ADVANCED REVIEW

Beyond rules: How institutional cultures and climate governance interact

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Abstract

Institutions have a central role in climate change governance. But while there is a flourishing literature on institutions' formal rules, processes, and organizational forms, scholars lament a relative lack of attention to institutions' informal side; their cultures. It is important to study institutions' cultures because it is through culture that people relate to institutional norms and rules in taking climate action. This review uncovers what work has been done on institutional cultures and climate change, discerns common themes around which this scholarship coheres, and advances and argument for why institutional cultures matter. We employed a systematic literature review to assemble a set of 54 articles with a shared concern for how climate change and institutional cultures concurrently affect each other. The articles provided evidence of a nascent field, emerging over the past 5–10 years and fragmented across literatures. This field draws on diverse concepts of institutionalism for revealing quite different expressions of culture, and is mostly grounded in empirical studies. These disparate studies compellingly demonstrate, from different perspectives, that institutional cultures do indeed matter for implementing climate governance. Indeed, the articles converge in providing empirical evidence of eight key sites of interaction between climate change and institutional cultures: worldviews, values, logics, gender, risk acceptance, objects, power, and relationality. These eight sites are important foci for examining and effecting changes to institutions and their cultures; showing how institutional cultures shape responses to climate change, and how climate change shapes institutional cultures.

This article is categorized under:
    The Social Status of Climate Change Knowledge > Knowledge and Practice

KEYWORDS
climate change, culture, governance, institutional change, institutionalism

1 | INTRODUCTION

Institutions have long been considered central for governing societies' responses to climate change (Adger et al., 2005; Moser & Boykoff, 2013), and are most often discussed as the "rules of the game" prescribing interaction and action in different social spheres; from local government to newspapers and churches (North, 1990; Ostrom, 2005). There is a flourishing literature on the *formal* rules, processes, and organizational forms facilitating climate governance in institutions, though much less attention to these same institutions' *informal* side, what we discuss as their "cultures." Yet various commentators (Bisaro et al., 2018; Garschagen, 2013; Geoghegan & Leyshon, 2012; O'Riordan & Jordan, 1999) argue for a more concerted focus on culture in institutional analysis. Cultures are important because they drive the interpretation of what climate change means for an institution and how people conceive of formally responding; *it is through culture that* "people relate to institutional norms and rules." Cultures—including worldviews, values, practices, or technologies for example—mediate how groups relate to rules and provide resources for complying with rules; "affect[ing] the way local participants understand, implement, modify, or ignore rules" (Ostrom, 2005, p. 27). At the same time, cultures are important foci for seeing how climatic change is re-shaping societies' institutions.

This *exploratory* review assembles research on institutional cultures and climate change, with the aim of discerning connections and common themes that characterize this as an emerging, coherent body of scholarship. We employed a systematic literature review (SLR) to collect a set of articles with a shared concern for *how culture dynamically affects, and is affected by, responses to climate change in institutions*. This shared concern steered our search and defined the institutional culture literature for us. Our particular search reveals a small but growing array of studies scattered across different literatures, and reporting on mainly local-scale empirical research, in various institutions all over the world. This body of work deploys diverse concepts and methods in different configurations, but largely circles around a common constellation of cultural themes. Importantly, our aspirations stop at identifying the themes around which this thin and dispersed literature can cohere, rather than to compare various studies or build an explanatory model of how exactly cultures mediate between institutions and climate change.

After presenting our method and key terms (Section 2) we interrogate our corpus according to some basic features about where and when studies were carried out (Section 3), the concepts availing authors to study institutional change and cultures in a changing climate (Section 4), and the cultural dimensions authors identify as important for mediating between climate change and institutions (Section 5). Section 6 argues for why institutional cultures matter.

2 | THE SYSTEMATIC LITERATURE REVIEW

This literature review explores how "culture" mediates the "interaction" between "institutions" and "climate change," but what do these terms mean in this study? Initiating this work, we discussed what phenomena we were interested in, which terms captured these phenomena, and what these terms meant for us. We started from institutions as social structures or patterns (distinct from but inclusive of organizations and communities) because the climate literature has engaged most at the institutional level (Dovers & Hezri, 2010; Gupta et al., 2010). We worked from a broad new-institutionalist definition of institutions as *specific sets of norms and rules that shape behavior and structure social interaction*, and generally focused on the informal elements that mediate *how people relate to (perceive, experience, live, enact) institutional rules and norms*, which we termed "culture." Importantly, we saw people as playing an integral part in institutions and their cultures, using the term "people" as short-hand for individuals, but also groups and organizations operating in institutional fields. We chose the term culture because it is inclusive (encompassing symbols and practices for instance; Sewell, 2005) and is used across schools of institutionalism; for example, new institutional economics (North, 1990; Ostrom, 2005), sociological schools (Scott, 1995), historical schools (Hall & Taylor, 1996), and in anthropology (Douglas, 1986). We were specifically interested in how an institution's culture mediates the way climate change influences that institution, and at the same time, how an institution can influence understanding of or responses to climate change. This mutual influence we described as dynamic "interaction" (climate acts on institutions/institutions act on climate), interplay or co-production, where dynamism relates to temporalities. And this demanded an inclusive meaning of "climate change" as more than physical; encompassing social, political, cultural, and phenomenological aspects for instance.

