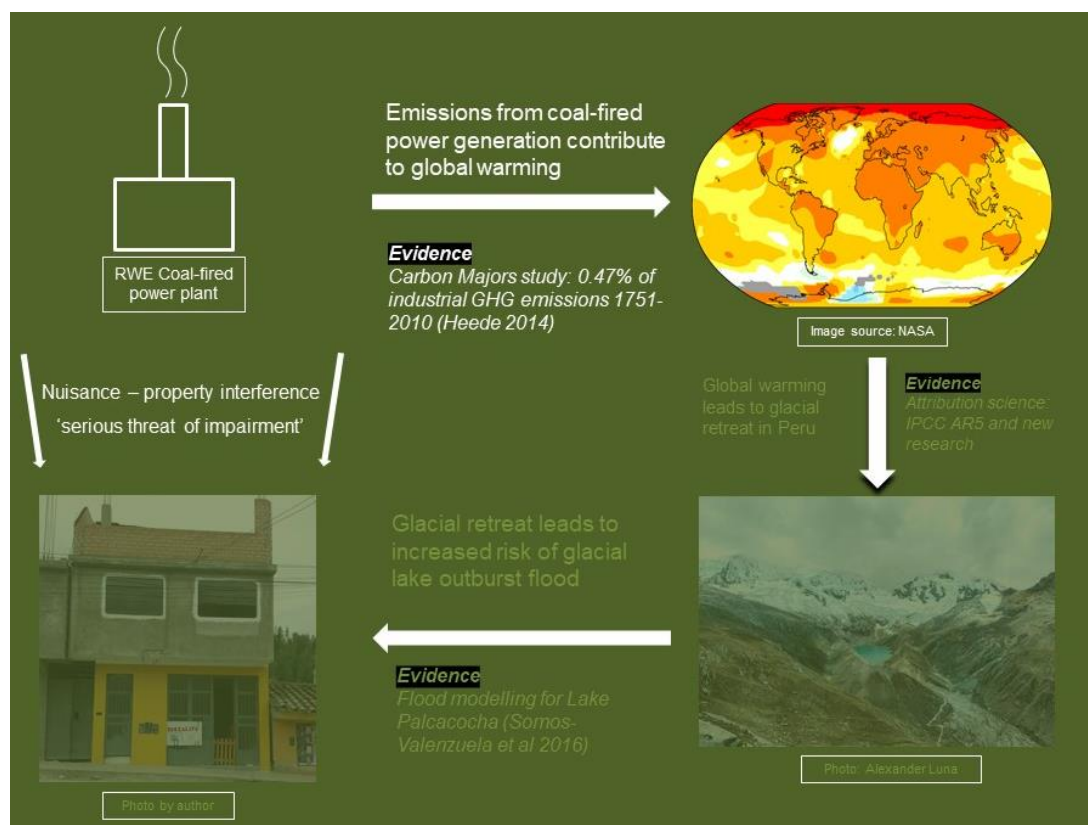


Figure 10: RWE's contribution to global climate change (Diagram by author)

Two and a half hours into the court hearing in November 2017, Judge Meyer turned to the practicalities of evidence. He had clarified the court's opinion that this lawsuit was legally admissible. The judges found no reason under the applicable legal framework to exclude RWE from liability. If the claimant could prove a causal link between RWE's emissions and flood hazard to his house in the Andes, the judges were prone to rule in Saúl's favour. RWE could become the first company to be held legally accountable for its contribution to climate change. Judge Meyer had rebuffed repeated and increasingly acrimonious attacks from RWE's lawyers.

If we go into the evidentiary phase, Judge Meyer explained, we will require independent experts who have not lost their impartiality. Within the German legal system, entering the evidentiary phase meant that the court would appoint expert witnesses to evaluate the facts.⁶⁹ If need be, the experts could conduct additional studies to determine whether RWE was partially responsible for flood risk in Peru. *We will need a geologist and a climate*

⁶⁹ While the judges decided whom to appoint as expert witnesses, they sought advice from the conflict parties. After the two sides failed to agree which scientists were best qualified, the judges independently sought out and appointed a set of scientific experts.

scientist, Judge Meyer elaborated. He gave a cold look towards RWE's lawyers who were shaking their heads and looked upset. *I don't understand what all the fuss is about.*

I suspect that Judge Meyer understood well what the fuss was about – the defendant's lawyers were clearly unhappy that the court found the lawsuit to be admissible. Nevertheless, the judge appeared determined to press on towards questions of evidence. After a brief discussion between Judge Meyer and the lawyers on both sides about what scientific expertise the court would require, Roda asked, *Can we agree on a process for how proof must be sought and presented?*

An expert should decide that after an initial analysis, Judge Meyer replied. The experts, it appeared, would know best how to handle the knowledge.

After clarifying the next steps – he hoped both parties would agree to enter written proceedings and there would be no oral hearings for the time being – Judge Meyer ended the hearing. It had lasted for two hours and 45 minutes. Later that month, the court issued a formal ruling to enter the evidentiary phase. After procedural delays due to multiple objections from RWE's lawyers, the court appointed two experts to examine the issue of flood risk in August 2018.⁷⁰ As of November 2020, the experts' analysis was ongoing. If the court finds, based on the experts' advice, that there exists a flood risk that is sufficiently high to reach the legal threshold, the judges will appoint a second panel of experts to evaluate whether RWE can be causally linked to the flood risk in Peru.

How did we arrive at this point? What were the key issues on which the conflict parties disagreed? All those involved concurred on a crucial set of facts: climate change is a problem of broad concern and greenhouse gas emissions, including those from RWE's coal-fired power plants, have contributed to climate change. Yet the devil lies in the detail. According to Section 288 of the Code of Civil Procedure, facts that one party alleges do not require substantiation through evidence if the other party admits to them (Bundesamt Für Justiz, 2013a). When both sides agree on a fact, the court accepts it as true. While the fact of climate change remained uncontroversial, the lawyers argued over the precise nature of climate change. In this section, I unpick the legal arguments concerning the first step of the causal chain:⁷¹ the link between RWE's greenhouse gas emissions and global warming. I show how

⁷⁰ As the trial is ongoing, the lawyers have requested that the experts' identities should not be made public.

⁷¹ The lawyers divided this first step into two stages: (1) CO₂ emissions released from the defendant's power plants ascend to the atmosphere and increase the overall density of atmospheric greenhouse gases, and then (2) the increased atmospheric concentration of greenhouse gases

both sides offered different analytical frameworks that made the socio-material-atmospheric processes of climate change legible in distinct ways. Lawyers deployed authoritative scientific and legal knowledge that made RWE's contribution to global warming appear either quantifiable or impossible to grasp. In socio-legal claims about climate justice, the very nature of climate change is at stake in terms of how it connects people, corporations, and CO₂ molecules ascending into the atmosphere.

Judicial procedure revolves around the production and circulation of documents which translate complex social and environmental processes into long texts governed by legal norms and conventions (Latour, 2010, p. 224). The parties to a legal dispute carefully prepare these documents with their arguments supported by facts and evidence. The judicial process began with the initial lawsuit which Saúl and Roda submitted to the Essen State Court in November 2015. On 39 pages, this document outlined the claim, providing both legal and factual argumentation. In April 2016, RWE's lawyers from the firm Freshfields Bruckhaus Deringer filed their initial response to the court. On 58 pages, they meticulously deconstructed almost all legal and evidentiary claims made in the lawsuit. This exchange of documents full of legal and scientific arguments continued as the case progressed.

By the time of the court hearing in November 2017, the case file consisted of over 700 pages, filling several binders and folders on the judges' table. Before beginning his analysis of the legal arguments during the hearing, Judge Meyer remarked on this extraordinarily extensive written exchange: *when a file like this falls onto your desk, you have to ask: why us?*

In this chapter, I conduct an epistemological analysis of legal documents⁷² in conjunction with an ethnography of the legal process which involved strategy meetings, evidentiary research, and court hearings. The present section examines how the lawyers drew on various types of authoritative knowledge to evoke distinct understandings of climate change. While Saúl's lawyers highlighted global interconnection in an attempt to establish legal accountability, RWE's lawyers pointed to the complex and diffuse nature of climate change, arguing that it was impossible to establish a causal link between the company's emissions and glacial hazard in Peru. Given my positionality in the case, I was involved in the production

reduces global heat radiation and leads to a global temperature increase. In my present discussion, I discuss these two stages in conjunction as the company's contribution to climate change via its greenhouse gas emissions.

⁷² These documents are not publicly available. The plaintiff has kindly granted me access to them. Redacted versions of some legal documents are available on the Germanwatch website (<https://germanwatch.org/en/huaraz>).

of legal documents on the plaintiff's side. In this analysis, I show how both parties produced and presented truths that appeared serviceable to their overarching aims.⁷³

Following the particles

Clever lawyers can call into question facts that appear utterly self-evident. In a gripping legal ethnography of a lawsuit against Chevron over environmental contamination linked to oil production in the Ecuadorian Amazon, Sawyer (2015) describes how the company's lawyers argued at an Ecuadorian court that there was no health risk for local communities – despite the unquestioned fact that the environment was full of crude oil residue. Applying an industry-sanctioned understanding of scientific risk analysis, the lawyers stated that though soil and water samples showed high levels of petroleum hydrocarbon particles, they did not find certain particles that were known to be toxic. According to Sawyer, they applied a matrix of legibility that rendered petroleum residue harmless. Following this industry-endorsed logic, plaintiffs would have to prove the presence of specific toxic particles to establish liability. For Sawyer, corporate risk management science established such strict specificity requirements for pollution that it became difficult to establish causation.

Sawyer's focus on the matrix of legibility is a useful framework for unpicking legal-scientific disputes about environmental damage and causality. A matrix of legibility constitutes 'a distinct constellation of molecular, technical, and social processes' (Sawyer, 2015, p. 136). It shapes people's understanding of chemical processes in a socio-material environment. In the case of climate change, the matrix of legibility applied to study the relationship between greenhouse gas emissions, global warming, and local impacts is crucial in disputes over responsibility and legal liability. Here, I analyse how lawyers applied distinct matrices of legibility to make and unmake a causal relationship between RWE and Saúl.

All participants to the lawsuit undoubtedly accepted that coal firing at power plants owned by RWE (and its legal predecessors) led to the emission of CO₂ and other greenhouse gas particles. Neither was there doubt that many of these particles subsequently entered the atmosphere and contributed to global warming. Nevertheless, each side employed a matrix

⁷³ Methodologically, my approach reflects concerns elaborated in the field of critical discourse analysis that studies of verbal and written discourse should reflect broader social issues at stake in discursive practices (Fairclough, 1992; Fairclough, 2003; Foucault, 1972).

of legibility that gave rise to a distinct understanding of how greenhouse gas particles are materially manifested in the process of climate change.

RWE's lawyers argued that it was scientifically and legally impossible to trace emissions to an individual polluter in cases of cumulative causality.⁷⁴ They drew a parallel to a set of cases from the 1980s concerning damage to forests due to sulphur dioxide (SO₂) emissions, allegedly originating from nearby industry.⁷⁵ The German Federal Court of Justice ruled that liability could not be established as numerous actors had emitted SO₂ which subsequently mixed in the air, making it impossible to determine whose molecules had damaged which specific trees. Citing this decision, RWE's lawyers argued that it was not possible to establish causal liability in cases of cumulative environmental damage. Much like SO₂ molecules from different sources mix in the air, CO₂ and other greenhouse gas molecules become inextricably linked when they enter the atmosphere. Consequently, they found, there could be no individualised causal relation in legal terms between RWE and Saúl; or more specifically, between RWE's emissions and potential climate change impacts in Peru that affected Saúl.⁷⁶ The defendant's matrix of legibility focussed on the materiality of individual greenhouse gas molecules as they ascended into the atmosphere and became lost among countless other molecules from countless other sources.

In response, Saúl's lawyers elaborated a matrix of legibility that highlighted the differences in behaviour between SO₂ and CO₂ molecules. They pointed out that SO₂ molecules remain closer to the earth's surface, potentially causing damage through coming into direct contact with material environments. In terms of legal causality, this placed a burden on forest owners to prove where the SO₂ molecules had originated that damaged their trees. CO₂ molecules, on the other hand, collectively rise into the atmosphere, contributing to global warming. And though the molecules become inextricably mixed, each molecule reinforces the planetary warming process. Accordingly, the lawyers concluded that individual emissions can be causally linked to climate change impacts – unlike with SO₂, it is

⁷⁴ As I explained in the theoretical section above, cumulative causality exists when multiple parties have contributed causally to the same process or event.

⁷⁵ These cases were summarily addressed in a 1987 ruling at the Federal Court of Justice (BGH, 10.12.1987 - III ZR 220/86).

⁷⁶ Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), pp. 38-40

not necessary to link specific molecules with specific damages as all CO₂ emissions contribute to global warming.⁷⁷

Summing up this argument, Saúl's lawyer argued in an article: 'every molecule that is emitted, irrespective of where it actually comes from, contributes at least marginally to the greenhouse effect and thereby to the rise in temperature and its consequences' (Verheyen, 2015, p. 164). This matrix of legibility, with its focus on the cumulative processes of greenhouse gas emissions and climate change, allows lawyers to construct a neighbourly relationship between Saúl and RWE. To make these molecular processes causally legible for a legal liability claim, the lawyers required a framework for measuring and quantifying the defendant's emissions in relation to all other emissions occurring on the planet.

Quantifying corporate emissions

In the early 2000s, burgeoning climate change lawyers faced a challenge – there was a lack of evidence to provide epistemological justification for private climate liability claims. They had an insufficient scientific basis to link specific companies and emissions to specific climate change impacts. Working with a group of environmental lawyers, Roda and her colleagues collected donations and commissioned a study that analysed historical fossil fuel extraction and emissions. This resulted in the Carbon Majors Report (Heede, 2014a; Heede, 2014b): led by the US geographer Richard Heede in cooperation with other academics, this research quantified industrial greenhouse gas emissions since industrialisation and linked them to specific entities. It concluded that 90 companies are responsible for around two thirds of historic industrial emissions.⁷⁸ The study was a key piece of contentious evidence throughout the legal process.

RWE was founded in 1898 at the height of German industrialisation. As of their 2019 annual report, the company still relies to a significant extent on coal-fired power (RWE, 2020). Consequently, it became one of the largest greenhouse gas emitters in Europe. According to the Carbon Majors Report, RWE is responsible for 0.47% of industrial

⁷⁷ Rechtsanwälte Günther, legal brief from 11 July 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), pp. 13-14

⁷⁸ Roda and Peter Roderick at the Climate Justice Programme first commissioned the research with Richard Heede in 2003. Before this, only emissions data by country was available. Greenpeace later provided additional funding to carry on the study. The study's results have been published in peer-reviewed journals (Ekwurzel et al., 2017; Frumhoff et al., 2015; Heede, 2014b).

anthropogenic emissions between 1854 and 2010 (Heede, 2014a). RWE sits behind larger emitters such as ExxonMobil (3.21%) and Saudi Aramco (3.17%). The company does not have any presence in Peru – it has produced emissions primarily in Germany and in other European countries. In the United Kingdom, RWE owns a subsidiary called npower.

The Carbon Majors study marked a significant turning point for climate litigation. It made specific greenhouse gas contributions – linked to potential defendants – identifiable and measurable. It provided a scientific basis for Saúl’s lawyers to argue that RWE should be held liable for 0.47% of the costs to reduce flood risk affecting Saúl’s house, in line with the company’s alleged contribution to global industrial emissions. The Carbon Majors report offers a useful matrix of legibility that draws attention to the role of corporate emitters by quantifying their historical emissions.

In their response to the lawsuit, RWE’s lawyers questioned the Carbon Majors study’s scientific validity.⁷⁹ They argued that it was ‘not tenable’ (*nicht belastbar*) as its source material was unclear and incomplete, it included a significant uncertainty factor, it only considered industrial CO₂ and CH₄ emissions, and insufficiently accounted for the changing ownership of specific power plants.⁸⁰ Overall, the lawyers stated, climate involves ‘a highly complex interplay between numerous factors and interactions that are characterised by high uncertainty and are not adequately understood to this day’.⁸¹ As such, they argued that it was not possible to establish a causal link between RWE’s emissions and climate change impacts in Peru. In the following section, I trace how lawyers argued over which matrix of legibility should be applied to understand climate change in relation to legal causation and liability.

Making climate change relevant

At the outset, both the lawsuit and RWE’s initial response define why climate change should – or should not be – a relevant topic of discussion in a German court. The lawsuit

⁷⁹ Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), pp. 25-26

⁸⁰ This point relates back to the discussion about corporate personhood in Chapter 2. As some coal-fired power plants were previously operated by other companies before being acquired by RWE, the lawyers argued that not all emissions from those plants could be linked to RWE as a legally responsible person.

⁸¹ Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), p. 24

paints a picture of climate change as a global process with distinct identifiable causes and impacts. It draws on German law, scientific publications, and Peruvian government declarations as authoritative sources of knowledge to argue that RWE should be held legally liable for its contribution to the flood hazard affecting Saúl's property in Peru. Opening the discussion about climatic processes, it states that glacial melt and the growth of Lake Palcacocha – which lead to the flood hazard downstream – are 'caused at least inter alia by anthropogenic climate change' (p. 11). Drawing on different types of authoritative knowledge, the lawsuit employs a matrix of legibility that helps to draw a causal link between RWE's past emissions and a contemporary risk to Saúl's property.⁸²

Initially, the lawsuit draws on one of the most authoritative sources of knowledge in a German courtroom – German law. Citing a law that regulates emissions trading for greenhouse gases,⁸³ the lawsuit states that the 'existence of global climate change through increased concentrations of greenhouse gases such as carbon dioxide in the atmosphere is undisputed in Germany' (p. 11). Next, the document cites a public statement from RWE that acknowledges the existence of anthropogenic climate change in a discussion of the company's long-term goal of climate-neutral electricity production (p. 12). This leads to the conclusion that climate change caused by increased atmospheric greenhouse gas concentrations should be considered as 'common knowledge' in accordance with Section 291 of the German Code of Civil Procedure (p. 12).⁸⁴ The cited section states the following: 'Facts that are common knowledge with the court need not be substantiated by evidence' (Bundesamt Für Justiz, 2013a).⁸⁵ With this, the lawsuit explicitly refers to one standard of authoritative knowledge under German law that regulates which truths a court can consider as applicable and serviceable. Given the high epistemological standard needed for a statement to achieve the status of 'common knowledge', the lawsuit cites both German law and the defendant.

RWE's legal response does not question that climate change exists, or that RWE's emissions have contributed to global warming. Rather, it employs a different matrix of legibility: citing UN reports and numerous articles from prestigious scientific journals, RWE's

⁸² Rechtsanwälte Günther, lawsuit from 24 November 2015 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15)

⁸³ Greenhouse Gas Emissions Trading Act (*Treibhausgas-Emissionshandelsgesetz*)

⁸⁴ At this stage in the case, it was unclear whether RWE would dispute the existence of anthropogenic climate change.

⁸⁵ I follow the official English translation of the Code of Civil Procedure which translates the German term 'offenkundige Tatsache' as 'common knowledge'. An alternative, more direct translation would be 'obvious fact'.

lawyers paint an alternative picture of global climate change – one in which the processes of exchange between people, the global environment, and atmosphere are extremely complex and not fully understood by the scientific community. This allows them to conclude with the serviceable truth that we cannot establish a causal scientific and legal link between RWE's emissions and a potential flood hazard to Saúl's property.⁸⁶

Climate change can gain competing social meanings (Callison, 2014, p. 11). Here, lawyers for Saúl and RWE are contesting the meaning of climate change through the judicial process. The climate, as a statistical abstraction and social fact, emerges through socially contingent relationships between people, technologies, knowledges, and the environment (Demeritt, 2001, p. 312). Scientific forms of knowledge are key, as they allow people to conceptualise the dynamics of climate change and make claims about how we should resolve the problems it causes. According to Callison (2014, p. 23), scientific discussions about climate change bring up complex questions with no simple scientific answers – how should we live with our planet and with each other? How do we relate local circumstances to global processes? The legal dispute between Saúl and RWE is an attempt to interrogate these questions via the normative framework of German law. Lawyers for the plaintiff and defendant applied distinct matrices of legibility that reflected their respective perspectives on causality and responsibility in the context of climate change. Each approach offered epistemological credence to lawyers' attempts to make or unmake an ethically charged socio-material relation between Saúl and RWE.

After reviewing arguments about RWE's contribution to global warming, I now move to the next step in the attribution chain: the link between global climate change and glacial retreat in the Peruvian Andes. More specifically, Saúl's legal team had to prove that anthropogenic climate change had caused a specific glacier situated above Saúl's hometown to retreat. Legal discussions on this issue involved disputes over the validity of climate models as well as attribution science which links individual impacts to climate change. Climate change knowledge emerges in the context of an international institutional framework that promotes and disseminates policy-relevant research about global warming. I show that as scientific climate change models become enveloped in legal claims over climate justice, they are becoming socially and politically charged in new ways.

⁸⁶ Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15)

Step two: Attributing glacial retreat to global warming

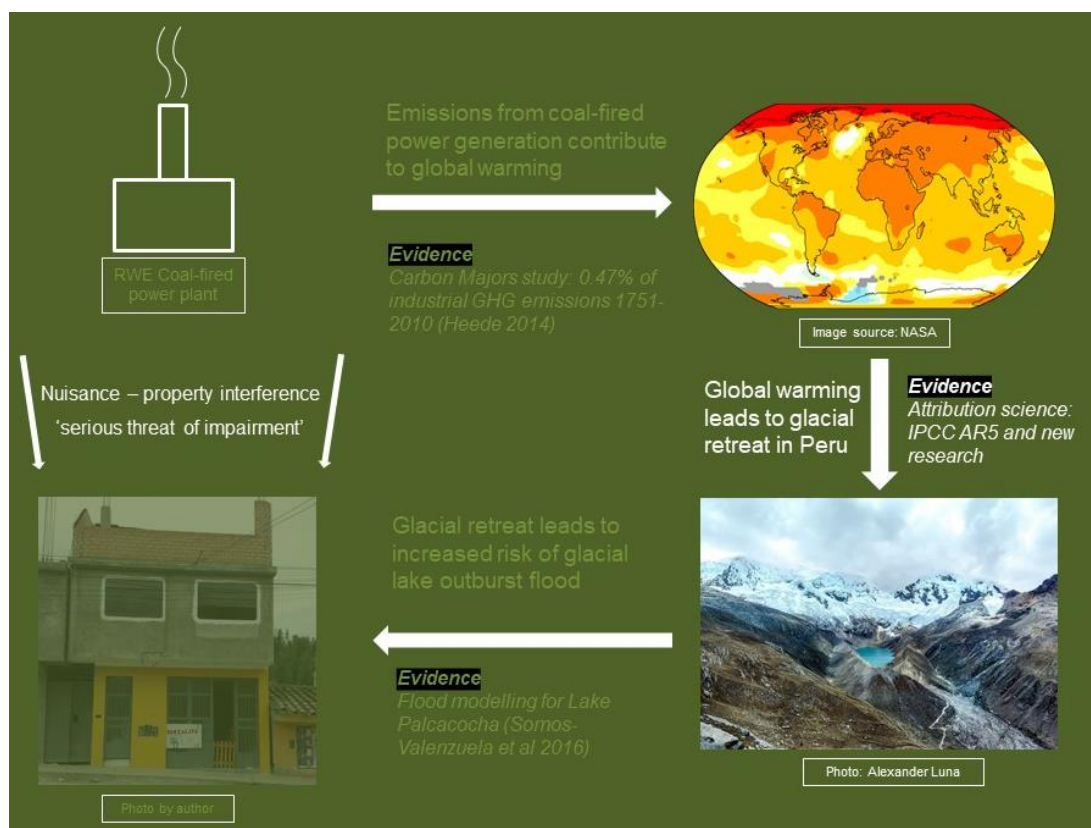


Figure 11: Climate change and glacial retreat in Peru (Diagram by author)

Science is key to understanding climate change: the processes of global warming are mediated through models and socially produced scientific facts (Knox, 2015, p. 410). Climate science makes the global climate knowable (Sayre, 2012, p. 63). Vital in this regard is the detection and attribution of climate change impacts – a field commonly known as attribution science. This involves attributing individual impacts to the global phenomenon of climate change.

Attribution science plays a significant role in climate litigation – scientific evidence is often critical for legitimising claims within a legal framework and establishing a causal link (Setzer and Vanhala, 2019, p. 9). Early climate litigation cases against corporations in the 2000s faced difficulties as plaintiffs were unable to prove a link between emissions and impacts in terms of legal causation. Since then, climate change science has evolved rapidly. New studies and research frameworks make it easier to link specific emitters with specific impacts, increasing the likelihood that future lawsuits might be successful (Ganguly et al., 2018). Litigants draw on this new scientific framework to characterise climate change in terms of specific causal relations between emitters and impacts, rather than a global process with diffuse local impacts. I begin this section with an overview of how scientific knowledge

about climate change is produced and validated in the context of political and legal discussions about global warming.