In this way, we framed the themes of interest and identified three inclusive search terms—"institution," "culture," and "climate change"—which we appraised to encompass the breadth of relevant work. After these first discussions, we dispensed with pre-determined definitions. In the review we wanted to see how authors themselves used these

terms, and the studies conducted within the bounds of these terms (Section 4). To validate these search terms, we cross-checked them against known subsets of articles, like the corpus of articles about institutions distilled by Bisaro et al. (2018) from the IPCC 5th Assessment Report. This confirmed that our search terms did capture articles meaningful for our review, and did not miss relevant articles.

We designed a *SLR* of scientific publications using our search terms. There were two reasons for this. First, we saw relevant publications were thinly scattered across diverse and disconnected literatures. We wanted to execute a systematic search that traverses these literatures, uncovers commonalities across publications, and discerns if this constitutes an emerging scholarship. To achieve this aim, a SLR is an ideal approach, where "findings from many disparate studies [can be] synthesised in a (semi-)formal manner, [...] through a meta-analysis of a defined corpus of work" (Hulme, 2018). Second, a SLR provided methodological transparency and rigor in our search, building on previous systematic review work, including in the field of climate change adaptation (Berrang-Ford et al., 2015).

We drew on a mixed methods approach, combining quantitative and qualitative approaches, following SLR protocols (see Figure 1). We started by conducting searches of key terms using the Scopus and Web of Science databases with the following rules: TITLE-ABS-KEY ("climat* change" AND "institution*" AND "cultur*") AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (SRCTYPE, "j")). The resulting 634 publications were subsequently
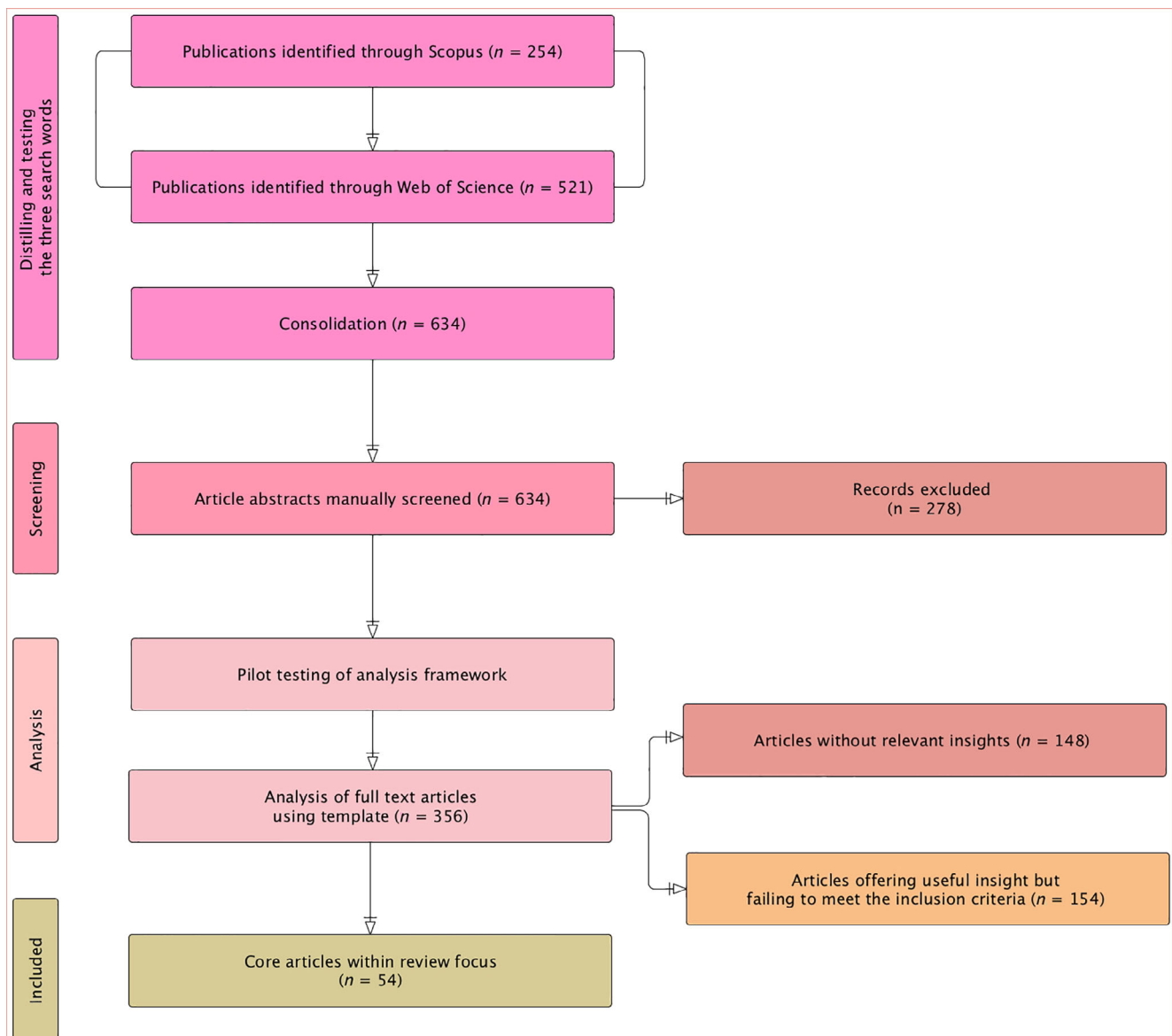

FIGURE 1   Flow chart of the systematic literature review process

thinned down through rounds of manual reading and analysis to arrive at a core corpus of 54 articles that explicitly engaged with the search terms and are analyzed in this paper. (Appendix A details the SLR method used.)