Who has the epistemological authority to define the dynamics of climate change? Lawyers for Saúl and RWE have drawn on a similar scientific basis in their arguments, citing peer-reviewed academic publications to reach divergent conclusions. Both sides prominently refer to reports from the Intergovernmental Panel on Climate Change (IPCC). The IPCC is the central international institution for producing and validating climate change knowledge, and is frequently cited in policy and public discussions (Hulme, 2010b, p. 561). In its Assessment Reports, the IPCC summarises and synthesises the current state of academic research on the causes and impacts of climate change, and the actions that would mitigate its impacts.⁸⁷ The UN created the IPCC in 1988 to study global climate change and provide a basis for the emerging international policy framework. As an intergovernmental body, it counts the world's governments as its members, along with leading scientists across academic disciplines (Miller, 2004).⁸⁸ Most recently, the IPCC published its Fifth Assessment Report in 2014 (IPCC, 2014b), which both Saúl's and RWE's lawyers cite extensively. The lawsuit points out that the IPCC 'is a panel of experts also recognised by the German Federal Government' (p. 12). This indicates that the court should consider scientific statements from the IPCC as authoritative knowledge in judicial proceedings.

Since it was established, the IPCC has contributed to an understanding of climate change as a global environmental problem, calling for global political action. Through its reports, the IPCC explicitly seeks to identify potential policy responses to climate change at global, regional, and local levels consistent with climate change mitigation goals (Miller, 2004, p. 55). Shortly after the IPCC published its First Assessment Report in 1990, the world's governments established the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 as a global institution for climate policy-making. While scientists had previously discussed climate change primarily in local or regional terms, this brought deliberations to the level of international politics (Miller, 2004, p. 51). At the UNFCCC's regular summits, policymakers from around the world meet to coordinate political responses

⁸⁷ Notably, the IPCC does not conduct any research of its own; rather it bases its reports on existing peer-reviewed academic publications.

⁸⁸ While scientists figure as authors and reviewers at the IPCC, reports must also be accepted unanimously by the participating governments. This means that IPCC reports are distinct from peer-reviewed journal articles as they can potentially exclude particular viewpoints from the scientific literature that government representatives disapprove. Accordingly, knowledge contained in IPCC reports is both scientifically validated and politically negotiated (Miller, 2004).

to climate change, which has led to international treaties including the 1997 Kyoto Protocol and 2015 Paris Agreement.

At the IPCC, scientific knowledge production is intertwined with political solutions (Callison, 2014, p. 14). Political demands and policy processes shape the production of climate change knowledge at the IPCC (Demeritt, 2001). In addition, new forms of activism and civil society engagement have emerged alongside scientific conceptions of global climate change (Miller, 2004, p. 56). A prime example of this is Germanwatch, the NGO that has collaborated with Saúl in the lawsuit against RWE, which is one of the few civil society organisations that has participated in all UNFCCC meetings since 1992.

While the IPCC has operated with the stated aim of producing policy-relevant knowledge, lawyers in climate litigation cases are rendering this knowledge legally pertinent.⁸⁹ The IPCC involves a knowledge regime that privileges academic research, giving scientific experts ‘a powerful role as politically neutral agents’ (Miller, 2004, p. 61). While the IPCC promotes itself as a purely technical institution, it can be difficult to distinguish in practice between scientific issues and value-laden matters of concern (Demeritt, 2006, p. 474). Building on IPCC insights, political discussions at an international level have primarily focussed on greenhouse gas emission control and adaptation to existing impacts, with little emphasis on the wider relation between capitalism, global inequality, and climate change (Wynne, 2010, p. 299). But as climate science comes into the sphere of legal climate justice claims, activists are using scientific knowledge to bring these issues to the forefront. In the legal dispute between Saúl and RWE, scientific knowledge validated by the IPCC could have wide-ranging ethical implications if it allows for novel claims about climate change accountability. In the context of climate litigation claims, this knowledge potentially becomes politically and ethically charged after its production.

⁸⁹ A notable case to draw on the IPCC was the 2007 case of *Massachusetts v. Environmental Protection Agency (EPA)* in which the US Supreme Court cited the 1995 IPCC Report in its ruling that the EPA had to regulate greenhouse gases as pollutants (Fisher, 2013, p. 251). In the Australian case of *Gloucester Resources Limited v. Minister for Planning in the New South Wales Land and Environment court*, judges cited the IPCC’s *Global Warming of 1.5°* report in support of a decision to block construction of a coal mine.

Climate science in the courtroom

In the trial between Saúl and RWE, climate models are a principal matter of dispute. Computer-generated models allow scientists to represent the complex atmospheric processes of climate change based on statistical and quantitative data. Since the 1980s, researchers have developed models that render the climate as an integrated system at a planetary scale, leading to an understanding of Earth as a global environment. Climate modelling allowed for a conceptualisation in which the entire world is at risk of dangerous transformation (Miller, 2004, p. 54). Jasanoff (2010, p. 241) traces our contemporary conception of Earth as a single place of value and concern to the history of US military dominance. During the Cold War, space travel produced the first images of the entire planet. This provided the US environmental movement with a normative imperative to protect Earth. Historically speaking, climate change has emerged discursively as a geophysical issue, leading to a political focus on CO₂ levels. In this context, scientific climate modelling has evolved in response to policy-makers' needs (Allan, 2017). Some have argued that climate change models are reductive as they only focus on the physical properties of greenhouse gases, concealing the unequal social relations that lead to emissions (Demeritt, 2001, p. 316). But as these models appear in climate litigation cases, they are becoming socially and politically charged because they provide the potential basis for accountability claims. Climate models offer a matrix of legibility that potentially links specific local events and processes to global anthropogenic climate change.

How do lawyers for Saúl and RWE deploy insights from climate change models in their legal arguments? How do models become serviceable in the courtroom as a matrix of legibility? In the lawsuit, Saúl's lawyer devotes extended attention to the parameters of scientific and legal truth, arguing that statements from the IPCC regarding epistemological certainty in relation to climate change models should provide sufficient evidence for proving a causal link of accountability. Citing the guidance notes issued to lead authors of the IPCC's fifth assessment report (AR5) that clarify how the authors should interpret scientific understandings of likelihood in relation to facts, the lawsuit argues that particular statements are considered by the IPCC to 'very likely' be true, corresponding to a certainty of 90-100%. 'As there are no linear causalities in climate science,' the lawsuit elaborates, and all statements about the complex climatic system emerge from models and statistics, 'it is categorically not possible to make other, more "certain" statements'. Nevertheless, scientific insights deriving from abstract climate modelling and statistics are 'not different', in the

claimant's view, 'from statements by expert witnesses based on experts' general experience, which are recognised as generally permissible in civil proceedings'.⁹⁰ With this, the lawsuit acknowledges a process through which scientific climate facts can be made legible for legal purposes.

Another section in the lawsuit elaborates on the legal requirements for evidence. Citing German procedural law and past rulings defining the need for establishing a serviceable degree of certainty that a fact is true, Saúl's lawyer contends that claims defined by the IPCC as having a 'very high probability' should be considered as true within the legal framework. While the IPCC acknowledges that all climate models and statistics retain a degree of uncertainty, the lawyer argues that this uncertainty – in cases where it remains relatively low – does not make a model's overall results unserviceable to German jurisprudence.⁹¹

To draw a causal link between global anthropogenic climate change and glacial retreat in Peru, the lawsuit cites the IPCC's AR5, which establishes as 'very likely' the fact that over half of the global temperature increase between 1951 and 2010 can be attributed to anthropogenic greenhouse gases (IPCC, 2013, p. 932). Another section of the report states with 'high confidence based on high agreement and robust evidence' that glaciers have retreated at a rapid pace, particularly since the 1970s, in several countries including Peru (IPCC, 2014a, pp. 1518-1520). Citing the same chapter of the IPCC report (IPCC, 2014a, p. 1544), the lawsuit argues that glacial retreat in the Cordillera Blanca can be attributed to anthropogenic influence.⁹²

In their response, RWE's lawyers explicitly attack the matrix of legibility presented in the lawsuit. They counter the claim that an increased atmospheric concentration of greenhouse gases has led to a recent accelerated glacial retreat in the Peruvian Cordillera Blanca region: 'such a simplistic causal link, as the claimant wants to assume, does not exist'. Relying on data from the IPCC's AR5, the lawyers argue that the global increase in greenhouse gas emissions is not linked in a linear fashion to global average temperatures – emissions increases did not always correspond directly to temperature increases. Comparing data from AR5 with a scientific publication about temperature development in the Cordillera Blanca, they argue that global average temperatures do not necessarily correspond with local

⁹⁰ Rechtsanwälte Günther, lawsuit from 24 November 2015 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), p. 13

⁹¹ Rechtsanwälte Günther, lawsuit from 24 November 2015 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), pp. 35-36

⁹² Rechtsanwälte Günther, lawsuit from 24 November 2015 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), p. 16

temperatures measured in the Cordillera Blanca – while one increases, the other may even decrease. They conclude that ‘greenhouse gases emitted since the 1980s cannot have contributed to glacial melting’.⁹³ While the lawsuit attempts to draw a causal link between anthropogenic global warming and local glacial retreat in the Peruvian Andes by pointing to broad trends reflected in climate models, RWE deploys more precise local temperature data to question the model-based matrix of legibility.

The limits of modelling

RWE’s legal arguments reflect critiques from social scientists who point to the reductive nature of climate modelling. These models privilege a planetary scale – the global perspective subsumes local and regional insights (Tsing, 2005, p. 102). The lawyers call for a greater focus on local dynamics in the Peruvian Andes which do not always follow global trends. Climate modelling involves inherent uncertainties, including limited knowledge about particular inputs and the physical randomness of atmospheric processes (Hulme, 2010a, p. 271). When scientists build climate models, they make assumptions about how certain human and environmental factors are developing (Wynne, 2010, p. 295). Implicitly incorporating this critique, RWE’s lawyers cite the IPCC’s AR5 to counter the lawsuit’s claim that greenhouse gases have caused global climate change via an increase in global temperatures. Arguing that this conception is reductive, they state that ‘global’ climate change should not be considered synonymous with ‘anthropogenic’ climate change.⁹⁴ Rather, numerous natural and anthropogenic factors shape the climate. From this follows a long discussion of climatic drivers, including anthropogenic and natural greenhouse gases, solar radiation, aerosols and volcanos, land use and agriculture, as well as ocean cycles.⁹⁵ For epistemological justification, these discussions rely on IPCC reports and scientific publications. The lawyers also urge the court to seek further verification from expert

⁹³ Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), pp. 8-13

⁹⁴ Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), p. 13

⁹⁵ Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), pp. 15-21

witnesses. Finally, the lawyers cite other scientific publications to argue that additional regional and local factors can affect glacial development.⁹⁶

What can climate models say about relations among people and environments across the planet? Some have critiqued the contemporary scientific and policy approach that assumes we can identify anthropogenic impacts on the climate. According to Sayre, the term ‘anthropogenic’ arose out of a modern scientific conception that drew a conceptual boundary between humanity and natural environments, assuming that the latter were inherently stable without human influence (Sayre, 2012). For Hulme, this disregards the fact that natural and human processes are inherently entangled (Hulme, 2010a). We find echoes of this argument – a more recent instalment in the longstanding debate over the nature/culture dichotomy (Latour, 1993) – in RWE’s argumentation. If we cannot separate human actions from environmental processes, we preclude legal and social claims that tie specific polluters to particular climate change impacts. Nevertheless, the study of human interference in the climate has significant ethical contours. The increasing impacts of human activity in all parts of the world are making it more and more difficult to distinguish between nature and humanity. Sayre (2012) urges that we reject the potential universalising implications embodied in the term ‘anthropogenic’ – that humanity as a whole is transforming the planet – and rather investigate which people have caused which changes, and who is affected.

While any distinction between ‘humanity’ and ‘nature’ is socially constituted (Ingold, 2000), contemporary advances in climate science potentially allow us to trace causal links between specific polluters – such as RWE – and people or places affected by climate change – including Saúl in Peru. Recent developments in climate change attribution science provide an epistemological framework for a differentiated understanding of causality in the contemporary age. Climate change offers a novel perspective for studying global concerns that moves beyond the nature-culture-dichotomy toward a new understanding of planetary entanglements and human responsibilities (Hastrup, 2013a, p. 279). Scientific advancements allow us to conceptualise the climate as a set of relationships in which we are all involved. Humans are part of the nature that climate science describes (Knox, 2015, p. 103). Scientific knowledge can point to the entanglement between people and environment and can open

⁹⁶ Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), pp. 22-24

novel possibilities for making claims about accountability, highlighting specific relations within that entanglement.

Some have argued that climate science, with its basis in modelling, frames the problem of global warming within the existing political, economic, and social framework. Predictions about climatic futures often incorporate dominant notions about capitalist growth, social progress and authoritative knowledge (Wynne, 2010, p. 295). In the Global South, others have criticised that global climate models represent emissions as neutral, ignoring the larger historical contributions of countries in the Global North (Tsing, 2005, p. 105). While all greenhouse gas emissions are the same in terms of their interaction with the global atmosphere, emissions can have disparate social and political meanings (Demeritt, 2001, p. 313). Building on contemporary advances in climate science, which offers increasingly precise accounts of the relations between emissions, atmospheric warming, and climate change impacts, the lawsuit draws a causal link between Saúl and RWE in an attempt to hold the company responsible. Combining scientific research that quantifies historical emissions in relation to individual corporate entities with climate models that attribute local impacts to anthropogenic global warming, lawyers and activists can potentially establish legally and politically charged relationships between specific polluters and people who are facing dangerous environmental transformations.

While climate models provide crucial evidence for climate litigation cases, how do judicial claims affect climate science? Scientists are becoming increasingly aware of the fact that their insights are relevant for controversial legal cases such as the dispute between Saúl and RWE (Mechler et al., 2019, p. 26). As new knowledge emerges through scientific research on climate change, it gains ethical contours as facts are potentially relevant for existing and future climate litigation cases. Lawyers have already applied some insights, such as those from the IPCC's AR5, as serviceable truths in individual claims.⁹⁷

While lawyers for Saúl and RWE draw on scientific climate data and modelling insights, principally from the IPCC, they diverge in their framing of the facts and in how they conceptualise their epistemological validity and legal serviceability. This leads to wholly different conceptualisations of climate change: one allows for an epistemologically grounded causal link between Saúl and RWE, while the other denies the possibility of tracing such a link due to the imprecise nature of global climate models. In this context, climate science can

⁹⁷ E.g. *Native Village of Kivalina v. ExxonMobil Corp.*, *Comer v. Murphy Oil*, *City of Oakland v. BP*, *City of New York v. BP*, and *Juliana v. USA*.

hardly claim to provide neutral and purely technical insights. Scientific climate knowledge is ethically charged and politically explosive.

At the November 2017 hearing in Hamm, Judge Meyer found that the lawsuit's matrix of legibility was potentially valid: *Unlike what RWE has argued, he explained, a climate model may be able to provide sufficient proof to this end. Similar models are not unheard of in the justice system; scientific models have been used as proof in medical lawsuits.* As legal proceedings between Saúl and RWE are ongoing, it remains to be seen which understandings of climate change will ultimately prevail in the courtroom.

Step three: Linking glacial retreat to flood risk

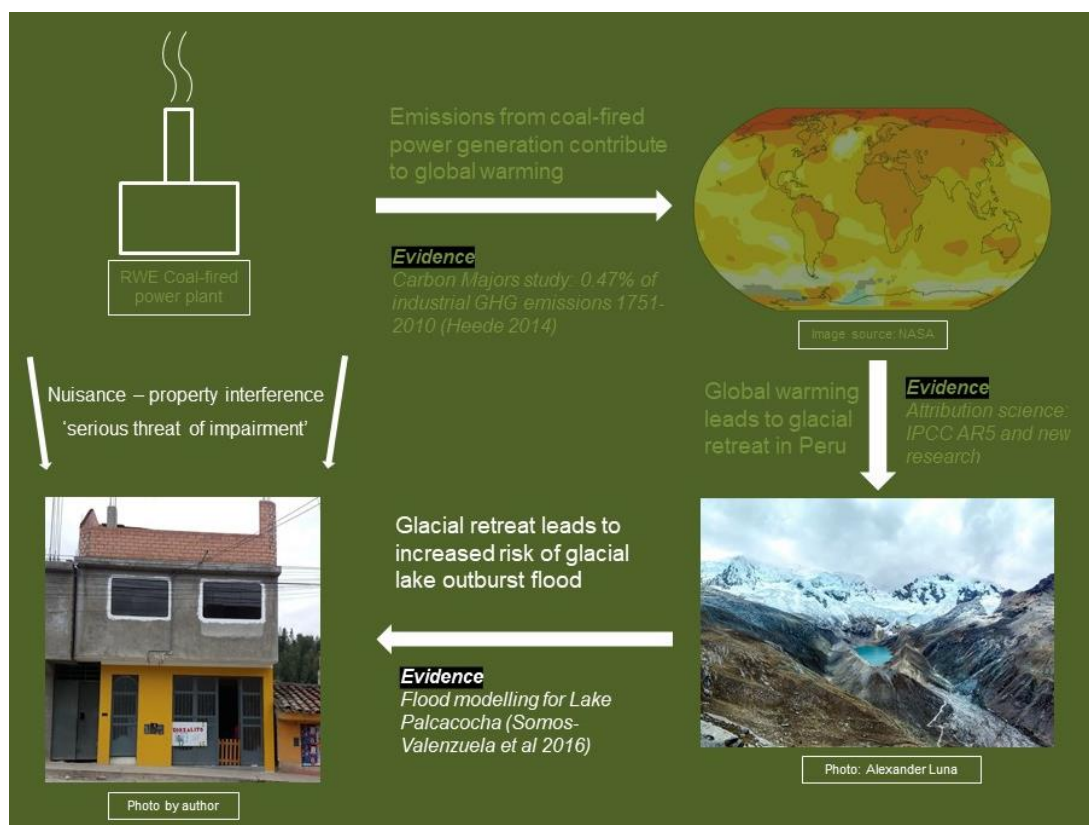


Figure 12: Glacial retreat and flood risk (Diagram by author)

In March 2019, RWE's lawyers introduced a surprising new piece of evidence into the trial: a 73-page scientific study commissioned by the company and authored by four professors from a prestigious German university.⁹⁸ Based on available scientific research and government publications from Peru, the study concluded that there were insufficient 'scientifically verifiable facts' to allow for the conclusion that there was a 'serious threat of

⁹⁸ Due to reasons of legal confidentiality the authors' names cannot be made public at this stage.

danger’ of Saúl’s property being affected by a glacial lake flood ‘within a foreseeable timeframe’. With this wording, the study mirrored the judges’ evidentiary requirements for establishing whether there was a sufficiently high risk of flooding to merit a legal claim.⁹⁹ The authors came to this conclusion by raising doubt about existing lake data, highlighting a lack of data about various parameters such as the likelihood of avalanche events, and by questioning methods of flood modelling and risk evaluation applied in previous scientific studies. Crucially, the authors did not conclude that there was no risk at all; rather, they argued that it was not possible based on the available evidence to prove a ‘serious threat of danger’ according to the legal standard.

After arguing that RWE had contributed to global climate change and that climate change had led to glacial retreat in Peru, Saúl’s lawyers had to complete the causal chain by linking glacial retreat to a risk of flooding affecting Saúl’s house. For the legal team, this appeared to be the simplest step of all. Numerous studies in peer-reviewed scientific journals had identified a high risk of flooding from Lake Palcacocha located above the city of Huaraz. The glacial lake had already caused a devastating flood when its banks burst in 1941, and as glaciers retreated in the past decades it had grown to be larger in volume than ever before. Local authorities had begun implementing infrastructural measures to reduce flood risk. Nevertheless, RWE’s lawyers argued throughout the legal proceedings that there was no serious risk of flooding; or at the very least, the risk was not serious enough to warrant a legal claim. Discussions revolved around scientific practices for measuring and evaluating flood risk at Lake Palcacocha. As various scientists and government agencies conducted research at the lake, competing data and understandings of risk became a subject of legal dispute. Lawyers on each side drew on measurements that justified their respective aim of either making or unmaking a relation between glacial retreat and flood risk. These measurements were key for establishing – or contesting – an ethically charged neighbourly relation between Saúl and RWE.

Measurements become socially relevant in relation to how they are applied beyond the scientific sphere. Political officials in Peru and legal practitioners in Germany brought measurement data from Palcacocha into discussions about how to evaluate risk and who was responsible for addressing climate change impacts. How they appraised the accuracy of

⁹⁹ As I elaborated above, the court sought ‘scientifically verifiable facts’ to determine whether Saúl’s property in Huaraz faced a ‘serious threat of danger’ that constituted a ‘serious threat of impairment’ caused partially by RWE via global warming. There must be a ‘sufficient probability that damage will occur within a foreseeable timeframe’ (Oberlandesgericht Hamm, ruling of the 5th Civil Senate from 23rd August 2018 [Saúl Ananías Luciano Lliuya ./ RWE AG, Az.: I-5 U 15/17]).

different measurement practices varied in relation to the technological and institutional standards applied to measurement data. Which standards they applied often appeared strategic, with RWE's lawyers applying particularly stringent parameters to deny that a causal link could be established to the legal standard of evidence. This section traces ethnographically how factual claims about Lake Palcacocha emerged and entered the legal process. While the lake itself was in constant flux – its shape and volume shifting from day to day – measurement practices stabilised it in a way that allowed for risk evaluation which, in turn, was shaped by varying technological understandings of accuracy and institutional conceptions of danger. Factual claims about flood risk at Palcacocha were shaped by these socio-material engagements as they became the subject of legal debate in Germany.

Scientific facts are concerned with turning the world into words (Latour, 1999, p. 24). When scientists make statements about Palcacocha, they seek to represent the lake's physicality in an authoritative statement. Abstracting trustworthy measurement data from the lake allows them to produce factual claims. I follow Bruno Latour's ethnographic approach to study the process of scientific fact production. Looking at the history of individual facts allows us to unveil how they became established through labour and controversy. We can investigate scientific claims by tracing how people strive to make them factitious – or question their validity (Latour, 1987). This approach does not judge whether facts are true or false, but uncovers their historical contingency (Hacking, 1999).

At the German court in Hamm, the judges sought 'scientifically verifiable facts' about Palcacocha. Scientists and other experts had drawn on different measurement data to make numerous authoritative statements about the lake. The court encountered lengthy arguments about which measurements and facts were most trustworthy. Scientific facts arise through a process of social contestation. A fact becomes more stable when others attest to its validity, yet it remains prone to critique. Underlying interests and broader concerns often shape the way people produce and deploy factual claims. Certain facts may even give rise to political interventions and social action. Drawing on insights from STS about the social production of knowledge, I trace how facts about Palcacocha came into being and affected people's lives between Huaraz and the German courtroom.

Measuring Lake Palcacocha



Figure 13: The siphons at Lake Palcacocha (Photo by author)

On a crisp Andean morning below blue skies, the sun began to rise above Lake Palcacocha. Lying below heavy woollen blankets, Martín awoke in his stone shack above the lake to the sound of radio static. It was around 6 a.m. Martín had drifted off after his last radio message to the city one hour earlier to update authorities about the lake's status. Opening a wooden door, Martín peered outside his shack. The sun was beginning to rise over a magnificently blue lake and sparkling white glaciers. According to a 2009 measurement, the lake had grown dramatically and authorities feared that it posed a risk to the valley below: if a piece of glacial ice or part of the natural moraine dam fell into the lake, this could produce a devastating flood wave that would threaten to destroy the city of Huaraz. To counter this threat, the government had installed siphons to reduce the lake level and planned to build a larger dam and drainage system to replace two smaller concrete dams built in the 1970s. Martín was part of a small group of men employed by the Regional Government to keep watch over the lake and keep the siphons running. In the case of a flood, their task was to warn the authorities via radio and allow for an evacuation.

I had spent the night in another shack by the lake and now joined Martín on his morning routine. Descending along a steep slope, he skipped across rocks like a mountain goat. From there, I followed him on a 10-minute walk along hilly ground to the lake's edge. Standing on the concrete dam, he surveyed Palcacocha as the first rays of sun hit his face. The wind was

causing a light ripple on the lake's surface. Every few minutes, a crashing sound from the glaciers disturbed the quiet morning. They were only small avalanches.

Walking up to Palcacocha's edge, Martín inspected the black siphons that stuck out of the water and went through a tunnel inside the dam. He knocked on some of them with his fist and was satisfied with the quiet thud. They were all in working order, carrying water from the lake into the river below. Walking along the lake's right edge, he inspected a yardstick in the water, making a mental note that the water had sunk by half a centimetre since the last evening. Morning inspection – done.