3 | OVERVIEW OF THE CORPUS: A BUDDING LITERATURE

Our core corpus assembles a diverse set of 54 publications that share an explicit focus on climate change and institutional cultures. One key finding was that this is not a mature and consolidated, internally coherent scholarship. This confirms a previous research finding that, up until around 2010, institutions escaped careful study relative to climate change responses (Dovers & Hezri, 2010; Gupta et al., 2010), and that since 2010 most work has "black boxed" culture and focused on formal mechanisms (e.g., Bisaro et al., 2018). In contrast to the well-established concepts and frameworks guiding work on formal institutional facets (e.g., Moser and Ekstrom's (2010) "barriers framework"), the institutional culture literature is highly disconnected; thinly scattered across fields, variously assembling concepts and methods, and with little cross-citation of each other's work. This re-emphasized the importance of our SLR method for uncovering these articles. But this noted, our review also revealed growing interest—a budding new literature—on institutions, cultures, and climate change. In the corpus, 49 (91%) articles were published since 2010 and 27 (50%) since 2015, in parallel with, and sometimes linking to, the copious work on institutions' formal framings (see Figure 2). And while authors begin from different conceptual starting points (Section 4), we see them finish with insights on common themes (Section 5), and they share some essential features, indicating an emerging (if disintegrated) thought collective.

Articles in our corpus mainly present empirical studies associated with climate change adaptation, with 48 articles (89%) presenting either solely empirical work or mixed empirical and conceptual work, and 41 articles (76%) having an adaptation, or joint adaptation and mitigation focus (13 articles focused on mitigation or had a general governance focus). This empirical work has quite a balanced coverage of studies in "global north" (24 articles) and "global south" countries (17 articles), and some multinational studies, sometimes spanning regions (8 articles), with 5 articles having an undefined geographic focus. Looking at countries where studies were carried out, most articles report on studies in
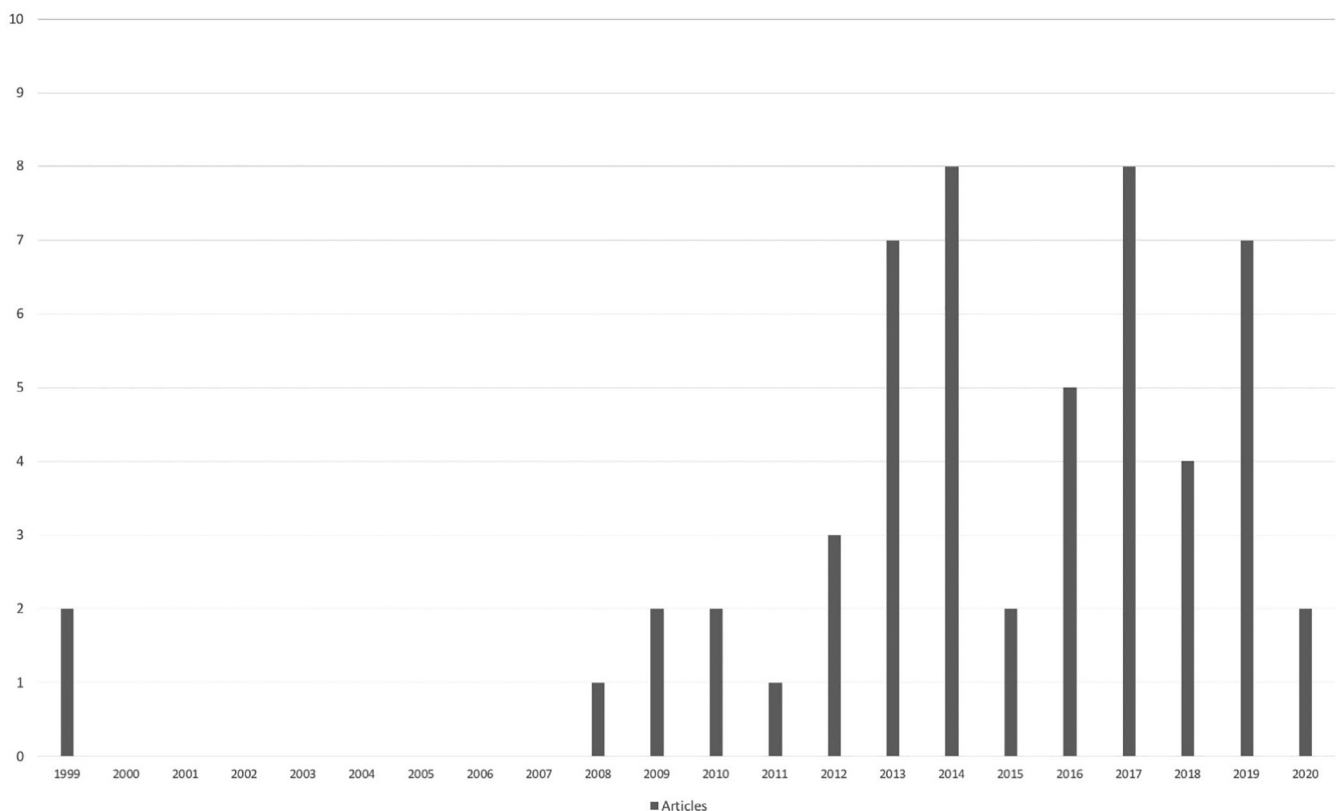

FIGURE 2 The number of articles from our core corpus (54) published each year. It indicates an emerging field, with 91% of papers published since 2010 and 50% since 2015. Our search stopped in February 2020, and papers published on this topic after 2020 are not shown

the UK (nine articles), United States (eight articles), Australia (four articles), and Ghana (three articles). Other empirical studies are conducted in Bangladesh, Canada, Colombia, Ethiopia, India, Korea, Mexico Nepal, the Netherlands, Russia, Sweden, Tanzania, Uganda, and Vietnam.

The articles engage with institutions at all scales, with most studies at the local scale (18 articles/33%) followed by a subnational regional scale (15 articles/27%), national scale (10 articles/18%), or global scale (6 articles/11%). Five articles (9%) had a cross-scale focus.

Authors address themselves to diverse matters of concern held by different social groups in different institutions. The most common concern surrounds water issues (10 articles/19%), including water management, flood risk, and infrastructure. Indigenous institutions—including indigenous beliefs, knowledge systems, and stewardship—are also an important concern, raised in seven articles (13%), and agricultural concerns are addressed in six articles (11%). Art and museums are the focus of three articles, whereas concerns around electricity, fishing, governance, policy, risk, and higher education surface in at least two articles each. There are many other topics besides. These foci see articles most often engaging with three social groups—farmers, indigenous actors, and policy actors—with all three groups featuring in at least eight articles each.

4 | CORE CONCEPTS: CLIMATE CHANGE, INSTITUTIONS, INSTITUTIONAL CULTURES, AND INSTITUTIONAL CHANGE

This heterogeneous corpus encompasses a breadth of conceptual set-ups that explains the articles' quite disparate entry points to culture. Laying out the conceptual framing is important for understanding how this field is taking shape, and in what directions it is moving.

4.1 | What is climate change?

In our corpus climate change provides the context for studying institutional culture and change, so it was interesting to see authors represent climate change in multiple ways. Most (33) articles in the corpus (implicitly or explicitly) engage with climate change as a physical reality affirmed by science and recognized by a global "policy culture," channeling this science into institutions; "plac[ing] complex climate models at the centre of new deliberations about energy policy and natural resource use, and eventually local planning" (Mahony & Hulme, 2016). But that is not to say all authors endorse this "climate-science-policy" framing, with many articles subjecting it to critical analysis. Alexandra (2017), for example, describes expert-defined climate change as a "quintessentially modern problem," detached from and in tension with other spheres of social life (Croxatto et al., 2020; Raymond et al., 2014).

Some authors frame climate change as a phenomenon directly experienced by people in their encounters with their environments as "social–ecological systems." This experience is woven into peoples' everyday lives and presents a challenge to livelihoods in vulnerable communities dependent on climate-sensitive natural resources (Deb & Haque, 2017; Lejano et al., 2013; Mersha & Van Laerhoven, 2016).

Other authors discuss climate change as a "partly cultural phenomenon" (Oksanen, 2014), particularly how it is upsetting stable institutional representations of social and natural order (Robin et al., 2014); "refer[ing] to the narratives, beliefs, and social constructions that determine cultural interpretations about how nature and ecosystems function" (McNeeley & Lazrus, 2014, p. 507). For the Pare people in Tanzania, for example, climate change is part of disruptive changes to the ecological, social, and political order that unfolded with the collapse of "traditional" institutions and the ambiguities of "modern" ones (Sheridan, 2012).

Still other authors reveal the contending social and political aspects of climate change, constructing a complex, multifaceted phenomenon, "... at once a reality, an agenda, a problem, a context, a narrative and a discourse [...] that allows for different ways of knowing to play a legitimate part in framing our personal, social and institutional responses" (Geoghegan & Leyshon, 2012, p. 57). As a legislative and policy agenda, it is not merely a "climate science-policy" issue; it is layered with ideas, rhetoric, and discourses (Aylett, 2013; Brinkman, 2017; Elliott, 2019; Faulconbridge, 2013). Mathews (2009), for example, saw climate science enters local politics through intersecting "traveling discourses," popular beliefs, and observed changes, as alliances mobilized for forestry management in a changing climate in Mexico.

4.2 | What are institutions?