To determine whether Palcacocha poses a 'serious hazard' of flooding, the court needed solid facts. Someone had to measure the lake and determine whether a flood was likely. Martín took measurements every day and shared them with government authorities. Officials drew on his data to argue that the lake was safe, or that it required safety works. Member of other state agencies and scientific researchers took alternative measurements with different tools, giving rise to rival figures and facts for Palcacocha. Measurement is a normative practice that shapes how we come to know the world. Particular modes of measurement determine what facts we can gain about Palcacocha, and which aspects we leave aside. Alternative measurements gave rise to competing facts that came to lay on the judges' table in the German courtroom.

The judges required accurate measurements to determine whether Palcacocha posed a flood risk. Someone must measure the lake, providing data that would give rise to scientific facts about Palcacocha's situation. Understandings of accuracy vary depending on how the term is defined; each regime of measurement defines its own standards of accuracy. According to Porter, measurement can provide legitimate knowledge if people trust its procedures and precision. He traces this to 18th century Europe when people began to accept experimental knowledge as universally true. This involved 'technologies of trust', relying on ordinary citizens' faith in the scientific method (Porter, 1995, p. 15). Measurement is a contemporary technology of trust: if we accept statements from Peruvian government authorities that Palcacocha's water level has decreased and the risk of flooding is lower than before, we must trust that Martín is taking accurate measurements.

On their own, the figures that Martín gathered were data that had little meaning beyond their immediate context. They were numbers on a yardstick in the water. If conducted effectively, measurement allows for local practices to generate knowledge to a universal standard; by separating knowledge from its context of origin, it generates ‘objective’ results (Porter, 1995, pp. 21-22). Turning measurement data into scientific facts involves a process of abstraction. Abstraction means that we transform a phenomenon to make it understandable to a wider audience. The scientific process involves long chains of abstraction and transformation. This makes a phenomenon increasingly commensurable according to universal standards, but obscures the circumstances from which it arose (Latour, 1999). The lake transformed from water hitting a yardstick to a number in a

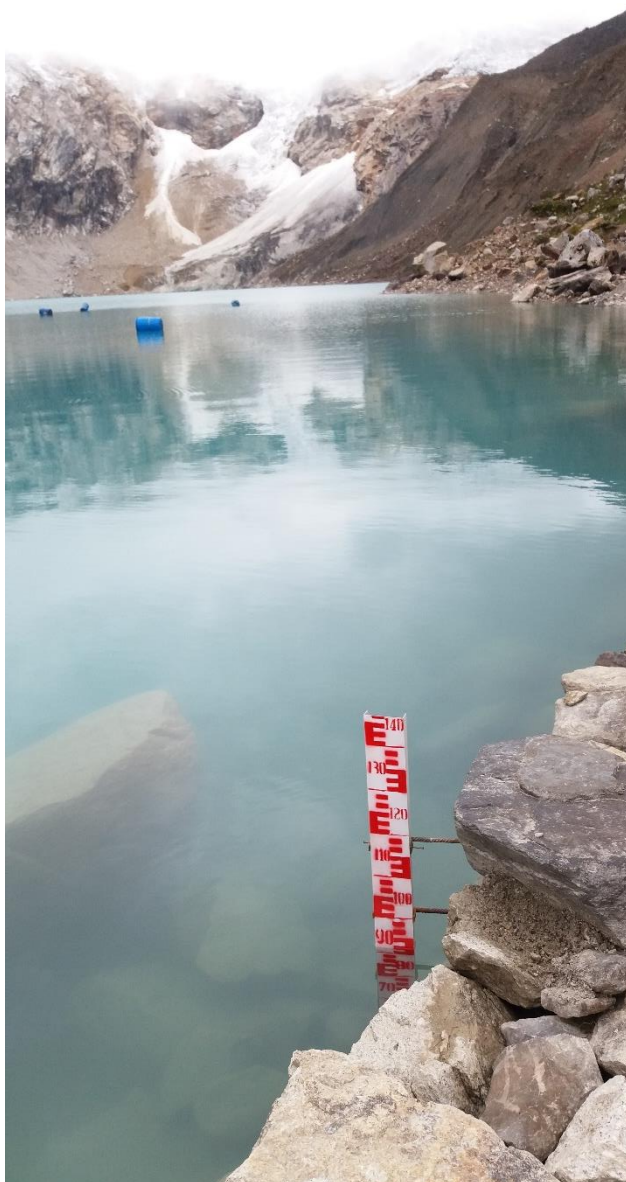


Figure 14: The yardstick at Lake Palcacocha (Photo by author)

notebook. Later, scientists and government officials used that number to claim that the lake level had decreased. In a further abstraction, they argued that the risk of flooding was now lower. Authoritative statements about Palcacocha involve taking measurements at the lake and abstracting this data. This gives rise to scientific facts.

Arriving back at the shack above the lake, Martín started boiling water over his wood-powered stove for his breakfast of porridge and tea made with fresh mountain herbs. He checked his wristwatch and saw that it was almost 7 a.m. – time to radio the city. He walked over into his room, turned on the two-way radio, and spoke into the mouthpiece in Spanish.

‘Base one to base two.’

Radio static.

'Base one to base two.'

Radio static. A few moments later, finally the response: 'Base two to base one. I hear you. Please go ahead.'

'Copy, base two.' Martín cleared his throat.

'Here the report for seven a.m. Weather: overcast. Wind: normal. Rain: none. Snow: none. Equipment: eight pipes operating. Water level: sinking. Level decreased 0.5 centimetres. Avalanches: minimal. Waves: moderate. Mudslides: none. Everything is operating, no news, base two. Please respond.'

Radio static.

'Base one, please repeat lake level.'

'Lake level decreased by 0.5 centimetres.'

'Copy that, base one. Base two, out.'

'Affirmative, base two. Thank you. Until next time.'

Martín took his job seriously. Day after day, he made the call every two hours. He and other workers took turns to work through the night. They could hardly sleep, staying attentive to the lake and mountains. At times, nobody answered the call at the Regional Government Emergency Response Centre in Huaraz. Someone had presumably fallen asleep at their post or stepped out for some food. In the event of a flood, the workers had to call down and warn the authorities via radio. They also had a satellite telephone and a list of cell phone numbers to call – the police chief; the mayor; the governor. In the meantime, Martín stuck at his post and kept watch over the lake.

Martín's shack above Lake Palcacocha had a table that held the two-way radio, powered by car batteries that he recharged with solar panels on the roof. Next to the radio in his dark room lay a stack of lined notebooks, the type children use at school in Peru. Every two hours, he recorded data by hand based on his measurements: wind, rain, snow, numbers of siphons in operation, water level, avalanches, waves, and mudslides. He measured the lake level twice a day and registered its relative change in centimetres to the previous measurement. He and his colleagues transmitted this data every two hours via radio to a government employee in Huaraz who transcribed the numbers into a computer. His data was later

compiled into internal government reports about the lake. Periodically, the government published press releases based on these figures and officials made declarations to the public about Palcacocha. To counter people's fears about possible flooding, officials often claimed that the situation was under control – they were monitoring the lake and the risk was low.

According to Latour, scientists make the world knowable by inscribing it with meaning. Inscription turns things into objects of scientific study (Latour, 1999, p. 65). Martín inscribed Palcacocha with meaning by measuring its water level. Measurement and inscription make the lake knowable. For this to be effective, Martín must follow a strict set of standards.

Measurement is weakest at the point where numbers meet the world – in the place where people take measurements. For this reason, methods of measurement are often bound by strict rules (Porter, 1995, p. 5). According to Polanyi, measurement allows for objective knowledge if it abides by universal standards. Ideally, it provides consistent results for different observers across the world (Polanyi, 2005, p. 57). Effective measurement relies on the standardisation of instruments and processes. People who take measurements, such as Martín, are subject to strict modes of discipline. Measurements are only comparable if everyone measures in the same way (Porter, 1995, p. 29). If we measure something according to a universal standard, it becomes commensurable with similar phenomena around the world. This allows us to draw larger conclusions (Latour, 1993, p. 113). Based on comparable measurements, government officials concluded that Palcacocha is currently the most dangerous glacial lake in the Cordillera Blanca.

Through measurement, we come to perceive phenomena that may have been previously invisible. According to Nelson, measurement produces what it appears to show. Quantitative figures allow us to see something that appears to already exist (Nelson, 2015, p. 218). Looking at Palcacocha, we see a large mass of water surrounded by towering glaciers. Measuring the lake allows people to make abstract claims about its status. Measurement enables observers to see Palcacocha as a potential threat.

Martín gathered data about Palcacocha that helped others make decisive statements about the lake. His measurements faced competition: he was one of many people involved in producing data and facts about Palcacocha. Members of several government agencies took measurements and produced a confusing – and sometimes contradictory – collection of facts, statements, and publications. This ultimately led the judges in Hamm to seek independent advice to clear up the situation. Producing authoritative knowledge about

Palcacocha is a complex process that shapes the possibilities of subsequent scientific and legal assessments about flood risk and climate change.

Contested measurements

On an early morning, I met Mariano in Huaraz to join him for his monthly visit to Lake Palcacocha. It was another sunny day as we took the Glacier Authority's pickup truck up bumpy dirt roads. The ride took around two hours. We talked politics – Mariano said he was fed up with corrupt politicians who prevented Peru from developing. He came from the city and had studied engineering at the local university. Now in his late thirties, he had spent most of his working life at the Glacier Authority. Mariano was part of the educated urban class of Peruvians who earn comparatively well and live a comfortable life.

Members of two state agencies regularly visit Palcacocha and take measurements: Mariano's Glacier Authority¹⁰⁰ and the rival Glacier Institute¹⁰¹. Mariano was in charge of glacial lake monitoring at the Glacier Authority. He performed the 2016 bathymetric study at Palcacocha that was presented as evidence in the German court. Bathymetry is a precise measurement of lake volume. Mariano had taken an inflatable rubber boat back and forth across Palcacocha for five days taking measurements at regular intervals across the entire surface. The result was a three-dimensional image of the lake and a precise assessment of its shape, volume, and location at the time of measurement. The most recent bathymetric studies – conducted in 2009 and 2016 – showed a volume of 17.3 million m³ and 17.4 million m³ respectively. However, Mariano and his colleagues at the Glacier Authority took those measurements when the lake was at particularly high levels. After 2009, authorities installed siphons and reduced the level by several metres. The lake grew significantly during the El Niño phenomenon in 2016, during which Mariano took the next measurement, but had

¹⁰⁰ Glacier and Lake Evaluation Area (Área de Evaluación de Glaciares y Lagunas), part of the National Water Authority (Autoridad Nacional del Agua-ANA). Originally founded in the 1950s, this agency was primarily responsible for glacial lake safety until recent decades. It has changed its name and institutional form numerous times since it was first established in 1951 – see Carey (2010) for a descriptive history. Since the early 2000s, it has only engaged in monitoring and no longer implements safety projects. For the sake of simplicity, I refer to the agency here as the Glacier Authority.

¹⁰¹ National Institute for Glaciology and Mountain Ecosystems (Instituto Nacional de Glaciología y Ecosistemas de Montaña-INAIGEM), a research institute founded in 2014. Its tasks overlap with the monitoring duties of the Glacier Authority and the two agencies are in competition over the authority to perform these responsibilities. Chapter 4 explores these dynamics in more detail.

decreased by several metres when I last visited in September 2018.¹⁰² Martín, Mariano, and others have taken visual measurements at regular intervals which they consider to be less precise. Once a month, Mariano visited Palcacocha to read the lake level.

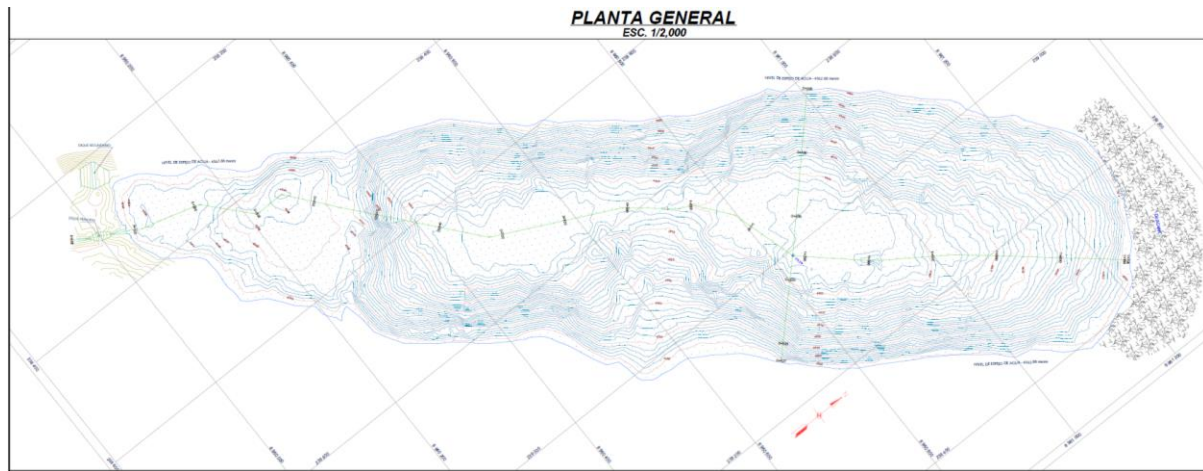


Figure 15: The Palcacocha bathymetry rendered in a two-dimensional model – each line represents a gradation in depth (Cochachin Rapre and Salazar Checa, 2016)

We arrived at Palcacocha. The road ended by the siphons that continuously pumped water out of the lake into the river that feeds Huaraz with potable water. Mariano, his driver, and I carried the measuring equipment – several heavy black plastic boxes and a tripod – on the 15-minute walk up to the concrete dam by the lake. With a panoramic view of Palcacocha, Mariano set up the tripod by the dam. Pointing to the black box I was carrying, he said, *hand me the thing in that case*. I set down the box on the dam and retrieved a small electronic device with a screen, little buttons, and an eyehole. As I handed it over and Mariano attached it to the tripod, he explained, *this is a laser measurement device – a total station. It gives me an exact reading of the lake's surface level*. He pointed it toward Palcacocha and activated the device. After punching some buttons and a few more adjustments, he was satisfied. *Now it's saved the measurement. Later in the office I can download that to my computer.*

So can you measure the lake volume or only the water level? I asked.

¹⁰² Despite these fluctuations in the water level, foreign scientists who study flood risk at Palcacocha told me that they saw an ongoing high threat unless the volume was reduced to a substantially lower level.

What I'm measuring here is the precise water level. I can see how high it is above sea level and how much it's changed since the last measurement. That shows us how the lake is developing – now we can see that it's sinking because we're entering the dry season. If I want to know the volume, I place this water level onto the diagram from the last bathymetric study I did two years ago. Since then, the level has decreased by around three metres, which should equate to about two or three million cubic metres. That means the lake now has a volume of 14-15 million cubic metres.

But what if the lake has changed shape since the last bathymetric study? Then the model wouldn't be accurate anymore, right?

Yes, that's the problem. The lakebed tends to transform over time. You can see that if you compare the last two bathymetries from 2016 and 2009: the shape of the lake actually changed during that time, even if the volume was still similar. When I do the laser reading, I can only estimate the volume; it's not a precise measurement. For Mariano, each measurement technique produced distinct understandings of precision.

We packed up the total station and tripod. Though the lake workers took analogue measurements with a yardstick every day, Mariano preferred his electronic readings. He regularly exchanged data with his counterpart at the rival Glacier Institute. Walking up to the lake's edge, Mariano pointed to a white plastic box connected to a metal pole that stood in the water just above the lake's surface. *That's the Glacier Institute's measuring device. Everyone calls it the Tupperware box. They made it themselves, so I'm not sure how well it really works.* He mistrusted their measurements. *My device is probably more precise.*

Though Mariano got along with the Glacier Institute's employees on personal terms, the Institute and Mariano's Glacier Authority are involved in a bitter competition over resources and responsibilities. *It's kind of crazy,* Mariano admitted. *We're both receiving public funds and we're doing the same measurements.* Mariano and Institute employees discussed the lake's evolution with Martín and the other workers during each visit but trusted their own measurements more than those that Martín took with the yardstick. Both agencies produced reports about glacial retreat and dangerous lakes. Much to the dismay of people at the Glacier Authority, the Glacier Institute had achieved more press coverage through a proactive engagement with the media. Unlike the Glacier Authority, the Institute also shares some data about Palcacocha on its website (INAIGEM, 2020). Mariano's measurements primarily stayed in his agency. Field visits were a rare occasion; he spent most of his time on the computer at the office processing data and writing internal reports.

Measurement involves underlying assumptions about what counts and what we can know about the world. At Palcacocha, measurement is contested in terms of accuracy. Mariano argued that his measurements were more precise than others'. Quantitative figures appear to provide authoritative and objective facts, yet they often embody theoretical assumptions. Numbers seem to speak for themselves, but can say much more beyond what they explicitly describe (Poovey, 1998). In her ethnography of people's efforts to count the dead in the Guatemalan genocide and civil war, Nelson argues that counting practices involve implicit ideas about what should be counted and why numbers should matter (Nelson, 2015). At Palcacocha, Martín measured daily changes to the lake's water level. He reported to officials at the Regional Government who regarded this information as important. Every month, Mariano measured Palcacocha's surface level. This allowed him to monitor its regular level changes during the dry season that lasts from May to October each year. At longer irregular intervals, the Glacier Authority conducted a bathymetric study to determine the lake's precise volume. Each of these measurements gave rise to alternative facts that would later enter the legal sphere in a large binder on Judge Meyer's table in the courtroom.

Numbers appear to speak for themselves, but what they say depends on measurement systems that make them count in particular ways (Nelson, 2015, p. 221). Numbers appear universal and rigorous, yet they are also manipulable and untrustworthy; 'numbers are like prisoners, if you torture them enough you can make them say anything' (Nelson, 2015, p. 23). Palcacocha measurements have allowed Peruvian officials, international scientists, and German lawyers to make competing factual claims about whether the lake posed a flood risk. If we want the facts about Palcacocha, we must make an authoritative decision about which types of measurement should count.

Palcacocha becomes a scientific fact

Lake Palcacocha has appeared in international scientific journals as an example of acute glacial lake danger (e.g. Emmer and Vilímek, 2014; Emmer et al., 2018; Frey et al., 2018; Hegglin and Huggel, 2008; Klimeš et al., 2016; Somos-Valenzuela et al., 2016). Scientists from US, Swiss, Czech, and other universities have visited the lake and produced scientific assessments about flood hazard. In addressing Palcacocha, they must choose from multiple contradictory measurements and statements about its water volume. These measurements became a key dispute in the lawsuit over RWE's contribution to flood risk at Palcacocha.

The construction of facts is a collective process. If scientists or other authoritative figures argue that a statement is true, people will often come to see it as a fact (Latour, 1987, p. 41). When researchers at the Center for Research in Water Resources in the University of Texas at Austin began modelling a potential flood disaster at Palcacocha, they had to choose from several potential values for the lake's volume. Based on the lake workers' daily readings as well as measurements by various state agencies, members of different Peruvian government authorities had made numerous statements that pointed to different figures. The Texas University scientists settled on the figure that appeared most trustworthy and precise: the 2009 bathymetric study that pointed to a water volume of 17.3 million m³. This measurement may have appeared most accurate as it offered a three-dimensional picture of the lake. This spatial detail allowed researchers to model how a flooding event would potentially develop.¹⁰³ Based on this, they simulated potential avalanches, subsequent lake behaviour, moraine erosion, and downstream flooding.¹⁰⁴ As they reproduced this figure and published in renowned scientific journals, 17.3 million m³ appeared to be the more stable scientific fact for Palcacocha.

According to Latour, 'the status of a statement depends on later statements'. A statement's facticity can shift retrospectively (Latour, 1987, p. 27). When the Peruvian press picked up on the Texas University studies and 17.3 million m³ figure, officials at the Regional Government in Huaraz began to worry that this fact – which pointed to a significant flood hazard at Palcacocha – would alarm the population. This could threaten the tourism industry, a vital economic sector in the region. Regional Government officials publicly criticised the Texas University study, arguing that the water volume had decreased to 14 million m³ and the lake was now safer. For outside observers, this destabilised the 17.3 million m³ figure and concurrent claims about flood hazard. With no stable facts in sight, the judges on Saúl's lawsuit had little choice but to seek additional expert advice. Only rarely do facts remain indefinitely unquestioned, making them truly stable (Latour, 1987, p. 43). Usually, scientific fact-production is an ongoing process marked by disagreement. Fact-making is particularly difficult for Palcacocha, which is engaged in an ongoing process of flux. It rises and falls with the seasons while the glaciers that feed it continue to recede, altering its shape and the possibility of overflow. Measurement practices are only able to describe the lake's volume at a single moment. This potentially obscured the lake's temporal variability to government

¹⁰³ Understandings of precision also depend on how measurement data is applied. The flood modelling technique applied by Texas University researchers required a three-dimensional representation of the lake which the 2009 bathymetry conveniently offered.

¹⁰⁴ See Somos-Valenzuela et al. (2016) for a summary of the study.

officials and legal practitioners who sought to determine clearly – based on ‘accurate’ measurements – to what extent Palcacocha posed a danger.

Making facts matter

When officials made factual statements about Palcacocha, their declarations were often linked to social and institutional interests. Some officials argued at particular times that there was a low risk – or none at all – stating that there was no reason for public panic. At the same time, others contended that the risk was high and required immediate intervention. According to some Huaraz residents trying to make sense of this convolution, statements often arose out of officials’ and state agencies’ particular ambitions, whether gaining political favour with the population or acquiring resources for flood prevention projects.

According to Latour (2004), broader concerns often shape how people produce and communicate facts. Wider issues can affect the process of fact production by legitimising certain types of knowledge and excluding others. What we can know through scientific research depends significantly on how we choose to know it (Jasanoff, 2007, p. 772). The social context often affects how people weigh factual claims. Even scientific epistemologies can vary in regard to how they prioritise particular forms of information (Callison, 2014, p. 22). In discussions about Palcacocha, some officials drew on measurements pointing to a decreased water volume to calm public worries about flood hazard. At the same time, scientific claims about imminent danger justified government authorities’ efforts to reduce the threat of disaster with flood prevention infrastructure at Palcacocha.

In January 2011, the Peruvian President signed a decree that established a State of Emergency for Palcacocha due to an imminent flood hazard.¹⁰⁵ The decree cited the bathymetry figure of 17.3 million m³ and called for immediate measures to reduce danger. As a result, Regional Government officials in Huaraz initiated a safety project to install siphons at Palcacocha with the aim of reducing the water volume and concurrent danger. In her discussion of international climate change discussions, Callison argues that facts can give rise to understandings that demand action (Callison, 2014, p. 11). When the Peruvian

¹⁰⁵ Decreto Supremo N° 002-2011-PCM

President encountered scientific facts pointing to a mortal flood hazard at Palcacocha, he swiftly implemented concrete measures to reduce the danger and avoid a loss of life.

Fact-making at Palcacocha involves an epistemological politics: knowledge shapes the priorities and scope of political action. An objective factual foundation can lend credence to a political project. When the facts are clear, solutions may seem obvious (Porter, 1995, p. 7). In debates over scientific facts, broader issues are often at stake, rather than scientific proof itself (Callison, 2014, p. 29). If officials who claimed that Palcacocha was safe were wrong and a flood occurred, people would ask why nobody took action when there were facts pointing to an imminent danger.

Claims about Palcacocha occur in the context of wider concerns with climate change. According to some scientific studies, Palcacocha flood hazard is an emblematic climate change impact (Rivas et al., 2015; Somos-Valenzuela et al., 2016). In discussions of climate change, epistemology is inherently linked to morality and politics: this defines what counts as knowledge, which knowledge matters, and how it should drive action (Callison, 2014, p. 14). Factual claims about climate change are inherently linked to conceptions about what should be done about it. This relates to more than adaptation measures – how we should address specific impacts such as the rising Palcacocha waters – but can also give rise to claims against those who are thought to be responsible for climate change. The Palcacocha facts not only justified an infrastructure project, but also provided Saúl and his legal team with a factual basis for the climate justice claim against RWE. Building on morally charged knowledge about flood risk at Palcacocha, the claim sought to establish an ethical neighbourly relation between the plaintiff and defendant.

In their formal response to the lawsuit, RWE's lawyers countered Saúl's legal and scientific argumentation at all levels. In the April 2016 legal brief, they cite a year-old local news report from Peru based on declarations from a Regional Government official. Accordingly, siphoning had reduced the lake level from 17 million m³ to 12 million m³. 'For this reason,' the lawyers conclude, 'the defendant denies that Lake Palcacocha currently poses an acute risk of flooding'.¹⁰⁶

Unbeknownst to the lake workers, RWE's claim arose from their daily measurements at Palcacocha. Neatly compiled into their notebooks, they communicated the figures to the Regional Government. Based on those figures, an official declared to a local journalist that

¹⁰⁶ Freshfields Bruckhaus Deringer, legal brief from 28 April 2016 (Saúl Ananías Luciano Lliuya ./). RWE AG, Landgericht Essen, Az.: 2 O 285/15), pp. 33-34

the lake was safe, allaying public worry about flood risk and concern that the definitive project to build a new dam at Palcacocha was not moving forward. In an effort to avert legal responsibility for climate change, RWE's lawyers cited the official's claim.

Meanwhile, Mariano from the Glacier Authority had conducted a new measurement at Palcacocha. In early 2016, he hiked up to the lake with mules carrying his inflatable boat. The road to Palcacocha was only built later that year. Mariano spent five cold days at the lake going back and forth over the surface with a sensor. Finally, he had compiled a complete electronic reading. Feeding this into his computer, he produced a three-dimensional image of Palcacocha and found that it held a volume of 17.4 million m³. Based on this measurement, he filed a report to his boss.

Saúl solicited the report from the Glacier Authority. It appeared as evidence attached to a legal brief in September 2016 countering RWE's arguments. Saúl's lawyers also argued that the Regional Government's claim cited by RWE was dubious – according to a glaciologist who provided scientific advice to Saúl's legal team, such statements from Peruvian government officials are often unreliable.¹⁰⁷ Following the legal brief, the facts pointed to an ongoing high risk of flooding.

In November 2016, the State Court in Essen dismissed the lawsuit. In the verdict, the judges found that it would not be possible to establish legal causation via global climate change. Saúl appealed and the legal dispute moved to the Upper State Court in Hamm where the claim would find unexpected success. Meanwhile, local disputes over flood risk at Palcacocha continued in Huaraz. In March 2017, representatives of the Peruvian Comptroller's office, a national oversight agency, visited Lake Palcacocha and concluded that the water level had continued to rise, and the risk of flooding was high. They called on the Regional Government to quickly implement definitive safety measures (La Contraloría General de La República, 2017). National news outlets picked up the story: Palcacocha continued to pose a threat to the city of Huaraz (Urbina, 2017). In Huaraz, authorities hastily organised a press conference, dismissing the Comptroller's report as scare mongering. The head of the Glacier Institute argued that the water level had decreased, though the lake still posed a 'latent risk'. He drew on measurements that Glacier Institute employees had conducted during their weekly visits to the lake.

¹⁰⁷ Rechtsanwälte Günther, legal brief from 29 September 2016 (Saúl Ananías Luciano Lliuya ./ RWE AG, Landgericht Essen, Az.: 2 O 285/15), p. 28

RWE's lawyers found valuable fodder for argumentation in a press release that the Glacier Institute subsequently published (INAIGEM, 2017). In an October 2017 legal brief, they cited this report to counter the argument that Palcacocha continued to pose an immediate threat.¹⁰⁸ Drawing on a new set of facts, they once again portrayed the lake as safe and controlled.

In mid-2018, the judges at the Upper State Court in Hamm appointed two scientific experts to provide an independent opinion on the matter of flood risk at Palcacocha. As I write these words, the court is planning a visit to Palcacocha with the experts, judges, and lawyers. Based on observations gathered during this visit, the experts will provide their assessment. If they conclude that Saúl's property faces a 'serious risk of impairment' and the judges follow their advice to make it legal fact, the court will hire a separate set of experts to seek out proof about whether RWE contributed to this hazard.

Facts arrive in the courtroom through a complex process of measurement, scientific fact-making, and legal storytelling. The practice of measurement shapes what we can know about the world. Rival measurements at Palcacocha gave rise to contradictory assessments about the lake's safety. Scientific facts about Palcacocha have seen their validity disputed. Often, they arose in relation to broader concerns about public safety or climate change and justified particular political strategies. Facing an ongoing climatic threat to his livelihood, Saúl took the matter to court. Lawyers on both sides of the legal process sought out convincing facts to strengthen competing responsibility narratives. Judges held the power to turn scientific findings into legal fact. It will ultimately depend on these facts whether the court establishes a neighbourly relation between Saúl and RWE. Law and science are powerful agents that shape how people understand themselves and the social order (Jasanoff, 2007, p. 772). Though legal knowledge is specific to individual cases, it can have broader implications. If Saúl wins his claim against RWE, the legal facts of his case could set a significant precedent.

Conclusion: Toward an anthropology of causality

In this chapter, I have traced how legal practitioners in the Luciano Lliuya v. RWE trial strategically deployed scientific evidence to make and unmake a neighbourly relation

¹⁰⁸ Freshfields Bruckhaus Deringer, legal brief from 30 October 2017 (Saúl Ananías Luciano Lliuya ./ RWE AG, Oberlandesgericht Hamm, Az.: I-5 U 15/17), pp. 18-19

between the plaintiff and defendant. Discussions about causation in the lawsuit revolved around what kinds of neighbourly relations we can establish in times of climate change, which types of evidence and expertise can produce those relations, and which norms should come to bear on those relations. Scientific understandings of climate change are marked by uncertainty which lawyers and judges grapple to capture within the legal framework.

I began with a conceptual discussion about scientific and legal knowledge production, showing how judicial parameters of truth set the framework for knowledge production in the legal process. In a context of scientific uncertainty, judges require serviceable truths that allow them to make informed legal decisions. In the main portion of this chapter, I traced the development of legal arguments over an alleged causal link between RWE's emissions and a risk of flooding to Saúl's house in Peru, proceeding in three stages:

First, lawyers discussed the possibility of determining RWE's specific contribution to climate change. I found that legal practitioners applied matrices of legibility that enabled them to read the socio-material processes of climate change in distinct ways. While Saúl's lawyers presented a quantifiable link between RWE's emissions and global warming, the opposing side conceptualised these processes as too complex to capture scientifically.

The second issue of causal dispute concerned the link between global climate change and local glacial retreat in the Andes. Causation arguments in the courtroom rely on scientific climate models that represent global atmospheric processes. This research emerges in the context of policy-makers' demands for policy-relevant research. It becomes socially and politically charged in new ways as it enters legal disputes over climate change and responsibility.

The third and final step to link RWE to Saúl was the causal relation between glacial retreat and flood risk affecting Saúl's house. Discussions revolved around scientific lake measurements and risk evaluations which gained new social meanings as political and legal actors deployed them to different ends. Lawyers strategically applied judicial evidentiary standards to scientific facts in their legal arguments – interpreting evidentiary norms in different ways to either make or unmake causal relations.

What broader conclusions might we draw from this discussion about legal causation? Causality is a key issue at stake in political and legal discussions about climate change yet has seen little explicit discussion in anthropology. Ethnography offers us a tool for tracing arguments about causation and responsibility as they seek to construct politically charged

socio-material relationships across scales of time, space, and social power. Neighbourliness, in this sense, arises out of a causal link: neighbourly relations are enacted through assertions about causal responsibility. Causality claims can entangle communities, corporations, governments, and nonhuman persons in webs of responsibility. Tracing these claims from an anthropological perspective, we can bring light to novel understandings of justice as they emerge in a warming world.

[Chapter 4] Glacial politics at Lake Palcacocha

What socio-material relations are at stake in the lawsuit, if we think of it as a political claim? In their public declarations, Saúl and his supporters have addressed a variety of issues that have become interlinked. They have stated that the claim is part of a broader effort to address climate change by holding greenhouse gas emitters accountable. This involves an intervention in international climate politics, which I understand as the institutional orders regulating human-environmental relations across the globe. This attempt at far-reaching political action operates through a targeted legal intervention in the politics of glacial retreat in Peru, aiming to contribute to a flood prevention project at Lake Palcacocha by drawing a foreign corporation into a neighbourly relation. In this chapter, I examine what other socio-material relations are at stake on the ground in Peru, and which are largely hidden in the judicial process. The lawsuit asserts that Palcacocha poses a serious flood risk and requires remedial infrastructure. How was this conception established? Contemporary glacial politics has emerged amid tensions over what knowledges and standards can be applied to make sense of and engage with glacial retreat in the Andes. I follow historically and ethnographically how this has developed at Palcacocha. In public discussions, people have expressed concern about glacial retreat and the growth of Lake Palcacocha in terms of a looming flood risk, potential water scarcity, and possible environmental sentience. Building on scientific conceptions of risk and hazard reduction, flood prevention infrastructure emerged as a dominant technical approach in local glacial politics. This infrastructure assembles a variety of knowledges, standards, and socio-material relations, sometimes bringing to the fore alternative conceptions on the stakes of glacial politics. Glacial politics brings together generalisable techno-scientific standards and specific modes of engagement with shifting socio-material conditions. The potential significance of earth beings highlights that more may be at stake in glacial politics than what initially meets the eye in public discussions and infrastructure projects. This reflects similar tensions in Saúl's lawsuit – oscillating between general and specific claims, it highlights that climate politics may concern more than political and institutional relations – potentially recasting the relations at stake in political discussions.

On a dark evening in May 2017, a large avalanche crashed down into Lake Palcacocha. The deafening noise frightened Martín who stood in his small stone shack above the lake to

keep watch. Employed by the Regional Government, Martín spent weeks at a time at the isolated lake, often enduring freezing temperatures. In the moonlight, Martín saw that the avalanche caused waves several metres in height, but the water did not overtake the concrete dams, preventing a flood in the valley below. Martín's job was to keep flood prevention infrastructure running at the lake. The waves washed ten siphons to the shore that continuously pump water out of Palcacocha. Via his two-way radio, Martín informed the authorities in Huaraz about the event – there would not be a disastrous flood tonight, but this was a close call. The following morning at 5 a.m., Martín still lay in bed as the sky beyond the mountains showed first signs of illumination – and another avalanche came roaring down. Again, the dams held steady, and Martín dutifully informed the city officials.¹⁰⁹

In Huaraz, Martín's calls caused a significant commotion. After initial news reports, several state officials declared publicly that the lake was safe in an effort to prevent panic. It appeared that the existing flood prevention infrastructure had successfully prevented a disaster. Public discussions flared up in a familiar cycle – for years, scientists had warned of a significant risk of flooding from Palcacocha. According to hazard maps that officials had hung up in shops and restaurants throughout the city, much of Huaraz could face potential destruction if a wave came crashing down. Confusion reigned as people argued over how high the risk might be, and how authorities should address the issue. Two existing concrete dams at the lake were built in the 1970s, when the lake was much smaller. For several years, public officials had spoken of building a new dam and drainage system at the lake, along with an early-warning system against flooding, but both projects were yet to materialise. Many were also concerned as the river emerging from Palcacocha provides the city's water supply, arguing that draining the lake might leave the city with insufficient water.

Later I spoke to Elías, who came from a nearby village and was the supervisor for flood safety works at Palcacocha. At the age of 83, he had spent most of his life living and working in the high Andes. His skin is rugged from toiling in the fields. Elías normally spent his days at the lake alongside Martín. On one of my first visits to Palcacocha he explained how he maintained a close connection with the beings of the lake and surrounding mountains. I watched him perform a *pago*, a ritual offering to the earth beings, which he did every few weeks to keep them happy. When the avalanches took place, Elías had not visited the lake for several weeks due to problems in his village. I asked Elías about the avalanches – he told

¹⁰⁹ Martín later recounted this experience to me in extensive conversations about his work at the lake.

me that the mountains were angry because he left them hungry. Elías soon returned to Palcacocha and continued performing pagos. There was no major avalanche for the rest of the year.

What is at stake in the politics of glacial retreat in the Cordillera Blanca? The political theorist Chantal Mouffe distinguishes between ‘the political’ and ‘politics’. In her conception, ‘the political’ refers to the potential for antagonism and conflict inherent to human societies. ‘Politics’ involves ‘the set of practices and institutions through which an order is created’. Politics thus involves attempts to calm social antagonisms (Mouffe, 2005, p. 9). Glacial politics in the Cordillera Blanca revolves around how people should understand and engage with glacial retreat. In this context, political claims involve efforts to expand the stakes of glacial politics – i.e., to broaden our understanding of what issues related to glacial retreat deserve public attention. In previous chapters, I have traced how the lawsuit asserts a neighbourly relation between Saúl and RWE, framing climate politics as a neighbourhood dispute. In this chapter, I examine who else is in the neighbourhood. I explore the localised political relations that were key to the lawsuit’s emergence but are often hidden in the claim’s public narration. I show how different ways of knowing the Andean environment define the potential stakes of glacial politics and give rise to social claims.

I begin with a historical overview, showing how authorities established scientific standards that rendered glacial lakes as potential flood hazards requiring remedial infrastructure. Following this, I provide an ethnographic perspective on recent political discussions about glacial retreat. As local debates became enmeshed in global concerns about climate change, Palcacocha emerged as a site of politics where officials, citizens, and lake workers grappled with scientific insights pointing to both flood risk and potential water scarcity. Finally, I trace how workers’ empirical engagement with flood safety infrastructure and the surrounding environment expands the stakes of glacial politics beyond flood risk and water scarcity. In practice, techno-scientific knowledge was entangled with relational socio-environmental engagements – and earth beings emerged as potential actors in the politics of glacial retreat. In people’s socio-material engagements around Lake Palcacocha, they have drawn on different knowledge practices and relational engagements to define the stakes of glacial politics. While these dynamics remained largely hidden in legal proceedings at the German courts, they reveal a broader set of ethically charged neighbourly relations at stake in concerns about climate change in the Andes.

Standards of danger: setting the stakes of glacial politics

On a cloudy afternoon in Huaraz, Saúl and I set off for Palcacocha. It was March 2017, and the rainy season was still in full force. The skies often cleared up in the mornings, allowing for some sunshine as people left their houses for the day. I was two months into my fieldwork and had spent the first weeks at a Quechua course in the city. That day, a German journalist was visiting Huaraz to report on Saúl's story. Driving in Saúl's old Toyota station wagon, we accompanied her to Palcacocha.

Huaraz lies at just over 3000 metres above sea level, enough to leave most visitors out of breath after walking up a flight of stairs. We took a dirt road outside the city, driving upwards along the Cojup River that originates at Palcacocha and supplies Huaraz with water. In the ongoing rainy season, the road was bumpy and full of potholes. After an hour in the car we arrived at a large metal gate that blocked the entrance to the Cojup Valley where a new road would take us up to the lake. This was the border to the Huascarán National Park. The park's director had lent us keys to the gate.

The first time I visited Palcacocha, in late 2014, there was no road from this point onward. With Saúl and the director of Germanwatch, the NGO backing Saúl in the lawsuit against RWE, we went on a gruelling six-hour hike up to the lake at 4500 metres. Since then, authorities in Huaraz had commissioned a project to improve mobility for flood safety works at Palcacocha. Over the course of several months, around 70 workers from nearby villages cut a road out of the mountain environment. While they moved the earth with tractors and removed the most unforgiving boulders with dynamite, much of the work involved brute human force with hand tools.

In Saúl's car, we drove slowly along the narrow, bumpy road up the valley. The skies began to darken – soon, the rain would pour. Around halfway to the lake we slowed down as a pickup truck approached us. Stopping alongside the other vehicle, I saw Fernando, an engineer from Huaraz who oversaw the flood safety project at Palcacocha.

Fernando greeted me through the open car window. He had worked at the lake since engineering works began in 2011. Despite chaotic administration at the Regional Government and intermittent payments to him and the workers, he stuck to his post. The previous year, he had overseen construction of the new road. Several times each week, he inspected the lake and ongoing work. I asked him how things looked.

The water level has risen slightly. There's been some strong sunshine that's made the glacier melt more, he explained. Elías, the project's foreman, was keeping a close eye on the situation. *I have all the siphons running to decrease the water level, and I asked Elías to perform a pago to keep the situation under control*, Fernando went on. *We can't control the sunshine, but the pago can help prevent avalanches.*

We waved off Fernando and drove on. As an engineer, he put into practice a state-sponsored infrastructure project to reduce the risk of flooding. In his work, he relied on scientific standards of measurement and hazard assessment. Yet for him, scientific engineering was not sufficient to address the problem. Working decades previously as a mountain climbing guide in the Cordillera Blanca, he had come to understand the mountains and lakes as living beings that require people's respect. Accordingly, he characterised appeals to Andean earth beings in pago ceremonies as an essential aspect of safety works at Palcacocha – an additional standard by which to abide in infrastructural practices addressing the possibility of glacial lake outburst flood (GLOF).

How did concerns over flood hazard emerge in the Peruvian Andes? What knowledges and standards have allowed authorities to characterise lakes as dangerous? Historically, glacial politics in the Cordillera Blanca emerged over worries about GLOFs following several notable disasters. Government officials developed techno-scientific standards to determine which glacial lakes in the region posed a flood hazard. This led them to characterise numerous lakes as potential sources of disaster requiring infrastructural remediation. Government agencies oversaw the construction of numerous glacial lake dams between the 1950s and 1980s. Barriers put in place at Palcacocha would resist heavy waves and prevent disaster decades later, when glacial retreat became a topic of international concern. Historical standards for analysing the Andean environment, focussing on potential flood hazard, shape the stakes of glacial politics to this day.

Infrastructure offers a fruitful site to study politics in its enactment through techno-scientific interventions in the environment (Appel et al., 2018, p. 4). As such, infrastructure has emerged as a significant theme of study in anthropology (Larkin, 2013; Venkatesan et al., 2017). From the perspective of governing authorities, infrastructures allow for systematic control of environmental variability (Edwards, 2003, p. 188). Ethnographic study can trace the narratives and epistemologies that emerge in the enactment of infrastructures. Infrastructures may embody assumptions about how socio-material relations are and should

be ordered. This is often reflected in standards that allow for particular representations of knowledge while excluding other perspectives (Star and Lampland, 2009, p. 22).

At Palcacocha, the standards at play in present and historical infrastructure projects point to different knowledges at stake in the politics of glacial retreat – and more broadly, in neighbourly disputes about climate change. Following Star and Lampland (2009), standards offer a useful empirical point of departure for studying broader social phenomena. On a daily basis, numerous systems of standardisation guide our behaviour and social relations. Standards often become invisible as people take them for granted. Particular standards may appear politically neutral, such as the measurement standards that Fernando and his workers applied to gauge the water level at Palcacocha. Nevertheless, Star and Lampland (2009, p. 8) argue that standards embody ethics and values. The standardised process of lake level measurement renders a representation along fixed lines – it may tell us that the water level has increased by five centimetres. While this representation could appear strictly technical, the applied standard does not allow us to perceive other possible conceptualisations – has the lake shifted horizontally? Has the lake's mood changed? Applying a particular standard over others involves a moral choice as we exclude other perspectives from view. Standards are always incomplete – the process of standardisation constrains a phenomenon within a set of standardised dimensions (Star and Lampland, 2009, p. 14).

In infrastructural systems, different standards are often nested within each other. Standards can become imbricated, building on one another in partially overlapping layers. Over time, the significance of individual standards within broader structures can vary; some standards may become obsolete (Star and Lampland, 2009, p. 21). My conversation with Fernando on the road to Palcacocha revealed multiple standards at play, each seemingly linked to distinct forms of knowledge: while he relied on scientific and engineering standards to measure the water level and operate the siphons, he drew on Andean standards of engagement with a sentient environment to appease earth beings at Palcacocha and prevent a dangerous avalanche. Nevertheless, I will demonstrate in this chapter how those standards were inherently entangled.

A history of disaster

Continuing our drive to Palcacocha, we arrived at the workers' camp below the lake. Several stone huts stood within a small compound surrounded by a low stone wall that kept out nearby grazing cattle. We emerged from the car below dark clouds – it was the late afternoon. Smoke rising from one of the houses indicated that the workers were cooking. Elías greeted us as we entered the camp – he had kindly arranged for us to stay the night.



Figure 16: Elías at Palcacocha (Photo: Alexander Luna/Yuraq Janka, used with permission)

Elías is an old man. He peered at us from under a wide-brimmed hat as we laid down our bags in one of the huts. Elías was born in a village just above Huaraz. The mountain waters irrigate his fields of potato and corn. He gave us a warm smile that showed a handful of teeth. Speaking Spanish with Quechua intonations, he told us to follow him up to the lake.

From the camp emerged a steep road leading upwards. Centuries before, expanding glaciers had carved a moraine into the landscape – a large mound of earth and rock that now towered over the houses. When the glaciers later began to recede, Lake Palcacocha grew behind the moraine which formed a natural dam (Mergili et al., 2020, p. 95).

Palcacocha first came to widespread public attention when that moraine broke in 1941, causing a violent flood. On the early morning of 13th December, around 12 million m³ of water rushed out of the lake and down the valley, ripping away boulders, trees, and earth. Further down, the flood swept up the smaller Jircacocha lake (Carey, 2010). It was just becoming light in Huaraz, one eyewitness told me, as masses of water and debris crashed through the city. As a child he was getting ready for school. From the window of his house

that lay far enough outside the city centre to escape the disaster, he saw the waves knocking over trees ‘as if they were toothpicks.’ The flood destroyed almost half of Huaraz and left around 1800 people dead (Bode, 1989; Wegner, 2014).

Walking with Elías up the path to Palcacocha, we came through the break in the massive moraine. Its walls towered around us on either side. Feeling the altitude of 4500 metres, I advanced slowly to catch my breath. Agile on his feet despite his age, Elías rushed ahead to meet a small group of workers who were completing the last stretch of the road. It was tough work in a rocky mountain environment. With shovels and pickaxes, the labourers slowly cleared a way up the mountain. Dressed in orange jackets and red construction helmets, they chatted in Quechua as the sky grew darker. Grabbing a pickaxe, I quickly tired after helping to break apart a little boulder.

In the decades following the 1941 disaster, Peruvian government authorities began conducting research and implementing infrastructure to address glacial lake safety. They put together a glacial lake inventory and organised numerous engineering projects to drain and dam glacial lakes determined as dangerous. Through these measures, the Peruvian state took on responsibility for disaster prevention while drawing the high-altitude environment and its inhabitants into the realm of government. These efforts were embedded in scientific measurement standards that rendered lakes as sources of potential disaster (Carey, 2010).

Glacial lake flood hazard became even more urgent for Peruvian authorities when it appeared to threaten the country’s industrial development: in 1950, a flood at Lake Jankarurish in the Los Cedros valley, north of Huaraz, damaged a major hydroelectric facility downstream. The following year, the Peruvian president established a state agency – the Lakes Commission – tasked with analysing glaciers and lakes for potential danger and implementing measures to prevent outburst floods. The newly appointed officials faced the significant challenges of inventing a classification system for glacial lake safety and developing engineering techniques to reduce danger (Carey, 2010, p. 84).

As a first step, the Lakes Commission sought to compile an inventory of glacial lakes in the Cordillera Blanca. Officials did not know how many lakes there were or where dangerous lakes were located. Avoiding the need to rely on information from local villagers or conduct field research, experts at the Lakes Commission used aerial photographs to identify potentially dangerous lakes, only visiting the lakes on exceptional occasions. Rather than using existing Quechua names, they gave each lake a number. This reflected an effort to

apply a universalising scientific standard, while also extending the state's reach to remote areas and communities (Carey, 2010, p. 85).¹¹⁰

Over time, however, government reports began to include local names for lakes and mountains, leading to a multilingual hybridisation (Carey, 2010, p. 86). Today, people speak of '*laguna Palcacocha*' – *laguna* means 'lake' in Spanish, *cocha* means 'lake' in Quechua, while *palca* means bifurcation in Quechua and refers to the shape of the mountain behind the lake. A handful of lakes are commonly known by their number, such as Lake 69 and Lake 513. This points to an imbrication of multiple naming standards that has shifted over time and reflects different knowledges at stake in discussions about flood risk.

Officials built on scientific conceptions of quantification and flood hazard identification to establish a set of standards for determining which lakes were dangerous and required intervention. In 1952, the Lakes Commission recruited a geologist from the University of California at Berkeley to assist in setting parameters for recognising potential danger. With this scientific input, authorities identified characteristics linked to lake stability: was the lake in direct contact with the glacier? How stable was the lake's natural dam? Based on this new classification system, authorities identified 35 dangerous lakes, of which 25 required immediate intervention. This system forms the basis for evaluating lake hazard in Peru to this day, and has been applied as a standard for examining glacial lakes around the world (Carey, 2010, p. 92). Explicitly designed to address flood risk, these standards might appear purely technical. Nevertheless, applying them above other modes of understanding involves an underlying moral choice because they take little account of local people's conceptions of the lakes as well as other possible concerns, including water supply.