Most publications in our corpus (32 articles) explicitly engage with at least one established institutionalist approach—Figure 3 shows how often different institutional approaches were referred to in the corpus—but many (22) use the term loosely, often seemingly to mean "organization." This echoes critiques since 2010 (Dovers & Hezri, 2010), that there remains quite careless use of institutions as a concept in climate research. Table 1 lists which of these institutional approaches and related authors were referred to most and how they were represented in the corpus. These framings affect how the relationship between institutions and cultures and institutional change in a changing climate is envisioned.

4.3 | What are institutional cultures?

As can be seen in Table 1, a core issue within the corpus is the ambiguous relationship between the formal and informal framings of institutions—with "culture" usually ascribed to the latter. In line with scholarship of New Institutional Economics or Rational Choice Institutionalism (e.g., North, 1990, p. 37; Ostrom, 2005, p. 27), formal institutions are discussed as explicit, codified, and legally sanctionable rules, while informal institutions are more implicit, transferred by teaching and imitation, and related to shared values and norms.

However, some authors in the corpus acknowledge that the "categorical distinction between formal and informal rules" (Raymond et al., 2014, p. 198) is difficult to draw, and others strongly criticize a distinction between formality and informality. They emphasize dynamic understandings of institutions and regard the boundaries between the formal and informal aspects of institutions as more fluid. On a theoretical level, they are more oriented towards the concept of bricolage (Faulconbridge, 2013; Frick-Trzebitzky, 2017) and the work of Mary Douglas (1986); looking at the fundamental natural and social categories legitimating institutions and infused in cultures and rules (Brinkman, 2017; Feola, 2017; Frick-Trzebitzky, 2017; Lejano et al., 2013; Toke & Baker, 2016; Willis, 2018). Other scholars stress the dynamic co-constitutive character of formal and informal institutions; how they both make and remake each other, seen in material objects (e.g., landscapes) and practices (e.g., in agriculture) for example in a changing climate (e.g., Geoghegan & Leyshon, 2012, 2014; Herman-Mercer et al., 2019).

Scholars in the corpus engaging with the informality of institutional cultures discuss culture as a category of social life—that is, "contrasted to some other equally abstract aspect or category of social life that is not culture, such as economy, politics, or biology" (Sewell, 2005, p. 39)—relative to overlapping and interacting practices (e.g., Hirons et al., 2018; Pelling et al., 2008), value systems (e.g., Feola, 2017), worldviews (e.g., Aylett, 2013; Feola, 2017; Lejano et al., 2013; Sheridan, 2012), or material objects and resources (e.g., Elliott, 2019; Robin et al., 2014) for example (see Section 5). Other authors deal with the relational interaction between different cultures—concrete and bounded world of beliefs and practices that are "commonly assumed to belong to or be isomorphic with "society" or with some clearly

■ No explicit reference ■ Rational Choice / New Institutional Economics
■ Sociological Institutionalism ■ Critical Institutionalism
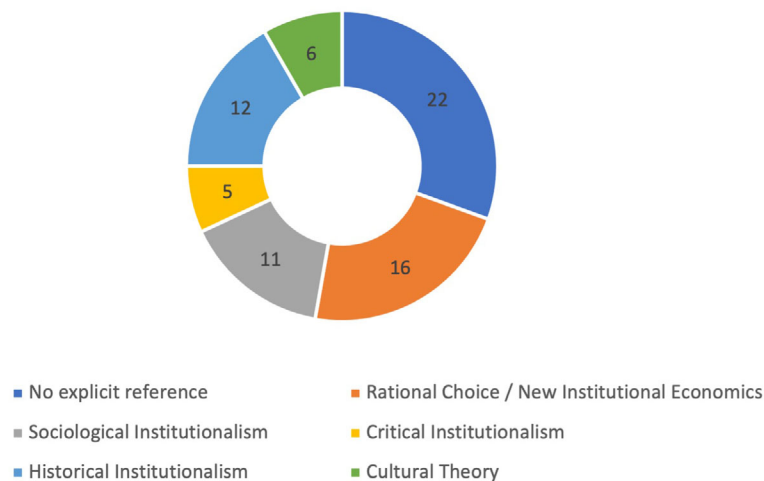■ Historical Institutionalism ■ Cultural Theory

FIGURE 3 Number of references to schools of institutionalism in the corpus ($n = 54$)

TABLE 1   Reference to schools of institutionalism in the corpus

Institutionalist school	Referenced scholarship	Examples of how theory is represented in the text corpus
New Institutional Economics/Rational Choice	Ostrom (1990, 2005) North (1990)	• "Institutions are the constraints that shape social behaviour: the rules of the game (North, 1990) that provide common ground for the negotiation and performance of power and influence in relationships between individuals and groups [...]." (Pelling et al., 2008, p. 868) • "Formal and informal refer to the nature of processes of development, codification, communication and enforcement. Formal institutions are linked to the official channels of governmental bureaucracies. They are codified in regulatory frameworks or any kind of legally binding documents. Correspondingly they can be enforced by legal procedures. Informal institutions refer to socially shared rules such as social or cultural norms. In most cases they are not codified or written down. They are enforced outside of legally sanctioned channels." (Pahl-Wostl, 2009, p. 356)
Critical Institutionalism	Cleaver (2012) Cleaver and De Koning (2015)	• "Mainstream institutionalism emerged from Ostrom's analysis of collective action in environmental management and seeks to uncover features that are predictive of success, such as stakeholder involvement and resource monitoring [...]. Critical institutionalism challenges such emphasis, claiming that efforts to "get the institution right" fail to address systemic drivers of global poverty, environmental degradation, and livelihood insecurity [...]." (Totin et al., 2018, p. 28) • "The key distinguishing features of critical institutionalism is that instead of emphasising the extent to which individuals and organisations can exert rational control of institutions with predictable outcomes, it focuses analyses on the complexity of interactions between everyday life practices and institutions at various scales, the historical formation of institutions and an explicit recognition of how power relationships and people's complex social identities shape decision-making arrangements and outcomes (...). Therefore, examining people's beliefs, worldviews and value systems, as a central component of social identity, becomes a key task." (Hirons et al., 2018, p. 122) • "'Institutional bricolage', the crafting of institutions beyond formal arrangements, is an analytical lens that was found to expose institutional adaptation in natural resource governance from a critical perspective [...]. From this perspective, institutions 'include designed arrangements of varying degrees of publicness and formality (...), institutionalized interactions as embodied in kinship and social networks, relations of reciprocity and patronage and in norms and practices deeply embedded in habits and routines of everyday life' (Cleaver, 2012)." (Frick-Trzebitzky, 2017) • "The concept of bricolage, originally proposed by Lévi-Strauss (1966), captures the way that entrepreneurs use the resources at hand and new combinations of these resources to assemble solutions to everyday problems." (Faulconbridge, 2013, p. 349)
Sociological Institutionalism	DiMaggio and Powell (1991) March and Olsen (1989) Scott (1995)	• "We define *norms* as 'standards of appropriate behavior for actors with a given identity' (Finnemore & Sikkink, 1998, 891), driven by a 'logic of appropriateness' aimed at conforming to social expectations or perceived practices, rather than a 'logic of consequences' aimed at maximizing one's perceived self-interest (March & Olsen, 1989). We use the term *institutions* to indicate larger and more complex constellations of social practices and rules of behavior [...]. *Formal institutions* are constellations of explicit, official rules created and enforced by governments and other organizations such as corporations, foundations, or churches [...]. *Informal institutions*, by contrast, combine implicit rules that are "created, communicated, and enforced outside of officially sanctioned channels" to organize social behavior in some domain (Helmke & Levitsky, 2004, p. 727). Although these definitions seem to rely on a categorical distinction between formal and informal rules, precisely delineating

(Continues)

TABLE 1 (Continued)

Institutionalist school	Referenced scholarship	Examples of how theory is represented in the text corpus
		the categories of formal and informal is sometimes difficult (Helmke & Levitsky, 2006)." (Raymond et al., 2014, p. 198) • "Scott (1995) argues that '[i]nstitutions are comprised of regulative, normative and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life' (p. 48). [...] The regulative pillar comprises foremost of rules which can range from encoded laws to non-formalised yet accepted 'rules of the game'. The normative pillar comprises of norms, values and role models. The cultural-cognitive pillar emphasises shared conceptions that constitute the nature of reality and the frames through which meaning is made (Scott, 1995, p. 57), with particular attention being paid on elements that are taken for granted and no longer reflected actively." (Garschagen, 2013, p. 32) • "The organizational field is 'a community of organizations that partakes of a common meaning system and whose participants interact more frequently and fatefully with one another than with actors outside the field' (Scott, 1995, p. 56)." (Schifeling & Hoffman, 2019, p. 215)
Historical Institutionalism	Hall and Taylor (1996) Pierson (2000) Skocpol (1992) Steinmo et al. (1992), Giddens (1984)	• "HI [...] arose out of a wish to explain why similar policy problems are dealt with differently by states. The core argument is that policy outcomes need to be understood in the light of the specific configuration of institutions and organisations that exist within each country. [...] Above all, institutions play a *determinant* role. In the spirit of Giddens, proponents of HI claim that sometimes institutions shape the actions of individuals, and sometimes are affected by collective and individual choices [...]." (O'Riordan & Jordan, 1999, p. 84) • "While the literature on policy transfer, diffusion and new institutionalism tend to provide a picture of dynamic and rapid policy change through policy networks and learning [...], this is often far from the reality: in practice, there is typically a substantial amount of inertia and resistance to policy change, especially in the case of instruments and/or procedures that are less-familiar to policy-makers [...]." (Stead, 2018, p. 2448)
Cultural Theory	Douglas (1970, 1986, 1996) Douglas and Wildavsky (1982)	• Developed through the work of M. Douglas, A. Wildavsky and others, Cultural Theory (CT) "has been successfully applied to public administration and regulatory issues [...]. CT argues that social behaviours reflect inherent cultural bias and claims that there are two basic divisions, or dimensions within a culture: attitudes around 'grid' and 'group'. 'Grid' concerns (positive or negative) attitude to rules while 'group' concerns attitude to group solidarity, either weak or strong." (Toke & Baker, 2016, p. 646/7) • "Douglas (1986) proposes that social institutions are inherently linked to natural models, which provide a fundamental representation of the world. Such a representation allows an evaluation of the desirability or appropriateness of a particular institution, or its consistency with a particular understanding of the world." (Feola, 2017, p. 119)

identifiable subsocietal group" (Sewell, 2005, p. 39)—such as Croxatto et al. (2020) who analyze the cultures of global knowledge networks and local political cultures.