Building on their mapping of the region's lakes, and employing scientific engineering standards, authorities began implementing infrastructure projects to prevent glacial lake disasters. This usually involved partially draining lakes identified as dangerous and building dams to prevent them from breaking out. In a first step, workers constructed open canals or drainage tunnels to lower the water level. Subsequently, they would construct dams with cement or earth. These helped to prevent the moraine dams that protected lakes from eroding. In addition, engineers hoped they would withstand flood waves caused by

¹¹⁰ Timothy Mitchell uses the term 'techno-politics' to refer to similar efforts by modern state institutions that used scientific knowledge to intervene in the environment, drawing on a study of technical expertise in Egypt during the 19th and 20th centuries. Accordingly, 'techno-politics' is a type of politics based on scientific expertise (Mitchell, 2002). Researchers have built on this approach to study infrastructural systems elsewhere (Larkin, 2013).

avalanches falling into the lakes. At the base of concrete dams, workers usually installed a drainage canal to allow for a constant outflow, preventing the water level from rising above that point (Carey, 2010, p. 93). In the 1970s, authorities completed two concrete dams at Palcacocha, one of which included a drainage canal. The dams stand around seven metres above the lake's water level (Portocarrero Rodríguez, 2014).

Back at Palcacocha with Saúl and Elías, we proceeded on the last stretch up to the lake. In front of us stood a steep slope that blocked our view of the glaciers. There we encountered the material traces of a recent infrastructure project: ten large plastic siphons expelled water from Palcacocha into the river that led downstream. As it slowly began to rain, we walked along the slippery siphons that led for 700 metres up and into the lake. Finally, we came across the concrete dam that stood steady after over 40 years. Struggling to reach the top, we gained a panoramic view of Palcacocha and the surrounding mountains.



Figure 17: Palcacocha in February 2017 during an inspection by local and national authorities (Photo by author)

The lake was a dark blue colour that stood out against the shining white glaciers towering beyond the water, almost two kilometres beyond our position at the lake's other end. We could hardly enjoy the picturesque sight as the rain began to pour down. Elías rushed us to a little shelter beneath a corrugated iron sheet beside the lake. We heard a thunder in the distance – a small avalanche coming down.

After working at Palcacocha for several years, Elías was familiar with the environment's power. Like Fernando the engineer, he was not only concerned with keeping the engineering

works running, but also sought to maintain a positive relationship with the Andean environment, which he described as sentient. While earth beings were an important consideration for Elías and others working at the lake, they are conspicuously absent in government reports documenting past interventions at glacial lakes. Relying primarily on scientific forms of knowledge, these reports applied standards that do not account for earth beings, leaving them invisible in the government-sanctioned historical record. From the perspective of state officials, earth beings are simply not relevant for flood risk assessments. Oral histories compiled in the region, on the other hand, provide extensive stories about mountain and lake beings (Yauri Montero, 2000).¹¹¹ For Elías, an engagement with earth beings was necessary to successfully address the issue of flood risk.

Hiding under the shelter, with Elías calm as ever, we watched the raindrops splash into the lake, which took on an ever-darker shade of blue as the clouds came down on us. By this time, we could hardly make out the glaciers beyond the lake. Saúl stared into the misty distance – because of his actions, Palcacocha had become the subject of an international legal dispute. Yet the lake had many meanings for many people. For the inhabitants of Huaraz, it served as a vital source of water, but many also worried about its potential as a mortal threat. State authorities approached Palcacocha as an object of techno-scientific intervention. With scientific knowledge standards and adequate engineering solutions, officials hoped they could contain the danger of flooding and benefit from the lake's waters.¹¹² Those who worked at Palcacocha sought to implement the project that intervened in the environment's flows, yet for them, this would only be successful if they maintained a relationship of trust and reciprocity with the beings that constitute the lake and surrounding mountains. The mountains and lake are neighbours of a different sort – their power is unquestioned for those who engage them as sentient beings. Standing at the centre of discussions about environmental change and global warming, Palcacocha became a site of glacial politics.

¹¹¹ I also compiled several oral histories involving earth beings in interviews with villagers.

¹¹² More broadly, Rasmussen argues that the Palcacocha project aims to reduce uncertainty for the residents of Huaraz by decreasing the risk of flooding (Rasmussen, 2016b, p. 80).

Glacial politics at Palcacocha

In early 2017, local, regional, and national officials from numerous government agencies gathered in a conference hall in Huaraz to discuss Palcacocha. Despite years of deliberations, there was little visible progress on the definitive project to build a new dam and drainage system, or on an early warning system that authorities had announced long ago. Following plans drawn up in 2011, after measurements pointed to a dangerous increase in the water level, authorities installed plastic siphons as a provisional measure to reduce the lake's volume before construction began on a new dam. While a road to Palcacocha, completed in 2016 as a Regional Government project, facilitated the transportation of materials, further safety measures still appeared far away.

The crowd in the conference hall reflected a wide array of institutional actors with a stake at Palcacocha. Representatives of the Ancash Regional Government and Municipality of Huaraz chatted with officials from the Glacier Authority, the newly founded Glacier Institute, National Park, Ministry of Agriculture, and numerous other state agencies. I sat quietly in the audience alongside members of the local press. Leading the meeting was a retired admiral who oversaw disaster risk prevention for the national Peruvian government and was visiting from Lima.

Sitting at a table in front of a crowd of seats, the admiral exuded authority and decisiveness. A retired submarine commander with the Peruvian navy, his firm posture and staunch expression provided an aura of military discipline. His powerful voice pierced through the room.

Palcacocha is an extraordinary beauty, but it can also cause terror. While the lake was an important natural resource, he explained, the authorities had to work together to prevent another catastrophe like the 1941 flood. They finally had to put in place an early warning system and needed to work towards constructing a new dam. The admiral would seek support from the Peruvian president and his cabinet, but he required the cooperation of all those present.

After regional and local officials provided updates on the current situation at Palcacocha and the state of planning for the pending projects, tensions arose over how to balance flood risk and water supply demands. A representative from the Huascarán National Park highlighted that Huaraz depended on Palcacocha for its water supply. He urged the Regional

Government to consider this issue within the lake safety project – they should avoid losing the water through building hydrological storage infrastructure. *We need a more holistic approach to this project*, he explained. An official from the Ministry of Agriculture quickly agreed, pointing out that water resource management was crucial.

This intervention left the admiral visibly annoyed. *The first priority is to reduce the risk. We should not delay the project any longer – remember the 1941 disaster!* Speaking with militaristic authority, he declared that saving lives was the most important issue. Anything else could come later.

Many people in the region, particularly in rural areas, are afraid of future water scarcity. A common view in the area is that people depend on glaciers for their water supply. Glacial retreat is visible year after year, and people are worried that they will no longer have sufficient water for drinking and irrigation. From a scientific perspective, glaciers act as water storage devices (Drenkhan et al., 2015). They melt slowly throughout the year, giving life to rivers and streams. When it snows, they rebuild mass. In the context of an accelerated retreat in recent decades, glacial ice is melting faster in many places than it can re-accumulate. Entire glaciers have already disappeared irreversibly.¹¹³

While public authorities have largely focussed on the issue of flood risk at Palcacocha, many farmers are much more concerned about potential water scarcity. ‘Throwing away the water is bad,’ one rural community leader told me in an interview. ‘I don’t have a problem with the siphons and it’s OK to implement safety works, but they shouldn’t throw away the water – they should build a reservoir.’ After all, Huaraz and the entire area depend on Palcacocha’s waters. He had little trust in officials’ statements about flood risk: ‘The lake won’t break out. For many years they’ve talked about an emergency, but nothing happens,’ he argued. ‘I don’t see any risk for the city of Huaraz.’

Mistrust in public authorities is widespread in the Peruvian Andes.¹¹⁴ Another community leader told me in an interview that the authorities had made up the issue of flood risk for the purposes of corruption: ‘They only talk about that so they can implement projects and steal money.’

¹¹³ Rima Rima, a formerly glaciated mountain visible from Huaraz, already lost its glacial cover in the 1980s.

¹¹⁴ As mentioned in the introduction, anthropologists have described a widespread sense of state abandonment in the rural Peruvian Andes (e.g. P. Harvey, 2005; Poole, 2004; Rasmussen, 2015).

These statements from local community members demonstrate how Palcacocha has emerged as a site of glacial politics. Government officials, citizens, and scientists engage in disputes over how state institutions should engage with the changing Andean environment. Fundamentally, there is disagreement over how glacial retreat will potentially affect social life, who can provide legitimate expertise, and what issues should take priority in the political sphere. This raises a series of questions: in what ways do claims about how people should engage with Palcacocha reflect different knowledges, standards, and values? To what extent has the shift to a decentralised neoliberal model of government affected glacial politics at Palcacocha? How do lake workers attempt to balance conflicting political priorities? I engage these questions from an ethnographic perspective, showing how glacial politics evolved at Palcacocha as the lake became enmeshed in global concerns about climate change.

Rising waters; rising concerns

After the 1941 outburst flood from Palcacocha that devastated Huaraz, the lake stood almost empty. A measurement showed 0.5 million m³ of water. In 1974, the Glacier Authority completed two concrete dams at Palcacocha to prevent a future disaster (Carey, 2010). After a mudslide in 2003 caused a minor outburst flood at Palcacocha, a new measurement showed that the water level had grown to 3.8 million m³. The flood partially eroded the lake's secondary dam. It did not reach Huaraz, but damaged water infrastructure and left the city without running water for one week. A subsequent measurement in 2009 pointed to 17.3 million m³ (Portocarrero Rodríguez, 2014). As the glaciers behind Palcacocha retreated, the lake had grown by a factor of 34.

Following these developments, Palcacocha and the Cordillera Blanca became a focal point for international scientific research on glacial retreat and GLOF hazard.¹¹⁵ Glaciers in the Cordillera Blanca are close to urban centres with established transport links, making them easier to access for research visits than other areas prone to GLOF, such as in the Himalayas. The Cordillera Blanca offered scientists a laboratory for studying the impacts of

¹¹⁵ For example, studies conducted in the Cordillera Blanca have examined GLOF hazard assessment (Emmer and Cochachin, 2013; Emmer and Vilimek, 2013; Emmer and Vilimek, 2014; Emmer et al., 2016; Emmer et al., 2014; Frey et al., 2018; Klimeš et al., 2016; Mergili et al., 2020; Schneider et al., 2014; Vilimek et al., 2015; Vilimek et al., 2014), GLOF hazard mitigation strategies (Emmer et al., 2018; Frey et al., 2014), glacial retreat (Emmer et al., 2015; Schauwecker et al., 2014), socio-hydrological change (Bury et al., 2013; Carey et al., 2014; Drenkhan et al., 2015; Mark et al., 2017), and engagements with local populations about climate change (Huggel et al., 2015; Jurt et al., 2015).

glacial retreat as climate change rose on the international political agenda. With the precedent of a past disaster, Palcacocha is a particularly valuable site to study the potential processes and impacts of an outburst flood. With support from European and North American research funding, subsequent studies came to shape the politics of glacial retreat in Huaraz.

A study directed by scientists from the University of Texas at Austin that I discussed in the previous chapter modelled how a GLOF at Palcacocha might develop in different scenarios. Researchers simulated possible flood paths for avalanches of different magnitudes, finding that an ensuing flood would take around one hour and 20 minutes to reach the city. Furthermore, modelling showed that the affected areas would be significantly reduced if authorities decreased the lake's water level. The authors explicitly recommend that authorities in Huaraz install an early warning system at Palcacocha, enabling them to evacuate the population in the case of a flood and reduce potential human damage. The study also urges officials to consider the economic costs and benefits of other risk mitigation strategies, including lake lowering. Overall, the authors contend that flood risk should be a priority for both science and glacial politics: 'There is consensus among local authorities, scientists and specialists that Lake Palcacocha represents a GLOF hazard with potentially high destructive impact on Huaraz, and this consensus has been validated by the modeling results presented in this paper' (Somos-Valenzuela et al., 2016, p. 2538).

A visual representation of this model soon became ubiquitous in Huaraz, printed on posters hung in restaurants and public buildings throughout the city. Financed by Swiss development cooperation, a team of scientists from the University of Zurich teamed up with the NGO CARE and local government authorities to produce hazard maps for Huaraz. This divided the city into red, orange, yellow, and green areas, pointing to varying degrees of flood risk. Ominously, the map also designated certain areas as corpse collection centres.

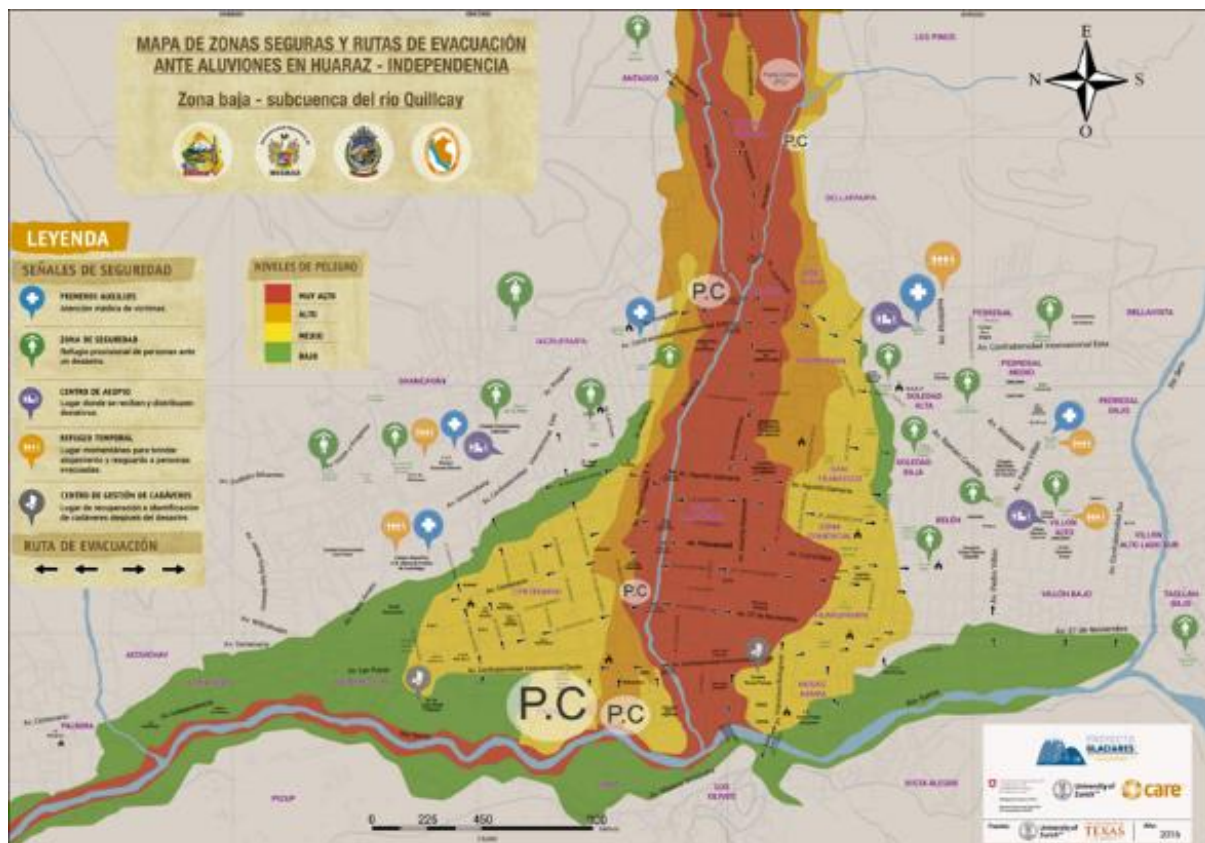


Figure 18: The flood hazard map of Huaraz (Courtesy of Proyecto Glaciares)

For public officials, the map became a key point of reference for warning the population about flood risk. The flood model set a significant standard used to understand how glacial retreat could affect the local population. Authorities said that around 50,000 people lived in potentially affected areas. In an interview, one official expressed worry that many did not take the risk seriously. Even if authorities initiated an evacuation process, he feared that 20,000 people would still lose their lives.

With their flood modelling scenarios for Palcacocha, scientists provided significant insights that came to bear on political deliberations about glacial retreat in Huaraz. The hazard map provided epistemological credence to officials and members of the public calling for a quicker implementation of flood risk infrastructure at Palcacocha. The need for infrastructure remained unquestioned in discussions among governing authorities and state agencies. Controversy persisted over precisely what type of infrastructure was needed and which types of knowledge should take priority for political decision-making.

Some residents I spoke to, particularly in rural areas, criticised the overarching political concern with flood risk. They worried that this drew attention away from water scarcity,

which they regarded as a more existential threat to their way of life in the long run.¹¹⁶ Inadvertently, the flood model set a standard for local glacial politics to address glacial retreat primarily in terms of GLOF hazard. Other scientific studies have focussed on glacial retreat and water availability in the region (Bury et al., 2013; Drenkhan et al., 2015). Drawing on approaches in critical human geography, some have developed hydro-social models that account for the entanglement of social and environmental change in the context of glacial retreat (Carey et al., 2014; Mark et al., 2017). Nevertheless, these studies have achieved less prominence in political discussions about glacial retreat in Huaraz. Recent research has proposed the implementation of multipurpose water management projects that address both flood risk and water supply (Drenkhan et al., 2019). Drawing on the latter approach, some officials have argued that the project to reduce GLOF hazard at Palcacocha should include water storage and irrigation infrastructure downstream, addressing longer-term worries about water scarcity. Overall, scientific research and flood modelling have shaped the possibilities envisioned in the politics of glacial retreat in the Cordillera Blanca.

Political fragmentation in times of global warming

Shaped by scientific research about climate change impacts, glacial politics in the Cordillera Blanca revolves around how authorities should balance different knowledges and social needs, and which infrastructures are most appropriate for addressing the problems at hand. As we saw in a legal context in the previous chapter, scientific knowledge shapes how environmental change is understood and which solutions are potentially viable. In a fragmented political landscape, progress on infrastructural measures has been painfully slow since Palcacocha came to renewed public attention in 2009.

In previous decades, the Glacier Authority in Huaraz commanded significant resources to implement engineering projects addressing glacial lake hazard. But in the 1990s, the Peruvian government under the authoritarian president Alberto Fujimori implemented neoliberal reforms that fundamentally reshaped relations between state institutions, citizens, and the environment. The Glacier Authority in Huaraz, which had overseen infrastructural interventions at dozens of glacial lakes since the 1950s, was part of the state-

¹¹⁶ Addressing both flood risk and water scarcity is conceivable in through appropriate infrastructure (Drenkhan et al., 2019), yet in local political discussions the two issues have sometimes appeared mutually exclusive due to an apparent lack of funds and technical expertise.

owned regional electricity company. But when this was privatised and sold to US investors in 1997, the new owners shut down the agency. Local residents and glacier experts denounced this move, lamenting that authorities had rescinded on their responsibility to keep the populace safe. The government re-established a small glacier monitoring office in 2001, but this no longer had the responsibility to implement large-scale lake safety infrastructure. Given this history, Carey (2010) argues that neoliberal reforms increased disaster risk and climate change vulnerability in the Cordillera Blanca.

After neoliberal reforms led to widespread privatisation and scaling back of the national state apparatus in the 1990s, a process of decentralisation in the 2000s began to transfer competences to regional and local authorities. In practice, the division of responsibilities between different levels of government often remained ambiguous (Pinker and Harvey, 2015, p. 17). In Huaraz, this has left the state apparatus with unclear standards for how to engage GLOF hazard, with several governmental authorities and rival state agencies vying for influence in political discussions.¹¹⁷ Formally, the Ancash Regional Government is the primary entity responsible for lake hazard in the Cordillera Blanca. In Huaraz, the municipalities of Huaraz and Independencia are also involved as the hazard zone cuts through both jurisdictions.¹¹⁸ While the Ancash Regional Government has received significant funding through transfers from the national government and through mining industry payments – enough to implement a large-scale glacial lake safety project – progress has been slow in executing plans to build a new dam and drainage system at Palcacocha. Numerous state agencies and non-state organisations are also involved in discussions. This includes the Glacier Authority which had a large staff until the 1980s and oversaw construction of numerous glacial lake dams in its heyday. Now entitled ‘Glacier and Lake Evaluation Area’ (*Área de Evaluación de Glaciares y Lagunas*), it is part of the National Water Authority (ANA) and has a small staff that engages primarily in monitoring. Another agency engaged in monitoring is the Glacier Institute (National Research Institute for Glaciers and Mountain Ecosystems, INAIGEM) which was founded in 2014. As I demonstrated with the disputes over measurement practices in Chapter 3, the division of responsibilities between Glacier Authority and Glacier Institute has often been unclear in practice, sometimes leading

¹¹⁷ Pinker (2015) points to similar dynamics in the Southern Peruvian Andes where decentralization has left unclear divisions of roles and powers between state institutions.

¹¹⁸ In an effort for increased institutional coordination on climate-related hazards, the Province of Huaraz and District of Independencia formed the Mancomunidad Municipal de Waraq (Waraq Municipal Association) in 2013 which has played a significant role in pushing for an early-warning system at Palcacocha.

to rivalries and duplications of work. Several other state institutions are also part of discussions, including the national agency in charge of disaster prevention (CENEPRED) as well as the Civil Defence Institute (INDECI) which oversees disaster response. Representatives of the national government in Lima have also joined some meetings on flood hazard at Palcacocha. Finally, NGOs such as CARE and the Mountain Institute have provided scientific and logistical support to state authorities at different levels in addressing climatic hazards.

Between 2011 and 2012, the Peruvian president issued twelve consecutive decrees declaring a state of emergency at Palcacocha, mobilising resources for immediate action.¹¹⁹ As the once-powerful Glacier Authority had been reduced to a small monitoring agency, the Ancash Regional Government, with its offices located in the regional capital of Huaraz, was now in charge of infrastructural works at glacial lakes. Other government agencies, such as the Glacier Authority, also participated in these projects. Regional officials drew up a plan to reduce the water level at Palcacocha and subsequently build a new dam and drainage system. Workers put in place a provisional siphoning system at the lake and remained permanently present to warn of a possible disaster.

In the following years, the Ancash Regional Government became mired in chaos. In 2014, Governor César Álvarez was arrested and removed from office pending charges of corruption and arranging contract killings of political rivals (Canal N, 2014). Waldo Ríos, who was elected as governor later that year, was arrested in 2016 and later convicted of corruption (RPP, 2016). His successor, Enrique Vargas, was in office for less than a year before being arrested and convicted in 2017 for presenting a fake university degree when he ran for office (Diario Correo, 2017). With every change in leadership at the Regional Government, the incoming governor usually brought in new officials for most higher positions. Despite being formally responsible for overseeing glacial lake hazard in the region, many of those in charge had little experience with the issue. Fernando, the engineer tasked with overseeing infrastructural works at Palcacocha, explained to me that corruption was endemic in the Regional Government. He was cynical. 'The definitive project hasn't happened in all these years mainly

¹¹⁹ Decreto Supremo N° 002-2011-PCM, Decreto Supremo N° 017-2011- PCM, Decreto Supremo N° 018-2011- PCM, Decreto Supremo N° 040-2011- PCM, Decreto Supremo N° 056-2011- PCM, Decreto Supremo N° 076-2011- PCM, Decreto Supremo N° 086-2011- PCM, Decreto Supremo N° 003-2012- PCM, Decreto Supremo N° 019-2012- PCM, Decreto Supremo N° 049-2012- PCM, Decreto Supremo N° 068-2012- PCM, Decreto Supremo N° 088-2012- PCM

because officials don't have a good chance to skim something off the top. They only care about enriching themselves.'

Amid political fragmentation and competing knowledges coming to bear on Palcacocha, progress has been slow to implement long-term flood mitigation infrastructure. Construction on a new dam had yet to begin as of late 2020 and scientists continue to warn of a high flood hazard for the residents of Huaraz. How have workers overseeing infrastructural works at the lake balanced conflicting knowledges and political priorities?

Balancing flood hazard and water scarcity

As state officials and members of the public discussed the value and potential danger of Palcacocha's waters, Fernando sought to find a practical balance in his job overseeing infrastructural works at the lake. On a clear morning in June 2018, I accompanied him in a pickup truck for an inspection at Palcacocha. It was the dry season – Andean summer – and the sun burned down on thirsty pastures in the valley below Palcacocha. We passed another pickup truck carrying Mariano, the official from the glacier authority who we encountered in Chapter 3, and stopped for a quick chat.

Mariano and Fernando were both concerned about the low water level at Palcacocha. If it sank even further, there might not be enough water to supply Huaraz. Fernando suggested installing siphons at Perolcocha, another lake in the valley, which could contribute to the river flow. In the meantime, he had only three siphons running at Palcacocha. *I'm trying to increase the lake level*, he told Mariano, *but it's still going down*. Once we arrived at the lake, Fernando instructed Martín to reduce the flow to one siphon until the water level rose sufficiently.