In addition, many papers in the corpus address the ambiguous relationship between institutions as embedded in cultural contexts, and institutions as having their own culture(s). The latter papers often referred to the institutional scholarship of Scott (1995), and discussed cultures as the particular logic of action in an organizational context, such as municipal bureaucracies (Aylett, 2013), flood risk management (Harries & Penning-Rowsell, 2011), urban water management (Kiparsky et al., 2013), or the energy sector (Geels, 2014). This shifts the analytical focus towards phenomena such as "de facto governance," that is, "informal elements embedded in the activities of networked organisations"

(Croxatto et al., 2020, p. 102512) or "organizational cultures," that is, "what happens in organisations by defining appropriate practices of policy making" (Schäfer, 2017, p. 341).

4.4 | How do institutions change?

There is a dynamic relationship between climate change and institutional cultures. Some articles explicitly frame institutional change as adjustments to the formal architecture (i.e., the law and procedures) that shape climate change drivers and responses (12 articles). The introduction of legislation or regulatory plans can be a catalyst for change (Alexandra, 2017), with the judiciary, for instance, a conservative institution that shifts on a case-by-case basis (Brinkman, 2017). Other articles look at budgets and formal operational capacity as levers of institutional change, leveraging authoritative expertise to advance anticipatory governance practices (Croxatto et al., 2020). Overall, authors in this corpus are concerned with changes in cultures that should accompany formal measures, if climate change responses are to take hold.

Few articles explicitly reference established theories of institutional change, though the notion of *gradual or incremental change* (after Mahoney & Thelen, 2010) is implicit in many accounts of institutions' cultural change. O'Riordan and Jordan (1999) discuss how rules are "continually *re-negotiated* in the permanent interplay between conscious human agency (…) and the wider structures in society (…) over which individuals have relatively little control." Others look at norms and logics of appropriateness, with changes in scientific culture in part shaped by expectations of science audiences, like policy-makers, and perceptions of how science might be applied (Shackley et al., 1999). Others like Pahl-Wostl (2009) see change as a process of social learning, with informal networks playing a crucial role. A synthesis of social learning and institutional theory suggests two key pathways for adaptation that indicate generic adaptive capacity: institutional modification and reflexive adaptation (Pelling et al., 2008). In this sense then, many articles engage with cultures' role in institutional change as incremental adaptation (Bohman et al., 2020; Deb & Haque, 2017; Dixon et al., 2014; Pelling et al., 2008; Van der Brugge & Roosjen, 2015; Velempini et al., 2018).

From another standpoint, authors like Burch (2010) postulate that institutional change is akin to *punctuated equilibrium* (after Baumgartner & Jones, 1991) in which sudden shocks, like extreme events, trigger institutional change. For Feola (2017), crises can be enablers of change by legitimizing some institutions and revealing the ineffectiveness or lack of fit of others to changing contexts and situations. Raymond et al. (2014) examine when institutions come to be inconsistent with predominant social norms and cultures and how this can render institutions vulnerable to challenge. Revealing such inconsistencies might open up new opportunities and pathways for institutional change; but powerful vested interests will need to be overcome and deeply rooted cultural practices uncovered.

Institutional bricolage is invoked as a conscious or unconscious process by which actors assemble mobile knowledges and other cultural resources to tackle diverse aspects of the climate change problem, from "green building design" (Faulconbridge, 2013) to the role of traditional chiefs in shaping responses to urban flooding in West Africa (Frick-Trzebitzky, 2017). Here culture is an active concept of practices, and institutional change is effected by creatively drawing on this cultural toolbox to address unfolding challenges.

Institutional change can also unfold through actors' own *agency*, for example, through the work of particular leaders or institutional entrepreneurs. Willis (2018), for example, examines how individual members of parliament in the UK navigate institutional norms and cultures while advancing their own climate cause; judging how an issue might be brought before the institution, and when prevailing norms might stifle this issue. Others discuss change as struggles over recognition and authority; "political action" to regain "political space" to address public problems in societies (Connor, 2012; Nightingale, 2017). Motion (2019), for instance, discusses activism to counter contradictions inherent in British Petroleum's corporate sponsorship of the Tate Gallery network in the UK. A justice discourse threads through accounts of indigenous people and institutional cultures. Some indigenous institutions are in conflict with, and being displaced by, more formal government regulatory institutions; threatening long-standing cultures that are paradoxically held up as adaptation exemplars (Gentle & Thwaites, 2016; Hirons et al., 2018; Lyons et al., 2019). Arctic indigenous adaptation rests on subsistence institutions built up over thousands of years—defined by flexibility and resilience—but they are in peril due to the rate and scale of combined climate, environmental, socio-cultural, political, and technological changes (Forbes, 2013; Herman-Mercer et al., 2019).