Formally, officials at the Regional Government were in charge of regulating the water flow at Palcacocha. In practice, they lacked expertise and left Fernando in charge. 'Reducing disaster risk is our principal objective,' Fernando later explained to me, but he sought to balance that with the need to maintain a sufficient water supply. 'It's difficult to handle these two situations, but both are very urgent.' While the river that emerges at Palcacocha used to receive significant input from water springs along the valley, these had begun to dry up in recent years. As the river flow decreased, particularly during the dry season, local officials approached Fernando and asked him to increase the outflow from Palcacocha.

Fernando began to regulate the water level, allowing it to increase during the rainy season so there would be a sufficient supply during the rest of the year. ‘When the water level goes up, the risk also rises, but this is an issue of primordial human necessities.’ He felt a significant responsibility resting on his shoulders. ‘We need water to survive, so maybe we have to permit a little bit of risk.’ Through improvisation and learning on the job, he sought to keep Huaraz safe and maintain a sufficient supply of water.

Flood infrastructure at Palcacocha is a site of glacial politics as people deliberate over how to engage with the changing environment. In a fragmented political context, lake workers have struggled to balance different claims and knowledges at stake. Meanwhile, Peruvian glacial politics has become embroiled in global concerns about climate change and glacial retreat, dramatically reflected in Saúl’s legal proceedings in Germany. Officials in Huaraz have begun to speak of glacial lake hazard as a climate change impact. Saúl even speculated that national and international media attention related to his lawsuit pushed authorities to expedite construction on an early warning system for Palcacocha which finally began in early 2020. In the following section, I analyse how lake workers’ empirical engagement with the environment at the Palcacocha flood safety project potentially expands the stakes of glacial politics.

The Palcacocha project: engaging the changing environment



Figure 19: Elías addresses Lake Palcacocha (Photo: Alexander Luna/Yuraq Janka, used with permission)

It was a rainy morning in March 2017 when I first witnessed Elías speaking with the earth beings. After travelling to the lake with Saúl and a German journalist, I had spent the night at the workers' camp. Frosty temperatures and high altitude made for fitful sleep and I spent much of the pitch-dark night listening to the workers snoring. While the labourers normally awoke at dawn, the rain kept them in bed. Without adequate equipment, they could not progress with building the road in the bad weather. Over a filling breakfast of soup and oatmeal, Elías explained that he would perform a pago by the lake which he did every two weeks. We were keen to watch.

The rain began to recede as we made our way up to Palcacocha. Elías carried a black plastic bag and skipped ahead at his usual swift pace. Climbing the concrete dam, we saw the misty blue lake. In the distance, glaciers stuck out from behind the low-hanging clouds. We followed Elías along loose rocks by the waterline up Palcacocha's right edge. Carrying his black plastic bag, he walked around a third of the way up the lake – over half a kilometre. On the way, he checked a measuring stick in the water to determine how much the water level had increased overnight with the rainfall. Finally, Elías stopped at a secluded spot by the water. We waited several paces behind. In front of Elías towered the great mountain peaks. He set down his plastic bag and extracted some coca leaves, candy, and a small bag of sugar. It was time to perform the pago ceremony. Elías turned to the mountains and addressed them in his native language of Quechua:

Apu Pucaranra, Apu Palcaraju, your tears have formed what they call Lake Palcacocha. Your people live in this lake, and I have brought them their sweets: coca, candy, sugar, different kinds of sweets, your coca. You told us that you wanted coca, so I brought you your coca.¹²⁰

Elías threw a handful of coca leaves into the water. They floated on the lake's surface. He tossed in a few pieces of hardy candy and watched them sink. He poured a portion of sugar out of the plastic bag into the lake. Finally, he retrieved some pastries from the bag. 'You told us you want pastries, so I brought you your pastries.' Elías threw in the pastries between the floating coca leaves.

So don't scare us anymore, don't make your mountains crash. That's why I've brought food for both of you, for you and for your people that live here. If you scare us, you will also scare those living in Huaraz, in Unchus, in Llupa, in Nueva Florida and you will scare

¹²⁰Words drawn from a subsequent interview with Elías – I asked him to retell what he had said during the pago. Translation from Quechua by Inés Yanac León.

the people living near those places. I'm bringing you what you asked for so that you won't scare us.

Elías retrieved a half-litre plastic bottle filled with a clear liquid, taking the cap off as he looked down at the lake. It was homemade cane liquor.

Also have your alcohol, you told me: 'Bring me the other thing, I'm thirsty.' I've brought that as well; here it is, drink up.

He poured a dash of liquor into the lake and put the top back on the bottle.

Don't scare us anymore, from now on we won't say: 'Pucaranra mountain is crashing down.' We will be calm, and will say, 'they're behaving; we've given them something to eat.' This is all I say to you, Apu, the next time you ask, I will come back.

With that, the ceremony was over. Elías put the plastic bottle bag into his bag and walked back up the lake. *Now, Palcacocha will be calm*, he exclaimed to us. *It won't scare us anymore.*

As foreman for the Palcacocha project, Elías oversaw engineering works embedded in a techno-scientific logic that rendered the lake as a dangerous flood hazard. In his work, he also applied a logic based on trust and reciprocity, engaging with the mountains and lake as living beings. As I explored in Chapter 2, the lake and mountains become part of people's lives as sentient beings through engagements that foreground ethical relations. For the lake workers, different logics and knowledges were inextricably entangled in flood safety infrastructure. The workers combined a pragmatic application of engineering standards with a situated mode of engagement that accounted for the environment's sentience. Ethnographically tracing these empirical engagements with the socio-material environment, we find other knowledges and ways of being at stake in glacial politics with earth beings emerging as potential political actors.

Flood safety infrastructure: design at its limits

It was mid-2011 when Fernando received a phone call. He was a middle-aged engineer from Huaraz working on an engineering project in the highlands near Lima. Over the phone, a friend told him to apply for a job opening to implement flood safety works at Palcacocha. While he was initially reluctant to work for the Ancash Regional Government, which many

see as unstable and corrupt, he agreed to send his CV by email. 'So, I got the job,' he later explained to me in an interview. 'They called me and said to come sign the contract immediately.'

In July 2011, Fernando began working at the lake. He was supposed to complete the project in five and a half months, but quickly ran into unforeseen difficulties. The initial plan was to install six plastic siphons to reduce the water level by 15 metres before beginning work on the new dam. Once installed, each siphon was almost 500 metres long and around 25 centimetres in diameter. The siphons came in pieces of six metres, each weighing 70 kilograms. Fernando hired men from nearby villages to work on the project. With only a footpath to access Palcacocha at the time, it was painstaking work to carry the siphons to the lake, piece by piece on the shoulders of two labourers. The project mandated 15 days to transport the siphons, Fernando explained, 'after that they said to start draining the lake.' In practice, it took three months.

As the siphons began arriving at Palcacocha, Fernando ran into the next problem. He was supposed to lay the siphons along a 400-metre-long path descending from the lake. 'To do that, you need flat terrain, free of everything,' Fernando explained. 'But the whole area was full of immense boulders.' As the National Park authority did not allow him to use machinery, they had to do the work with hand tools. 'We had to remove all those rocks. We had to break apart the big rocks with brute force, using a wedge, because they didn't let us use explosives. Those are things that weren't considered in the project plan.'

Making slow progress, Fernando and his workers cleared the pathway and began installing the siphons. Rather than five and a half months, as originally planned, it took over a year until the drainage system was finally running in August 2012. 'It was calculated really poorly,' exclaimed Fernando.

As the work continued, Fernando explained, it was difficult to find reliable workers. Few people could stand the tough labour of carrying heavy equipment to Palcacocha and spending weeks at the isolated lake. 'After a month and a half, the majority seemed to get tired; they got bored with the job and abandoned their post.' Fernando sought out Elías, who was known in the area for his extensive knowledge of mountain plants and expertise in healing people with homemade remedies. He had also worked on several glacial lake infrastructural projects in the 1960s and 70s, giving him valuable experience with dams and drainage systems. Elías later recruited his son-in-law Martín, a mountain guide used to working at high altitudes. While the Regional Government saw a high turnover in public

officials over the subsequent years, Fernando, Elías, and Martín formed the core of the Palcacocha project. The latter two spent most of their time living at the lake, with Fernando usually visiting several times each week.

In their ethnography of road construction in Peru, Harvey and Knox argue that engineering practice involves a tension between project design and pragmatic engagement with unpredictable environmental conditions. In such a context, universal standards are rarely sufficient for implementing projects as engineers must engage with technical and social complexities. At times, they had to adapt to unexpected challenges not accounted for by designs and abstract standards (Harvey and Knox, 2015, p. 10). In his narration of Palcacocha safety works, Fernando argued that the project miscalculated the time and difficulty it would take to establish a siphoning system at the lake.

According to Edwards, infrastructures often fail because project planners approach nature as an orderly domain that is separate from society (Edwards, 2003, p. 195). Engineers deploy epistemological techniques such as standardised practices of measurement to understand complex environments. Nevertheless, they are often acutely aware of the fact that the environment is less stable than their designs suggest. In a Peruvian road building project, engineers realised the contingency of their own practices which provided valuable guidance but sometimes failed to offer solutions in an unruly material and social environment (Harvey and Knox, 2015, p. 108). The Palcacocha project design reached its limits when Fernando encountered socio-material resistance – such as heavy boulders and unreliable workers – that prevented him from putting in place the siphons as planned. He and his workers engaged empirically with the environment, developing pragmatic solutions that accounted for social and material difficulties. Project workers developed contingent expertise to put in place an infrastructure that functioned as well as possible under the given circumstances.

Once they had set the siphons in place by August 2012, Fernando and his workers began to lower the water level at Palcacocha. The siphons worked with gravity – the tubes ended at a lower altitude than the lake level, meaning that once they started running, they continuously pumped out water. Elías and Martín made sure the siphons functioned properly, performing daily maintenance. They fixed punctures from falling rocks. Sometimes an avalanche would hit the lake, causing waves that swept up the siphons in the water. Using a little rubber boat, they put the siphons back into place. As the project funds began to run out, they bought a two-way radio and antenna out of their own wages, establishing a

communication system in a small hut they built above the lake. They monitored Palcacocha 24 hours a day, providing regular updates to officials in the city via radio.

‘We’ve gotten used to it,’ Martín explained to me one morning beside the radio as we glanced toward the morning mist above the lake. ‘We’ve gotten used to the altitude, the cold, the sun’s heat, the wind, everything. As responsible people we do this work; we’re here permanently to monitor the lake’s ascent and descent, reporting via radio to the authorities.’ Given administrative difficulties at the Regional Government, the workers often had to wait months until receiving their wages. It was a tough job, but Martín was proud of his labour. The lake workers applied scientific standards of engineering in their empirical engagement with the mountainous environment to keep flood safety infrastructure running at Palcacocha. To continue functioning, the infrastructure depended on a complex set of relations: lake workers and engineers employing techno-scientific standards and pragmatic expertise, scientists who continued to render the lake as a flood hazard based on predictive modelling, voices in the population calling for urgent remedial works, as well as political institutions that had to prioritise and fund flood safety infrastructure. How do earth beings fit in with these engagements?

Sentient environments in the Andes

At an early age, Elías had learned about earth beings. ‘My grandparents told me that the mountains and water are living beings,’ he explained to me. ‘From then on I knew that they are living beings, just like humans.’ When he worked on flood prevention projects at other glacial lakes in the 1960s and 70s, he encountered local earth beings in his dreams.

As I discussed in previous chapters, elaborate pago ceremonies are not a common practice in the Cordillera Blanca. In his younger years, Elías travelled all over Peru to work at construction projects. He learned about pagos to earth beings in the southern Andes where this practice is still widespread. In the Cusco region, anthropologists have documented the practice of making a burnt offering (*despacho*) to the sentient landscape (Allen, 1988; de La Cadena, 2015). In the Colca Valley, people make offerings (*pagos*) to mountains, ponds and canals (Stensrud, 2019a). Some Andean and Christian practices have also become entangled – the Qoyllur Rit’i pilgrimage in Cusco is a Christian ritual that involves appeals to mountain beings (Allen, 1997). Elías is Catholic and his engagements with earth beings are entangled

with Christian understandings. In one interview, he explained to me that God could prevent a flood from happening at Palcacocha; ‘and if God wants, [the lake] can break out – nothing can stop Him.’ Engaging with earth beings required a strong belief, much like his belief in God: ‘Only if you truly believe in them will they come to you.’

Numerous ethnographies have described Andeans’ engagements with a sentient environment (Allen, 1988; Gose, 1994; Harris, 2000; Harvey and Knox, 2015). Many studies highlight the role of reciprocity – humans live in interdependent relations with non-human earth-beings. While I did not often witness people engaging in overt practices such as offerings in the villages above Huaraz, earth beings seemed to have a powerful potential presence for many of those whom I met in the countryside. As I discussed in Chapter 2, earth beings appeared to be neighbours of a different sort. Numerous mountain guides I spoke to, including Saúl and Martín, highlighted their efforts to appease powerful earth beings during climbing tours.

In the Andes, anthropologists have argued, people’s identity is tied closely to the land (Allen, 1988). For many Andeans, the landscape has agency. They must actively engage with that agency to ensure that it acts positively towards humans and their endeavours. People and powerful non-human beings are involved in mutually beneficial relationships: earth beings offer life and vitality in exchange for ritual offerings and other signs of respect. Positive reciprocal relations between people and earth beings ensure productive harvests. People gain knowledge and understanding of these beings through a continual close engagement with the landscape (Harvey, 2001).

Early anthropological studies of Andean life point to a bounded cosmology revolving around relations of reciprocity between humans and non-human beings in the landscape (Allen, 1988; Gose, 1994; Harris, 2000). According to Catherine Allen, who studied a rural community in the Cusco region, people and earth beings are bound together by relations of reciprocity that sustain their life and well-being. Earth beings are physical and moral nurturers – they protect people, give vitality to the earth and can punish transgression. The Earth (*Pachamama*) and its beings (*Tirakuna*) are the ultimate sources of everything that people eat, drink and wear. Putting reciprocity into practice, the *Pachamama* and *Tirakuna* demand offerings in return. In this framework, villagers have a responsibility to participate in reciprocal relations. Refusal leads to negative exchanges, potentially provoking angry responses from other people and earth beings. Regarding the entire landscape with its beings as alive and interconnected, people assert that this responsibility extends to the

whole world. Every person has the responsibility to engage in reciprocal relations with humans and non-human beings (Allen, 1988). Based on recent research in the Colca Valley, Stensrud argues that these relations must be nurtured to ensure water supplies and prosperous agricultural production (Stensrud, 2019a, p. 158). Following this, we could interpret Elías's pago as a reciprocal engagement with earth beings at Palcacocha – through providing them with nourishment, he hoped to maintain their trust and prevent them from causing a flood.

Historians have traced Andean understandings about a sentient environment to Inca and pre-Inca symbolic geographies. The continuity of Andean understandings about landscape agency is remarkable given extensive historical change – from colonisation, over land reform to more recent processes of neoliberal development. Harvey (2001) argues that people continue to renew and reconstitute their relations with the environment, acknowledging its agency through reciprocal offerings. Some have warned against overemphasising the coherence of Andean earth practices. Commenting on earlier ethnographies that focussed on the internal integrity of Andean cosmologies, Rasmussen argues that we must also account for relations of power in discussions of sentient Andean landscapes (Rasmussen, 2015, p. 43).

In the past two decades, a significant body of anthropological literature has focussed on engagements between people and sentient landscapes in the Peruvian Andes in the context of contemporary environmental concerns. This has covered mining (de La Cadena, 2015; Li, 2015), road construction (P. Harvey, 2005; Harvey and Knox, 2012; Harvey and Knox, 2015), and irrigation infrastructure (Paerregaard, 2018; Rasmussen, 2015; Stensrud, 2019b). While extensive work in the natural sciences has analysed glacial lake hazard, as I discussed above, my contribution is to study relational engagements around flood safety concerns. What role do earth beings play in infrastructural practice at Palcacocha?

Earth beings in infrastructural practice

As the engineer in charge of the Palcacocha project, Fernando had an almost managerial engagement with earth beings. Unlike Elías, who grew up as a Quechua-speaking farmer in the rural Andes, Fernando came from an educated family in the city of Huaraz. He saw the pagos as an important aspect of hazard management at Palcacocha and frequently reminded

Elías to perform the ceremonies. *It's hard to believe*, Fernando explained to me on one of our many bumpy rides up the road to the lake, *but when Elías wasn't performing them the water level went up; and when he did the pagos the level went down*. While they were building the road to Palcacocha, Elías got sick and stayed in his village for several weeks. During that time, there were two accidents that left workers injured. Fernando had not believed in these Andean practices, he told me, until he saw them produce real effects. Before going to university, he worked as a mountain guide. At the time, Fernando told me, he did not believe that mountains were living beings. During one climbing tour, an avalanche nearly left him dead. Subsequently, he came to understand that the avalanche was a violent response from a powerful mountain being toward whom he failed to demonstrate respect. Earth beings could be spiteful neighbours. Fernando gave up on mountain climbing after the accident and began his studies as an environmental engineer. Working at Palcacocha, he sought Elías's support to maintain positive relations with the earth beings and placed great value on these practices from an academic and philosophical perspective. Turning back to me from the front seat as we slowly rode up to the lake, he exclaimed, *we have to preserve this Andean science!*

Anthropological studies of engineering practice have shown that technical expertise is rarely sufficient for implementing engineering project designs. In their ethnography of road construction in Peru, Harvey and Knox show how engineers sought to implement technical solutions that delimit the social world from engineering science. Nevertheless, engineers were conscious that their work required an engagement with complex social worlds. They were aware of the limits of their technical expertise (Harvey and Knox, 2015, p. 10). For Fernando, technical expertise, an understanding of the social relations at stake, and knowledge of the environment's sentience were all crucial for his labour at Palcacocha.

In her ethnography of industrial infrastructure in an Indian special economic zone, where locals worried that construction obstructed the paths of spirits, Ishii (2017) argues that infrastructural management can involve both technical maintenance and appeals to nonhuman beings. In her field site, people saw both as essential to the infrastructure's functioning. Through practices of care, people sought to manage spiritual forces by regulating relations between humans and nonhumans. She distinguishes these practices of care from a technical scientific approach that seeks to control environmental forces. Engaging in a similar dynamic, Fernando sought to appease earth beings at Palcacocha to prevent a flood disaster.

However, numerous ethnographic examples also point to a lack of understanding between engineers and locals over sentient environments. At a large-scale irrigation infrastructure project in the southern Peruvian Andes, Stensrud describes engagements between engineers and local farmers as ‘disencounters’. While engineers sought to implement their project using universalising scientific knowledge, they failed to understand the farmers’ relational engagement with a sentient Andean landscape. Rather than relying entirely on technical solutions, the farmers sought to maintain respectful relations with water which for them is a form of life. With diverging understandings between farmers and engineers of how to understand and engage with potential water scarcity linked to climate change, and in a context of historical inequality and a perceived hierarchy of knowledge, they failed to engage with each other on common terms (Stensrud, 2019b).

In such projects, government officials have often promoted water as a singular substance – a resource we can understand through science. Stensrud (2019a) argues that this perspective disregards alternative understandings of water as a being. With these examples, we can recognise the relevance of different ways of knowing that allow people to apprehend the environment in distinct ways. What knowledges are at stake at Palcacocha? How does Elías come to know the lake?

As Elías began working at Palcacocha in 2011, Fernando and the authorities in Huaraz were worried about the lake’s high water level. When Elías first slept in the camp by the lake, as he and the workers were installing the drainage siphons, the mountain and lake beings approached him in his dreams. They looked and dressed like local people. ‘You see me, I live by your side,’ he explained to them. ‘Don’t scare me!’ The beings told Elías not to be afraid. ‘They said to me, “I want coca, cigarettes, beer, and alcohol. If you bring all that, I will be fine, I won’t scare you.”’ Elías began performing regular pagos, fulfilling the beings’ requests, and the water level receded.

For Elías, techno-scientific hazard management and a relational engagement with earth beings went hand in hand. ‘The siphons stop the water from growing,’ He explained in an interview. We sat in a dark hut by Palcacocha next to a small fire that kept us warm. ‘They make the water level go down, and that makes me happy. The siphons have their own will; they work as if they were people. The mountains help as well; they are also alive. The lakes and the mountains – they are all alive if we have faith. They are listening to us now as we speak.’ His work would be successful as long as he showed the earth beings sufficient respect.

‘I’m happy – the lake has shown me no resentment; it’s cheerful. I always provide its pago and my siphon is working day and night.’

The lake beings appear most clearly in Elías’s dreams. ‘The lake is five people. A woman – the mother, and a man – her husband; and their children – a plump woman and a thin one; and a guy who’s in the middle. They come and talk to me; ask me how I am.’ Elías feels a close connection to the lake beings. ‘They talk to me with great trust; like my family members. They talk to me like we’re sitting here with you, and they tell me not to worry.’ Trust is key in Elías’s neighbourly relation with the beings – ‘they’re very fond of me’ (*mucho me quieren*). Yet their power was also clear to Elías; hence his appeals that the earth beings stop scaring him and prevent a flood disaster.

How might we characterise the different knowledges at play in Elías’s engagement with Palcacocha? Many anthropologists have written about encounters between universalising scientific knowledge and particularising relational knowledge, often focussing on relations of power. In her study of people’s engagements with the environment on the border between Canada and Alaska, Cruikshank describes how Aboriginal narratives account for glaciers as sentient beings. While local approaches emphasised the landscape’s agency and valued mutual relations with the sentient environment, she contrasts this to a scientific colonial approach that objectifies nature in an effort to control the colonised environment (Cruikshank, 2005). In a similar vein, we could distinguish between a techno-scientific approach at Palcacocha that renders the environment as inanimate, and the workers’ conception in which earth beings are active players.

Knowledge systems do not only shape what we can know and think; they can also make particular things unthinkable, thereby erasing their existence (de La Cadena, 2015, p. 76). Engineering practice has often been identified with modern statecraft, as when engineers imposed authority at an irrigation project in southern Peru, applying a generic form of knowledge that purports to trump relational knowledges (Stensrud, 2019b). Harvey and Knox demonstrate how engineering practice can both acknowledge and erase other knowledges. At a road building project in Peru, engineers deployed a range of knowledges to engage with material and social dynamics. In this context, Harvey and Knox argue that we should avoid the assumption that local indigenous knowledges are opposed to generic modern knowledges (Harvey and Knox, 2015, p. 12).

In practice, different domains of knowledge are not necessarily mutually exclusive. When farmers struggled with an unruly environment in the construction of irrigation infrastructure

in the Cusco region of southern Peru, they offered both technical and relational explanations: while they accepted engineers' concerns that the environment's biophysical condition was the problem, they also argued that work had stalled as people had not demonstrated sufficient respect towards sentient beings in the environment (Boelens, 2014).

In Elías's daily labour, technical and relational modes of engaging Palcacocha became intertwined. He came to know the lake and surrounding mountains both through scientific measurements and through engaging earth beings in pago ceremonies and his dreams. According to its design, the Palcacocha project was embedded in universalising scientific and engineering standards. Implementing this infrastructure in practice involved an engagement with the socio-material environment that evoked technical standards alongside pragmatic empirical knowledge. Tracing this labour at Palcacocha, we can recognise that more may be at stake in glacial politics than flood risk and water provision. Through Elías's relational engagement, earth beings emerged as potential political actors. How might we characterise their participation?

Earth beings play politics

What kept Fernando, Elías, and Martín working at Palcacocha, despite the difficult conditions? All three felt a strong sense of responsibility in their labour. Speaking to Martín in the radio shack one sunny morning above Palcacocha, I asked him why he was still there, even though the Regional Government rarely paid him. 'I'm here because I love my work,' he explained. 'I'm here even if they don't pay me, because work gives us dignity, and out of love for my people, for the city of Huaraz; because this is what any Peruvian should do.'

Fernando quit the job for several months in 2015, but ultimately returned when regional officials promised to pay him back wages. They never paid the full amount, and the situation returned to normal: 'even if they aren't paying me, here we are, trying to make this work.' Fernando felt dedicated. 'Time goes by; years go by; but I can't abandon this situation. So we have to continue; not because we want to, but because the socio-political circumstances obligate us to do this work.' He was happy to count on Elías and Martín who both stuck around through all hardship. 'They've taken this labour to be their own,' he explained. 'They see this as a service to society. The three of us have identified ourselves that way; that's why

we endure it all even if they don't pay us.' If they left, who would take their place? 'There aren't any other people who could do this.'

And Elías? Despite his age, he felt a stubborn devotion. 'I live here for the people of Huaraz; in the cold, with the frost – I've gotten used to it. I endure being here because of what has been revealed to me, and so I pay and pay the pago to the lake.' According to Elías, his engagement with the earth beings was crucial for preventing a disaster. 'When I provide the pago, the mountain doesn't come down. But when I leave for my break after 15 days, the mountain can fall down and scare us,' he explained. 'As long as I'm here it's calm; the mountain doesn't collapse, and it doesn't scare us.' While his relation of trust with the earth beings was strong, Elías said, there could be trouble with other people. 'They [the mountains] said to me: "if you leave me and another person comes, that person might die. We'll get rid of them."' Elías was worried – 'they might cause a flood.'

In an interview, I asked an urban official about the claim that an avalanche had occurred because the lake workers failed to perform a pago. As an engineer, his answer was shaped by a scientific understanding of the environment. 'People and populations have their beliefs,' he explained. 'Avalanches happen due to the mountain's geodynamics; we'll always have them.' He stated that he had nothing against traditional practices or beliefs, but his perspective was realistic and rational: 'nature has its own dynamics, with or without a pago.'

What role do earth beings play in political engagements over Palcacocha? Can they participate in glacial politics, even if other actors refuse to recognise their existence? According to Marisol de la Cadena, 'political-epistemic practice' establishes the ontological limits of reality. Typically, those in power engage in this practice to define what we consider to be relevant topics of political discussion (de La Cadena, 2015, p. 276). From the urban official's scientific perspective, earth beings are nothing more than traditional belief. Yet for Elías, they appear to have a tangible presence. In this chapter, I have shown how different ways of knowing the Andean environment shape the stakes of glacial politics. But those participating in political disputes may disagree on which knowledges are most legitimate for political decision-making. The stakes of glacial politics depend on whom you ask. In this final section, I discuss how the politics of glacial retreat – and environment more broadly – might be able to account for different ways of knowing and being.

Anthropologists such as Marisol de la Cadena and Astrid Stensrud have applied an ontological approach to understand people's engagements with earth beings in the Andes. Stensrud argues that anthropology can reveal a multiplicity of reality: ethnographically, we

can trace how practices construct particular realities (Stensrud, 2016a). In her ethnography of environmental engagements in the southern Peruvian Andes, she describes pago ceremonies as ‘world-making practices’ that bring parts of the landscape into being as sentient actors. Through this ritual action, farmers enacted earth beings as non-human persons. These practices are thus important to Andean farmers for constructing their lifeworlds in which earth beings are relevant participants (Stensrud, 2019a). Similarly, Marisol de la Cadena argues that earth beings exist through people’s relational practices involving them (de La Cadena, 2015, p. 57).

De la Cadena further contends that we, as anthropologists, cannot know realities that we are not involved in constructing. Accordingly, we cannot truly know Andean earth beings as do people such as Elías. Nevertheless, she argues that ethnography should acknowledge the ontological differences arising in our conversations with interlocutors who enact realities that are other to our own. This, she states, can highlight incommensurabilities – differences between distinct ontological worlds that we cannot overcome (de La Cadena, 2015, p. 31). We should accept that there may be things that exist or emerge that we cannot understand; that lie beyond the limits of our own epistemology. Modern epistemic knowledge can capture some things through empirical ethnographic study, but there may be more – things that we cannot grasp (de La Cadena, 2019, p. 32). In ethnographic practice, finds Van de Port (2011) in his study of Afro-Brazilian religious rituals, there may be things we are unable to know empirically. Recognising the limits of our knowledge, he goes on to argue, we can acknowledge the significance of realities beyond what we can understand.

I follow Marisol de la Cadena and other authors writing from an ontological perspective in that we should acknowledge distinct realities that our interlocutors enact through their practices. Nevertheless, a focus on the incommensurability between distinct worlds risks overstating the coherence of particular configurations of reality, as well as overemphasising the difference between such worlds. Rather than seeking to distinguish distinct ontological ways of being, my analytical approach is to study how different knowledges and practices of socio-material engagement emerge in the Andes. I trace how these practices enact different entangled ways of being and come to bear on political disputes and claims about ethical relations. Infrastructural practices are often ambiguous, enmeshing different ways of knowing and being. Fernando, the head engineer, did not engage directly with earth beings at Palcacocha – he left that to Elías and Martín. Nevertheless, he described earth beings as important actors in his work at the lake and reminded Elías to perform regular pago

ceremonies. Through these engagements, earth beings came to figure among the stakes of glacial politics for Fernando and his workers.

Infrastructures can be sites of engagement between people, materials, and nonhuman beings. Ethnographic exploration of these engagements can help reveal the underlying stakes of political disputes. Jensen and Morita argue that infrastructural arrangements give rise to ‘practical ontologies’: they can shape what people perceive as social and natural, framing relations between people, state, nonhuman beings and environment. In this sense, infrastructures are ‘emergent systems that *produce* novel configurations of the world’ (Jensen and Morita, 2017, p. 618; original emphasis).¹²¹ Building on this perspective, we might say that workers’ engagement with flood safety infrastructure at Palcacocha gives rise to socionatural configurations in which earth beings are active participants in political engagements over the mountain environment. Nevertheless, earth beings have remained largely out of view in political discussions about glacial retreat in Huaraz. Might they still play an active role?

In other political disputes in Peru, earth beings have emerged as ambiguous, yet contested potential actors. In social conflicts over mining projects, anti-mining activists have cited earth beings to justify their concerns. In a controversial statement, former president Alan García vociferously denounced that premodern beliefs – such as earth beings – were slowing down national economic development. Despite García’s refusal to accept them as real, Marisol de la Cadena argues that earth beings affected Peruvian politics when their presence forced the president to slow down mining expansion (de La Cadena, 2015, p. 168).

This brings me back to an example I mentioned in Chapter 2. Fabiana Li describes a conflict between farmers and a multinational mining company at Mount Quilish in the northern Peruvian Andes. Protestors described the mountain as a water source – using scientific terminology – and as an *Apu*, a sacred mountain. While the latter characterisation arose out of many rural people’s understanding that the mountain was sentient, describing it in this way was also a strategic move. The mountain as *Apu* lent it a romantic appeal for urban environmentalists and journalists, speaking to contemporary imaginations of Andean indigeneity. In fact, the term *Apu* was not common in that part of the country; activists had borrowed it from southern Peru. Mount Quilish came to matter in different forms through encounters between knowledges. In asserting that both scientific and spiritual

¹²¹ See Harvey et al (2017) for a similar argument.

understandings were valid, activists sought to bring spiritual issues into the realm of the political (Li, 2013).

While the politics of glacial retreat revolving around Palcacocha is less overtly conflictual, it also emerges as an encounter of knowledges and ways of being. In political discussions and infrastructural works, different socio-material engagements have emerged that point to a broad set of issues and relations potentially at stake in glacial politics – and that come to bear on ethical claims about neighbourly relations in times of climate change. In encounters with journalists and academic researchers – including myself – Fernando and Elías have also described the mountains surrounding Palcacocha as *Apus* – even though this term is not common in local parlance. They may have picked it up on travels to other parts of Peru; perhaps they heard it in news reports about mining conflicts. Either way, the term is serviceable to describe the ambiguous potential significance of the sentient environment for political engagements about glacial retreat and climate change.¹²²

According to Marisol de la Cadena, who builds on Latour (1993), modern political theory assumes a separation between nature and culture. In this conception, science mediates representations of nature through its knowledge practices. De la Cadena argues that earth beings can have no place in modern politics as they constitute an alternative understanding – or ontological reality – of the environment. Modern politics can only account for earth beings as cultural belief but cannot acknowledge them as potentially real. De la Cadena argues that we should open up our understanding of politics and the political to overcome the nature-culture-dichotomy and allow for the existence of earth beings as political participants (de La Cadena, 2010). Modern politics participates in ontological disagreement, as when earth beings came to participate in mining conflicts, yet it ignores this participation (de La Cadena, 2015, p. 283).

How might we formulate a more inclusive understanding of politics that accounts for earth beings as potential actors? According to Marisol de la Cadena, the entrance of earth beings into modern politics questions its very foundations by disavowing the separation between nature and culture. Disrupting politics as usual, this potentially allows for a pluralisation of politics. Building on Isabelle Stengers's discussion of cosmopolitics,¹²³ de la

¹²² I draw inspiration from Sheila Jasanoff's work on serviceable truths (Jasanoff, 2015).

¹²³ Stengers's 'cosmopolitical proposal' calls for us to slow down reasoning and account for things and forms of existence in political processes beyond human-centred understandings that are common in political theory (Stengers, 2005).

Cadena argues that a redefinition of politics and the political¹²⁴ can acknowledge the existence of multiple worlds, or socionatural formations. A 'new pluriversal political configuration' – a cosmopolitics – allows for legitimate political disputes between different worlds (de La Cadena, 2010, p. 361). Marisol de la Cadena calls for a politics that recognises ontological disagreement across multiple worlds on the basis of mutual respect (de La Cadena, 2015, p. 285).

At Palcacocha, earth beings have inadvertently become part of political processes, even if not everyone involved in those processes recognises them as such. In empirical terms, my study of the Palcacocha project shows how different ways of knowing and engaging with the Andean environment come to bear on political disputes. When Elías made appeals to earth beings in his work at Palcacocha, he drew them into the stakes of glacial politics.

Politics and the political are ever emergent. While state officials in Peru and elsewhere have denied that earth beings are relevant for political discussions, ethnographic study at sites such as Palcacocha reveals that nonhuman entities can nevertheless play a potential role. Given this, 'modern politics' no longer appears as a coherent approach relying exclusively on scientific forms of knowledge. In political practice, different knowledges can emerge hand in hand, forming part of political claims about social relations and the environment. While their existence is ever ambiguous and often disputed, earth beings play a potentially significant role in Peruvian glacial politics.

Cruikshank argues that stories about sentient glaciers can broaden public debates about environmental change. They can reveal how the environment can be sentient and agential, enacting an understanding of the world in which nature and culture are inherently entangled. Such perspectives can provide an alternative to dominant narratives of nature as an object to be managed by humans (Cruikshank, 2005, p. 259). In this sense, Elías's account of his engagement with earth beings at Palcacocha provides an alternative understanding about the stakes of climate change.

¹²⁴ De la Cadena follows Mouffe (2005), as I do in this chapter, in distinguishing between politics and the political.

Conclusion: Expanding the political stakes

As the glaciers above Palcacocha continue to recede, diverse knowledges and practices have shaped discussions about glacial retreat in scientific, public, and political spheres. The potential stakes of glacial politics emerge from how we choose to know the Andean environment. In this chapter, I have shown how a focus on flood risk shaped glacial politics in the Cordillera Blanca since the 1940s, leading to the construction of flood safety infrastructure at numerous glacial lakes. In the new millennium, glacial retreat led to renewed worries about flood risk as climate change rose on the political and scientific agendas. Palcacocha emerged as a site of glacial politics as public officials, scientists, and citizens discussed which knowledges and standards should guide political decision-making. At the lake, infrastructure workers tried to balance concerns about flood hazard and water scarcity. In the lake safety project, workers applied scientific engineering standards while relying on pragmatic expertise gained from their empirical engagement with the infrastructure and socio-material environment. This involved an engagement with earth beings which they regarded as vital to keep the infrastructure functioning. Earth beings emerged as potentially significant actors in the politics of glacial retreat.

How might this discussion about Lake Palcacocha inform broader conversations about climate change? As with Peruvian glacial politics, climate politics builds on knowledge of the environment – how is the global climate changing? How should we best engage with changing environments? Knowledge of climatic and environmental processes shapes the scope of political claims about how we should respond to climate change. In his ethnography of environmental politics in Hong Kong, Timothy Choy argues that political claims gain strength when they address both specific and generalisable issues. In Hong Kong, environmental activists formulated their concerns about endangered species in both local and global terms, relating situated worries to environmental problems at a larger scale (Choy, 2011).

In his legal proceedings against RWE, Saúl attempted a similar move in addressing both specific concerns about glacial retreat in Peru and global worries about climate change. As in political deliberations over Lake Palcacocha, his claim brought together diverse knowledge practices: from scientific knowledge about climate change and flood risk in the Andes, over legal knowledge about causal accountability, to Andean ways of knowing that account for environmental agency. These knowledges shape the potential scope of social and political

discussions. For Saúl, the claim is an attempt to expand the stakes of climate change politics – to account not only for scientific conceptions of global warming, but also for the potential presence of earth beings. Saúl engaged RWE and the Andean mountains as different kinds of neighbours. The mountains, for him, are greater – ‘they are something more,’ he once told me. Unlike in his engagement with RWE, the environment’s moral and physical power was unquestioned. Like other Andean villagers I encountered during my research, Saúl has expressed uncertainty over what earth beings are and how glacial retreat might affect them. Nevertheless, as I showed in Chapter 2, he hopes to bring them into conversation as an additional issue at stake in global climate politics.

[Conclusion] Making neighbourly relations in times of climate change

‘It went perfectly. A super decision. Now it begins!’

On a cold Andean morning in late November 2017, I received a WhatsApp message from Saúl’s lawyer – the judges had issued a ruling moving the case into the evidentiary stage. She texted me from the courthouse in Hamm after a brief hearing that formally confirmed what the judges had indicated several weeks prior when Saúl was in the courtroom – they found that the lawsuit was admissible and wanted to examine evidence to see whether a causal link between RWE’s activities in Europe and climate risk to Saúl’s property in South America could be proven to a legal standard.

If this was the beginning, where would it end? The lawyer’s words gave me cause for reflection as I stood inside my dark little room in an adobe house, my home during much of my fieldwork in the Peruvian Andes. I had eaten a quick breakfast with my host family before they set off to the fields for the day’s work. Their children had already left the village in a rickety public bus to attend school in Huaraz, further below in the valley. Under the icy morning sun, I drove off on my motorcycle to meet Saúl – he had spent the night higher up in the mountains. He was seeing to his cow that roamed freely grazing in a grassy valley and was about to give birth.

By that point, the lawsuit had already achieved much more success and recognition than we had ever imagined. In early discussions with Saúl, the lawyers told him that the chance of legal victory was approximately ten per cent. From the outset, the courts could have rejected the claim which appeared to many as outlandish. As the first case of its kind, even basic evidentiary standards were at question – how could a court measure causal impacts via global climate change? Yet the judges in Hamm decided to take the case seriously in all its complexity and publicly acknowledged the possibility of a ruling under German law to hold greenhouse gas emitters accountable for their contribution to climate change impacts.

I met Saúl at the end of a bumpy dirt road in front of a wide valley leading up towards the glaciated mountain peaks. He was happy to hear the news, responding in his usual reserved manner with a slight smile. We speculated how the case might continue. Saúl had already received significant media attention around the world. He reflected: in terms of *la causa* – the cause – we had achieved significant success by bringing people’s attention

around the world to climate justice and glacial retreat in the Andes. In the long run, Saúl hoped this would make a small contribution towards stopping global warming and saving the mountains that surrounded us from losing their white caps.

On the motorcycle, we drove down the road looking for cell phone reception. Finding a place that gave us a view of Huaraz in the glorious morning sunshine, we called Saúl's lawyer to hear more details. She explained that the court hearing that day was short and straightforward: RWE's lawyers had presented new written arguments several days previously arguing against the lawsuit's merits, but they had not convinced the judges. The lawyers on both sides now had one month to suggest potential court-appointed experts to examine the evidence. The case would likely go on for several years – Saúl's lawyer was thrilled.

Standing by the road with the mountains behind him, Saúl wondered what this would mean for his immediate future. He had been celebrated on the international stage as a hero of climate justice. During press interviews, journalists from around the world often expressed open admiration for him and his claim. Saúl was a shy person who never intended to become famous; he took on the role of a climate change celebrity with initial reluctance. In his own view, he was not – or should not be – at the initiative's centre. He was only acting on behalf of the mountains. Saúl was not a charismatic leader who held speeches in front of village assemblies to propagate his cause. In fact, many of his neighbours found out about the lawsuit through press articles and social media.

As I discussed in Chapter 1, opinion was divided in his own community and rumours abounded. On the rare occasions that people confronted him directly, he patiently explained that nobody was paying him to make this case and that he hoped to benefit both the mountains and his community. If he won the case, he would not receive any money – the winnings would go to local authorities to reduce flood risk. Now Saúl worried that renewed public attention would crank up the rumour mill once again.

As we conversed beneath the mountains, I received a Skype call from a producer at ZDF, one of Germany's national television stations. They conducted a brief videocall with Saúl that was later broadcast to households around Germany. Saúl explained that he was happy with the result – no matter how the case ended, the fact that his cause had received so much attention already felt like a massive victory. After the interview, I drove Saúl back up to the valley – he had to check on his cow again.

Saúl rose to unexpected international stardom in an unprecedented legal claim for climate justice. For the German climate activists who organised the lawsuit, he conveniently fit the role of a subaltern subject in the Global South that faced the worst impacts of climate change. Yet Saúl did not present himself as a passive victim. He contributed to a claim that offered legal, moral, political, and cosmological perspectives on climate change and social justice. Saúl and his lawyers were surprised at the success the claim achieved – yet structural socio-political change addressing climate change still seemed far away. Crucially, the claim appeared to produce little concrete benefit to help Saúl and his compatriots face the impacts of climate change.

I began this thesis with a question that Judge Rolf Meyer posed in a hearing for Saúl Luciano Lliuya's lawsuit against RWE: is it just to leave people in poorer parts of the world on their own to face climate change, 'even when we are causing the problem over here?' The matter at hand was strictly legal – the judges were to decide which norms of justice should regulate the relationship between RWE in Germany and Saúl in Peru. Yet the judge's question was both moral and political: he broadened the scope of discussion to the relationship between 'the places in the world where money is scarce' and 'we' who 'are causing the problem over here'. The judge made explicit what many observers had already speculated: the lawsuit concerned not merely a connection between localised natural and corporate persons, but the very fabric of global life in times of accelerated environmental and social change. At stake was the relationship between the 'Global North' and 'Global South'. The claim attempted to reconfigure climate change by asserting a neighbourly relation between those who had made the largest contributions to greenhouse gas emissions and those who face the worst impacts of climate change.

In this thesis, I have taken the lawsuit as an ethnographic opportunity to study how climate justice claims enact morally charged social relations that draw together people, corporations, and other potential beings. Saúl, in collaboration with his lawyers and other supporters, drew on disparate knowledges, perspectives, and moral norms to raise fundamental questions about how people should live and engage with each other across a warming planet. Each chapter has highlighted different dimensions of the social relations at stake in concerns about climate change in the Peruvian Andes, both within and beyond the legal process. I offer a set of perspectives gleaned from shadowing glacial lake workers in the high Andes, acting as Saúl's interpreter in countless conversations with lawyers and journalists, as well as spending long hours poring over legal documents. These insights arise from my participation and commitment to the cause of climate justice. This thesis is also the

story of my journey in the conceptual sphere of climate justice and my attempt at employing an anthropological sensibility to make sense of it all.

Looking back

What new perspectives has this thesis offered on making responsible social relations in times of global warming? I began with the story of how Saúl came to face RWE in court, showing how the claim configures climate change in terms of neighbourly relations. Taking analytical inspiration from this conception, I suggest that a neighbourly approach allows for a fruitful ethnographic examination of climate change that focusses on how people make – and contest – morally charged relations. Next, I explored who might be involved in those neighbourly relations. While the legal framework allows for a claim between Saúl and RWE as legal persons, thereby reinforcing historically situated notions of human and corporate personhood, Saúl raised the possibility that Andean earth beings might also have a stake in the claim. Saúl engages the Andean mountain as neighbours of a different kind who are suffering due to climate change and glacial retreat – in fact, one his primary motives for collaborating in the lawsuit was to take a stand on their behalf. This ties into broader discussions about whether legal and political processes should account for ecosystem beings – further research may be needed to develop appropriate analytical frameworks.

The following chapter dove deeper into the judicial dispute in the German courts, examining how lawyers deployed scientific evidence to establish and contest a neighbourly relation between Saúl and RWE. A key issue at stake in the lawsuit is that of causality. I explore this from an anthropological perspective, tracing the legal practices that linked greenhouse gas emissions from RWE's factories with global warming, global warming with glacial retreat in the Andes, and glacial retreat with an alleged risk of flooding to Saúl's house. I foregrounded the processes through which legal practitioners sought to translate scientific facts about climate change – with their inherent uncertainties – into serviceable legal truths. Claims about neighbourly relations in times of global warming arise out of scientific knowledge that offers increasingly detailed understandings of climatic processes. I call for an increased anthropological interrogation of causality claims that enact morally charged relations across geographic and conceptual bounds.

Finally, after a journey through court rooms and legal texts, I returned to where it seemingly began – the Peruvian Andes. The lawsuit draws our attention to great questions of global politics, potentially overshadowing the socio-material relations at stake in Saúl's home region. Calling for an anthropological focus on the politics of glacial retreat, I show how concerns about glacial lake flood risk and water scarcity have emerged in relation to scientific and political standards of engagement with the environment. When authorities implemented engineering projects to address flood risk, lake workers sought to appease powerful earth beings as they executed an infrastructural project grounded in scientific knowledge. Earth beings, I argue, thus emerge as potential actors in the politics of glacial retreat.

Where does this all leave us? Taking an ethnographic approach, this thesis has traced the enactment of morally charged relations between diverse entities with a prospective stake in the politics of climate change. They are conceptualised as potential neighbours through the deployment of scientific climate knowledge. We followed Saúl between Andean mountains and German courthouses – a reserved yet intensely principled protagonist standing up for climate justice, whatever that might mean. We came across RWE, materially manifested in its towering buildings, open-pit coal mines, and well-dressed lawyers, fighting with seemingly endless resources to unmake a socio-legal relation with a soft-spoken Andean farmer. And lurking behind the curtains we caught glimpses of Andean earth beings – always difficult to comprehend analytically, yet intensely significant for those who directly engage them, and perhaps also significant for those of us who do not. It makes for a fascinating narrative, but how might this be relevant for other scholars and non-academics looking to make sense of climate change? I end with a handful of reflections on anthropology, litigation, and climate politics. In the following, I review what the claim hopes to achieve according to its protagonists.

Climate litigation brings political claims about climate change into the legal sphere by drawing people, organisations, corporations, and governments into a web of morally charged relations. In concrete terms, the claim against RWE enacts a neighbourly relation between plaintiff and defendant. Like other climate change activists, Saúl and his collaborators seek to promote social, political, and economic change addressing global warming. The NGO Germanwatch, which has logistically supported the lawsuit, looks back on almost three decades of participation in the UN climate negotiations process. Saúl's lawyer, Roda Verheyen, began participating in UN climate summits in the 1990s with the environmental group Friends of the Earth and later acted as an expert negotiator for the German

government until the early 2000s. UN negotiations address climate change primarily in terms of relations between nation-states with some involvement by civil society groups and industry. Roda became increasingly disillusioned at the slow pace of progress in tackling an increasingly urgent global problem. She began discussions with other lawyers and campaigners about the possibility of using legal tools to push for political change. As I discussed in Chapter 1, this eventually culminated in several high-profile claims with Roda as the leading lawyer, including Saúl's claim against RWE.

Saúl, Roda, and Germanwatch came into the lawsuit with distinct, yet overlapping aims. Asked about this in press interviews, Roda has argued that her aim is to achieve legal protection for her client against the harmful impacts of climate change. In her formal role as a lawyer, her duty is to defend her client's legal rights. The claim demands that RWE pay a relatively small sum of money towards reducing glacial lake flood hazard in the Peruvian Andes. The fact that RWE has refused to settle, instead presumably incurring much more in legal costs than the lawsuit demands, points to the claim's broader aims. In media interviews and public statements, Germanwatch representatives have frequently pointed to the lawsuit's potential for setting a legal precedent to hold large emitters responsible for their contribution to climate change. A positive verdict for Saúl could potentially provide the basis for future claims against other companies, both in Germany and other jurisdictions that have similar legal provisions for nuisance and liability. While a large number of lawsuits may be unlikely given the cost and effort required to bring forward each case, Germanwatch co-founder and long-standing chairman of the board Klaus Milke would welcome an increase in litigation to make polluting corporations contribute towards climate change adaptation: 'This test case against RWE is already crucial for an equitable political approach to global warming and is also influencing the climate negotiations at the UNFCCC'. An increased risk of litigation may also put pressure on policy-makers to address the causes and impacts of climate change. Saúl's case arose in a broader context of climate litigation: many governments have also become the target of lawsuits. The campaign group Urgenda successfully sued the Dutch government to increase its ambitions for reducing greenhouse gas emissions (Leijten, 2019). Roda has acted as a leading lawyer in similar claims against Germany and the European Union. Legal researchers have associated the recent increase in climate litigation with a perceived political failure to address global warming (Setzer and Vanhala, 2019).

What does Saúl hope to achieve with the claim? Witnessing potentially devastating environmental transformations in his Andean home, he hopes to make a small contribution

towards slowing global warming and glacial retreat. He understands this is a long and difficult effort and that paradoxically, the claim provides little concrete support to help him and his community make a better life in times of unpredictable environmental change. He feels a responsibility to take whatever action he can, despite facing difficult repercussions at home. 'I don't care what the other people in the village say,' he told me one night in his house in June 2017 as we reflected on the lawsuit. His eyes welled up with tears – 'I'm doing it for the mountains.'

The lawsuit formally concerned one person's engagement with climate change-related flood risk, yet it could potentially produce ramifications far beyond the courtroom. Judicial claim-making limits the purview of political activism, framing broader concerns in terms of a legal relationship between two or more clearly defined parties. The legal framework defines what kinds of claims can be made, who can participate, and what types of evidence count. Nevertheless, climate litigation enacts morally charged social relations that are relevant to social discussions and political deliberations about global warming outside the courtroom. In the following, I present several broader conclusions from my study of legal climate change activism.

Reframing climate politics as a neighbourhood dispute

In this thesis, I have taken analytical inspiration from the lawsuit's focus on neighbourly relations. Transposing this approach to anthropological examination, it allows for an ethnographically grounded understanding of climate change. It draws attention to the way that concerns about climate change are often manifested in social claims about specific relations between polluters, those who face the impacts of global warming, and other potential stakeholders such as NGOs, governments, and nonhuman beings. This approach can elucidate how ordinary people come to understand climate change – and show how many people see their own role in discussions over climate politics that concern ethically charged relations between humans, environments, and other potential actors around the world. A focus on neighbourly relations highlights the power relations at stake in these discussions and allows us to capture analytically how people attempt to undermine and reshape those relations.

While the legal framework places tight constraints on possible arguments and relevant knowledges, and the lawsuit only addresses one specific climate change impact in relation to one emitter, litigation serves as a strategic tool to challenge climate politics as usual. By framing climate change in terms of neighbourly relations, the lawsuit opens up the possibility for new political conceptions of responsibility in relation to climate change. The claim between Saúl and RWE reproduced an individualistic legal framing that characterised responsibility in terms of a relationship between two neighbours; yet for all those involved, the case concerned much more. In the November 2017 court hearing, one of RWE's lawyers dramatized the potential implications of expanding the judicial concept of liability to allow adjudication of climate change cases: if the claim set a precedent, 'there would be a wave of lawsuits by everyone against everyone!'

Rogers argues that legal structures were developed by ruling classes to defend their interests, yet disempowered groups can mobilise these structures to offer a radical critique of society. People can employ legal tools to challenge dominant social meanings and political structures (Rogers, 2013). As an activist strategy, litigation harnesses the apparatus of the state to achieve political change, often combining old laws with new insights. Activists use the tools of the establishment to challenge the establishment (Peel and Osofsky, 2015, p. 31). Accordingly, strategic litigation has a significant deconstructive potential that can open up new political possibilities (Rogers, 2013).

While the case frames climate change as a global process with local impacts, it also expands that conception by drawing a neighbourly relation between an emitter and impacted person. Establishing this connection within a scientific and legal framework produces a power relation between Saúl and RWE that is unequal, yet the existence of the relationship brings a new dynamic into social and political discussions about climate change. Climate change is disruptive to law in that it challenges our understanding of fundamental legal concepts such as liability (Fisher et al., 2017). Climate litigation, in turn, has the potential to disrupt climate politics as usual by reframing discussions about responsibility. A focus on neighbourly relations draws attention to the way that litigation challenges dominant power structures.

As a multi-scalar process in terms of causes and impacts, climate change is a significant regulatory challenge for policy-makers (Osofsky, 2007a, p. 234). As I discussed in Chapter 1, conventional climate politics involves a hierarchical approach to scale. From this perspective, climate change is a global process with wide-ranging local impacts. The political impetus for

addressing climate change is on the global community of nation-states, with policies being implemented at lower levels of government. Political projects often build on particular scalar configurations that shape the policy approaches we can consider (Mackinnon, 2011).

In climate politics, scalar configurations derive substantially from scientific conceptions of climate change. Drawing on an ethnographic study of climate modelling, Tsing argues that climate models produce the notion of 'globality'. They aggregate weather and environmental data from around the world to produce global and regional models of current developments and future scenarios for climate change. These models convey a unified image of the globe, constructing the necessity to save the global sphere through unified political action at an international level (Tsing, 2005, p. 103). Following this scientific approach, the global policy regime on climate change constructs the planet and atmosphere as regulatory objects (Whittington, 2016, p. 9). For over two decades, the central international forum for climate change policy-making has been the UNFCCC with its regular international conferences. At those summits, representatives of the world's governments seek consensus on how to stop global warming and deal with impacts that are already occurring. Numerous non-state actors are involved in the process as nonvoting observers: NGOs such as Germanwatch participate in UN summits, attempting to lobby governments for more ambitious action. Some indigenous people's organisations also attend these meetings, as do energy industry representatives. Nevertheless, nation-state representatives dominate the relations of power, and unsurprisingly, large actors such as the United States, European Union, and China have often wielded substantial influence. In this political framework, government officials negotiate how responsibility should be distributed and who should pay how much to alleviate the impacts of climate change. Representatives of poorer countries have frequently demanded that large historic emitters foot a larger bill. Unsurprisingly, the latter countries have been reluctant.

While discussions at the UN have often concerned the role of nation-states, legal claims such as Saúl's revolve around the moral responsibility of private corporations. In the contemporary capitalist political economy, business stands conceptually apart from the sphere of public politics: policymakers establish a legal framework within which corporations can act of their own accord in the pursuit of monetary profit. Corporations are not politically accountable to any population; instead, they answer to their shareholders. Under neoliberal global capitalism, corporations have become increasingly powerful actors while

accompanying discourses promoting individual self-advancement have shifted responsibility for social well-being from states to individuals (D. Harvey, 2005).

Eriksen argues that people impacted by climate change may face a scalar disconnect when they seek to assign responsibility. Following dominant discourses, they may assign responsibility for climate change to the generic global scale. This absolves any individuals, institutions, or organisations from responsibility (Eriksen, 2016, p. 141). Nevertheless, recent developments in climate litigation are leading to a shifting conceptualisation of climate change in academia and beyond. While climate change was previously characterised as a diffuse problem with numerous unidentifiable sources, recent scientific advances allow us to identify specific actions and choices by identifiable actors that cause measurable damage. This turns climate change from a broad political question into an issue of individual concern and liability (Ganguly et al., 2018, p. 856). The lawsuit, building on climate change attribution science, invokes a neighbourly relation between Saúl as a person impacted by climate change and RWE as a partial contributor. Drawing this new connection, and legitimising it in the legal sphere, has profound implications for global climate politics: it recasts the relationships at stake. Climate change is no longer merely a confrontation between locals impacted and a global process, to be resolved at an international level among nation-states. Climate politics is recast to include translocal neighbourly disputes between corporate contributors to climate change and impacted people around the world. This opens up a new power dynamic at the heart of climate politics – between affected people and large emitting corporations.

Climate litigation allows a wide range of actors to interact with legal and political processes on climate change (Peel and Osofsky, 2015). Through the lawsuit, Saúl became a significant actor on the stage of international climate politics. While claimants in climate litigation cases are typically located in one place where they face climate change impacts, making a claim connects them to other people around the world who are also impacted by climate change. This leads to a modified political understanding of climate change where nation-states are not the only primary actors (Osofsky, 2005). Climate change can give rise to new imagined communities around climate change concerns (Jasanoff, 2010, p. 248). Through its neighbourly approach, the lawsuit promoted an understanding of climate change that links localised greenhouse gas emissions directly to localised impacts.

How else might a neighbourly approach be helpful for anthropological analysis, going beyond this specific case? Future studies might examine how climate litigation against governments engages these as different sorts of neighbours in arguing that they should take

more ambitious action to tackle climate change. Rather than establishing a neighbourly relation in the first place, as with the lawsuit between Saúl and RWE, such claims seek to alter the relational responsibilities between citizens and governments. Recent youth-led environmental protests, most prominently involving Greta Thunberg, also concern ethical responsibilities between older and younger generations. Again, a focus on neighbourly relations traces ethnographically how people come to understand the broader issue of climate change in terms specific relational engagements. A focus on social claims about ethically charged relations may also be useful for studying other trans-scalar socio-material processes.

The judicial framework limits possibilities for claim-making

Climate litigation translates broader political concerns into specific legally actionable claims. To achieve this, lawyers and activists often seek to deploy existing legal mechanisms in new or unusual ways. As in other climate litigation cases, Saúl's lawyers have deployed existing legal mechanisms that predate contemporary concerns about global warming. While such a strategy can attract significant public attention, it also requires that activists fit their claims into judicial frameworks that restrict who can take action against whom, what kinds of claims can be made, and which types of evidence are considered valid. I examine each of these points in turn.

First, regulatory frameworks determine who has legal standing – which actors can make and defend claims? Only clearly defined legal entities can act in judicial proceedings – such as people, corporations, government institutions, and other legal persons. Climate change often affects larger communities in similar ways, as in the city of Huaraz where around 50,000 people inhabit the area affected by flood risk from Lake Palcacocha. For legal and logistical purposes, a joint claim involving all 50,000 people would be immensely complex and expensive. It was much easier for Saúl to bring the lawsuit forward on his own. In addition, he could have sued numerous other polluting corporations alongside RWE. This would involve significant jurisdictional difficulties as those companies are based in many different countries. A claim between one person and one corporation was easier to pursue within the judicial framework, yet it individualises the problem of climate change. Such a strategy potentially distracts from the systemic nature of global warming. As Greta Thunberg

has eloquently argued, fundamental change is needed in modes of social and economic organisation to limit global warming and prevent significant socio-ecological disruption (Rowlatt, 2020). At stake are relationships between human communities, environments, industry, and government institutions across spatial and temporal scales. Through litigation, climate activists can draw individual links between people and emitters within this wider conglomerate of relations. While this may contribute to public awareness about the global nature of climate change, the scope of legal claims is necessarily limited to individual relations between specific actors.

A second limiting factor in climate litigation concerns what kinds of claims can be made. As discussed above, legal climate activists must fit their claims within a given judicial framework. Saúl's lawsuit emerged after over a decade of discussions among German jurists about how they might apply existing legal provisions to sue polluting corporations over their contribution to climate change impacts. The lawyer and legal scholar Wilhelm Frank first proposed in a 2010 article that German Civil Code Article 1004 might be used for this purpose (Frank, 2010). As I discuss in Chapter 1, this law was passed in 1900 as a general nuisance provision, allowing claims over property interference – as when one party causes damage or risk of damage to another party's property. Consequently, this provision only permits claims in which property ownership is clearly defined. Potential claim-makers may face similar restrictions in other jurisdictions where legal property ownership is a prerequisite for legal standing in such claims. Such judicial frameworks may exclude claimants from places where land rights are disputed or regulated according to alternative standards. Historically, legal structures emerged as a tool for ruling classes to defend their interests (Rogers, 2013). While in formal terms, the legal sphere brings together plaintiffs and defendants on equal footing, anthropologists have argued that legal systems enshrine and reinforce asymmetrical power relations (Starr and Collier, 1989). In the present day, many judicial systems may disadvantage or exclude subaltern parties.¹²⁵ Legal costs are a significant factor in this: the claim between Saúl and RWE would not have been possible without large donations from private donors. In addition, Saúl would not have been able to travel to Germany and submit the claim without support from people at Germanwatch who booked his flights, helped him

¹²⁵ Sawyer (2006); (2015) provides an interesting case study in her research on a claim by an Amazonian community in Ecuador against Chevron over oil contamination: the plaintiffs obtained a ruling in their favour in an Ecuadorian court, but a US court later refused to recognise the ruling and hindered its enforcement.

obtain a visa, and housed him during his stay. Upon entering into the legal sphere, climate change activists must account for the restrictive nature of law.

On a related note, judicial systems also limit what type of justice claimants can achieve. As I have discussed throughout this thesis, a legal victory for Saúl would provide him and his community with little concrete benefit as any money he receives would go to regional authorities as a minor contribution to a glacial lake hazard project. Legal success would be symbolic in the short term, while potentially contributing to political and socio-economic change in the long term. Although the judge may have asked rhetorically whether it was just that people like Saúl suffered the worst impacts of climate change while companies like RWE had polluted the planet with impunity, the judicial framework only offers limited answers pertaining to specific neighbourly relationships between individual actors.

Finally, legal frameworks determine which types of evidence are considered valid. In Chapter 3, I traced how evidence was produced and deployed in the trial between Saúl and RWE. As in numerous other jurisdictions (Jasanoff, 2006, p. 330), evidentiary standards in the German judicial system grant significant value to scientific knowledge and formal expertise. Faced with contradictory evidentiary claims as to whether RWE has contributed to a risk of flooding affecting Saúl's property in Peru, judges at the court in Hamm appointed independent scientific experts to provide their opinion and guide judicial decision-making. What might be the wider consequences of the centrality of science in climate litigation?

Scientific research and fact-production can be expensive. A significant hurdle for campaigners interested in climate litigation is the cost to produce and compile scientific evidence. Large emitters such as RWE likely have significantly more resources at their disposal to produce counterevidence, placing people affected by climate change, litigating activists, and environmental organisations at a disadvantage. In addition, the availability of scientific research potentially limits the feasibility of new claims. For Saúl's lawyers, a case involving the Peruvian Cordillera Blanca mountain range was advantageous as numerous studies about climate change impacts had already been conducted in the area, providing a solid evidentiary base. On a global scale, Huggel et al. (2016) point to a distributive injustice in climate change research as impacts in the Global North have been studied significantly more than impacts in the Global South. This uneven availability of scientific research may create additional disadvantages for potential claimants from the latter disadvantaged areas.

Furthermore, framing a socially contentious issue such as climate change in terms of a scientific dispute during legal proceedings may distract from the underlying normative concerns at stake. As I discussed in Chapter 3, judges defer to scientific expertise under the assumption that this can provide neutral and uninterested answers to resolve legal disagreements. This may obscure the fact that science is itself a highly normative endeavour, as STS scholars have painstakingly described (Jasanoff, 2004a; Latour, 1987; Wynne, 1998). In the present age, some researchers studying the processes and impacts of climate change may even be motivated by social and political concerns (Kotcher et al., 2017), seeking to produce knowledge that will contribute to political – and even legal – strategies for tackling global warming. When scientific disputes arise at the heart of climate litigation, this does not merely involve technical disagreement, but rather relates to normative concerns about how people should engage with each other and who should take responsibility for ongoing ecological transformations.

A final reflection on the centrality of science in climate litigation relates to public understandings of evidence beyond the courtroom. Litigation can provide public legitimacy to concerns about climate change (Fisher, 2013, p. 242). Attribution science, which models links between localised events or processes to anthropogenic climate change, plays a key role in the trial between Saúl and RWE, along with research that quantifies individual companies' contribution to climate change. In these comparatively new fields of study, researchers are attempting to demonstrate at increasingly small scales that observable events such as the retreat of individual glaciers are related to global warming. If judges recognise such research as valid in legal proceedings against polluting corporations, they may inadvertently provide public legitimacy to the field of attribution science. This, in turn, could shape political discussions: if publicly recognised evidence points to the responsibility of industry for specific climate change impacts, politicians may face increasing calls to hold corporations financially accountable. As such, legal process has the potential to shape public and political standards of evidence.

Expanding perspectives beyond the courtroom

What happens to the standpoints that the judicial framework excludes? When social justice activists take legal action, they subject themselves to a restrictive epistemological and ontological politics. In epistemological terms, I have demonstrated throughout my thesis

how legal procedure systematically leaves out non-scientific perspectives. Lacking scientific or legal qualifications, Saúl made little formal contribution to the written arguments brought forward with his claim. He could offer little more than anecdotal evidence that held limited sway in legal proceedings. In ontological terms, the legal framework did not recognise the Andean mountains as potential actors – yet for Saúl, his relationship with the mountains, that he engages as living beings under threat from climate change, was the principal factor motivating his participation in the claim. As I discussed in Chapter 2, some legal systems in other countries have begun to expand their ontological horizons, granting legal rights to rivers and mountains. Here, I reflect on how alternative standpoints may achieve increased public and political recognition as a result of climate litigation, even when legal frameworks fail to acknowledge them.

As I have argued in this thesis – and others have demonstrated elsewhere¹²⁶ – legal proceedings can inadvertently grant public legitimacy to subaltern ontological understandings. Social justice-oriented legal claim-making involves more than judicial process – campaigning efforts and public discussions around lawsuits are crucial to activists’ efforts. Many of the most significant impacts from Saúl’s claim arose far beyond the courtroom, including portraits in TIME Magazine (Nugent, 2018), the New York Times (Jarvis, 2019), and Vice News (VICE, 2017). While judicial procedure offered few opportunities for Saúl to contribute his perspective, media reports foregrounded his experience of climate change in the Andes. His perspective was legally anecdotal, but existentially significant. The TIME Magazine article begins with a dramatic snapshot:

Climbing a snowcapped mountain in the predawn light, Saúl Luciano Lliuya says he could sense something changing. All his life, pristine glaciers have nestled between the peaks surrounding his hometown in the Cordillera Blanca region of the Peruvian Andes, providing water, work and beauty. ‘Now you can see it,’ he says. ‘They’re disappearing.’ (Nugent, 2018)

This points to a multi-layered epistemological politics at the heart of climate litigation: while the judicial standards of evidence were strict and exclusionary, situated experiential perspectives appeared alongside scientific facts in media articles. Saúl’s claim generated wider public sympathy by placing a human story at the centre of climate change discussions. In this sense, Saúl did make a significant epistemological contribution to the claim.

¹²⁶ See, for example, Hetherington (2013) for a case study from Paraguay.

What becomes of Saúl's assertion that he should not be at the claim's centre, but the mountains themselves? The mountains had no legal standing in the courtroom – within the ontological framework of the German judicial system, they did not exist as actors. Saúl brought Andean earth beings into public discussions on some occasions, yet it remains to be seen whether this will have a wider impact. As I argued in Chapter 2, this could potentially expand the scope of climate politics by bringing new actors into play.

Toward an engaged anthropology of climate change

Climate litigation clearly has implications beyond the courtroom. After exploring this in relation to power and politics at a global scale, I now turn my attention to our own academic discipline: what conclusions can be drawn from this study for the practice of anthropology? As Eriksen (2006) describes in his book on public engagement in the discipline, many anthropologists have been reluctant to disseminate their insights beyond academia since the Second World War. To this day, the discipline sees little representation in public discussions around the world. As such, anthropology rarely achieves the relevance it deserves, despite its potential to help people understand the world – and to change it (Eriksen, 2006, p. 129). Anthropologists have made little contribution to political discussions about climate change and anthropological knowledge tends to be side-lined at international institutions such as the IPCC and UNFCCC. In their recent review of climate change anthropology, O'Reilly et al. (2020, p. 23) argue that this is a lost opportunity as anthropological approaches can help us rethink political solutions for climate change and reimagine human-atmosphere relations. Eriksen (2020) contends that climate change makes it all the more urgent for anthropologists to raise their voices in public discussions – we may not have all the answers, but we do ask some of the right questions. In addition, suggests Eriksen, anthropologists are able to tell compelling stories that can help people envision different futures and – we might hope – convince them to stand up for change.

I agree whole-heartedly with these sentiments. Anthropology has the potential to trace how people around the world are engaging with changing environments, unpick the epistemological and normative stakes of scientific climate change knowledge in its production and dissemination, and to question dominant political and economic frameworks. If we as academics are able to communicate these insights with broader public

audiences, we might help people recognise how different solutions are possible. In this thesis, I have shown how the legal claim between Saúl and RWE configures climate change in terms of neighbourly relations – involving people like Saúl, corporations such as RWE, and nonhuman ecosystem beings. At the end of this analysis, a final question lingers beneath the surface: what about us anthropologists? What kinds of neighbours should we be? What responsibility do we have, and towards whom?

One of our primary responsibilities, naturally, is towards our interlocutors. Offering us the relational engagements in which our discipline is rooted, we have a moral duty – formalised, though often inadequately, in institutional ethics guidance – to prevent them from encountering harm as a result of our work. And if we conduct research about climate change, we might even be drawn to interlocutors who face the worst impacts of global warming. We are also responsible towards our students – to them, we do not only impart our knowledge, but urge them to ask critical questions as they engage with the world. In all its disciplinary breadth, one of anthropology's foundational attributes is its capacity to question what people take for granted. As such, we can lend our students the anthropological sensibility to interrogate the failure of our political and economic systems to forestall a looming climate disaster.

Bearing in mind these underlying responsibilities, another fundamental question arises: why do we produce anthropological knowledge? Eriksen (2006, p. 16) draws a useful distinction between analytical work and advocacy. Accordingly, anthropology's core disciplinary commitment is to analyse why and how things are the way they are. It does not answer the normative question of how things should be. As such, analytic work in anthropology is of a different nature than advocacy in which anthropologists take a political stand. At times, the two may be difficult to reconcile: while advocacy usually requires a clear commitment to a particular set of ideas, anthropological analysis often does its best to unpick and defamiliarize everything it encounters. Nevertheless, anthropological analysis can certainly inform normative understandings – both our own and those of the people with whom we share our insights.

In this study, I have used an anthropological approach to unpack many of the underlying assumptions and social dynamics emerging in a transnational climate litigation claim. I have examined how the claim functions and reflected on its significance beyond the courtroom. Throughout my doctoral studies, the anthropological lens always impelled me to ask ever more questions. It did not provide normative answers to those questions. Nevertheless, I am

aware that legal practitioners involved in the case might read these very words. Analysis potentially undermines advocacy if it points to the potential contradictions inherent to normative commitments. Or, I might hope, an open engagement with the underlying difficulties in one's normative stance could subsequently strengthen social and political arguments. The world, as anthropology teaches us, is full of contradictions.

As such, anthropologists studying climate change – one of the decisive issues facing our planet today – should be aware of the implications their knowledge might have beyond the academic sphere. This sensibility might even inform our research – between planning, fieldwork, analysis, and dissemination – and our engagement with students. Even if anthropological analysis itself does not answer normative questions about climate change, our personal normative commitments and professional responsibilities should guide our work as anthropologists. And in the context of climate change, these commitments and responsibilities may leave us with no choice but to take a stand – to engage more proactively, for example, with non-academic audiences.

My engagement in climate litigation began as a professional activist working for an NGO. This engagement changed shape when I became a professional anthropologist conducting ethnographic research. At the end of this doctoral journey, I remain committed to anthropological analysis and climate justice advocacy. From both a scholarly and activist perspective, climate change is too urgent for me to resort to the illusion of academic neutrality. In academia, particularly in the Global North, we write from a position of privilege. Many of us will be insulated from the worst impacts of climate change that linger in the near future – from glacial retreat and water scarcity, or from rising sea levels that swallow entire countries. I can choose whether or not to think about climate change. Saúl, as he has told me in many conversations, does not have a choice. In the long run, climate change threatens his community's way of life – if glaciers disappear and rivers run dry, his fields will be barren. He feels the environment suffering and wonders what will become of its sentient inhabitants.

Saúl chose to take a stand, collaborating in a claim that has drawn attention around the world. In studying this claim, I seek to make an intervention in scholarly discussions about climate change. However, taking inspiration from Saúl, I also hope to make a contribution towards addressing the climate emergency. As anthropologists, we have a responsibility towards our interlocutors and our students who will inherit this planet. To this, I would add a further dimension: if anthropology entails attending to social life in all its complexity, I contend that we also have a disciplinary responsibility towards social life itself. Climate

change threatens life as we know it, in the most literal sense. Let us be good neighbours on this warming planet.

Climate justice litigation in context

Climate litigation raises fundamental questions about how people should engage with each other and their environments and who should take responsibility for increasingly catastrophic disruptions. Courts have become sites of dispute about these issues, offering strategic platforms that potentially give a voice to subaltern actors and allow them to participate in public discussions. Courts can rule on individual cases. Nevertheless, addressing these questions in the long term requires social negotiation and political decision-making over which values should be at the forefront in addressing climate change.

Going forward, how might social research contribute to these discussions? In their review of academic literature on climate litigation, Setzer and Vanhala (2019) state that anthropology offers a productive approach for understanding the broader social significance of climate litigation. The unique contribution of this thesis is an ethnographic study of how climate change is brought to court, placing litigation within the context of social and political discussions about climate change at local, national, and global scales. I have shown how knowledge frameworks and ontological standpoints shape how people understand and engage with climate change. Litigation frames disputes in terms of legal and scientific technicalities, yet judicial claims are shaped by power dynamics that often leave litigators struggling to cover court costs while polluting companies possess significantly more resources to counter legal claims.

While anthropological research cannot provide definitive answers to the normative questions underlying global concerns about climate change, it can uncover the values, standpoints, and relationships at stake. Climate change entangles people, nonhuman persons – from corporations to earth beings – and material environments in morally charged relations. Anthropological analysis can show how people approach these relations from different perspectives and we as anthropologists can push for open political discussions that account for multiple standpoints. In dialogue with social activists, academic researchers, policymakers, and other interested parties, I hope that this will allow for more informed exchange and decision-making.

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