These examples highlight another feature of institutional change; notably that it is *context-specific* and *dynamic*. Authors focusing on regulatory institutions describe localized policy-making taking place in a relational, political, and often transnational context of policy transfer and local translation. Similar policies might therefore unfold in different

ways depending on the local economic, social, and institutional setting, with different political systems and organizational cultures (Mathews, 2009; Schäfer, 2017).

Articles also looked at *cultural and political inertia and resistance to institutional change around climate change*. It is important to not lose sight of power, politics, and regime dynamics; ways in which actors actively resist fundamental change as opposed to static notions of lock-in and inertia. Geels (2014) reports on powerful regimes that hold institutions in place: "incumbent regime actors [...] have used instrumental, discursive, material and institutional forms of power to resist climate change-related pressures [...] without fundamental system change."

5 | CLIMATE CHANGE MEETS INSTITUTIONAL CULTURES

What account is given in the corpus for how culture dynamically affects, and is affected by, responses to climate change in institutions? In this section we distil eight key "sites" (or themes) where authors commonly describe climate change—in all its forms—interacting with institutions through various expressions of culture.

We identified these eight "sites of interaction" (see graphical abstract) by coding the corpus to uncover themes authors commonly determined. These sites thus emerge from the corpus, and are mostly empirical findings. At the same time, the coding scheme started out as theoretically informed by the general literature on institutions and cultures (see e.g., work by DiMaggio & Powell, 1991; Giorgi et al., 2015; Scott, 1995; Sewell, 2005; Swidler, 1986), which provided fundamental themes for coding (e.g., around worldviews, practices, values, and materiality). The analysis thus began from theoretical themes but expanded to follow themes raised in the corpus. The corpus provides some indications of how interactions take place and offers focal areas for future research on the dynamic interplay between and temporalities of institutional cultures and climate change.

5.1 | Institutional cultures mediate institutions' responses to climate change

All articles in the corpus discuss ways in which institutional cultures shape how people are confronted by climate change and come to respond (or not), addressed here according to the eight overlapping (rather than mutually excluding) sites of interaction.

First, institutional *worldviews* define how groups represent and perceive the relationship between society and nature, and how nature functions (McNeeley & Lazrus 2014; Robin et al., 2014). Authors see worldviews stemming from histories of human interaction with the environment (Gentle & Thwaites, 2016); providing background knowledge for situating climate change globally and locally (Mathews, 2009), and relating it to wider conceptions of change and temporality in the world (Geoghegan & Leyshon, 2014). Institutions variously symbolize the climate as naturally stable, or in flux. For some authors, models of natural and cosmological order (ghosts and Gods) are important analogies for how institutions pursue social order (Feola, 2017; Sheridan, 2012); appealing to natural and supra-natural categories (e.g., seasons), as a legitimizing basis for social organization. Worldviews also create social categories, portraying some groups as climate "vulnerable" (Deb & Haque, 2017). Some authors discuss shared narratives as constitutive of worldviews, where narrative structure determines climate as a matter of concern (Gibson et al., 2016; Lejano et al., 2013). Worldviews also color the phenomenological study of individuals' everyday experience of climate change, through engaging with their environment (Lejano et al., 2013). Institutional worldviews appear to impact whether, when, and what aspects of climate change are picked up as potential issue(s) that need to be dealt with. For instance, an institution working from a worldview of "constant change" might be quicker to react to changing conditions than one built on "stability."

Second, groups are steered by normative consideration for "socially defined and held *values* regarding desirability…" of certain practices (Crane, 2010, cited in Forbes, 2013, p. 37). Cultural theory is deployed to understand how groups' different value orientations and ways of life condition responses to climate change (McNeeley & Lazrus 2014; O'Riordan & Jordan, 1999). Values are also discussed as coordinates for identities, such as "British" connections to the coast (Geoghegan & Leyshon, 2014), typifying how "people like us" respond to climate change. Other authors critically foreground values (e.g., of profit maximization) as constraining climate governance (Motion, 2019; Raymond et al., 2014). This influences why certain aspects of climate change or climate policy are seen as potential problems or good solutions. Whereas worldviews might determine whether institutions acknowledge that something is changing, values determine the desirability of change, and whether some form of intervention is required.

Third, organizational and professional *logics* and practices prescribe reasonable and appropriate courses of action in performing an institution's functions (Harries & Penning-Rowsell, 2011). Authors discuss the routinized and siloed practices that "create a high degree of consistency and social conformity in large organisations" (Aylett, 2013, p. 1389), but discourage innovative approaches to complex challenges like climate change. Orthodox practices, together with infrastructures, investments, and relationships produce a "path logic" that reproduce old patterns of activity, even as they are recognized as problematic (Bohman et al., 2020; Burch, 2010; Geels, 2014). Climate challenges are remolded into "doable problems," manageable through persistent practices (Schäfer, 2017; Willis, 2018). Within organizations, particular disciplines and professions—from scientists to engineers or policy-makers—overlay their own logic of appropriateness. Alexandra (2017) and Bohman et al. (2020), for instance, examine the taken-for-granted technical framing of water management by engineers and planners. Stead (2018) and Schäfer (2017) look at policy styles and practices, with Stead (2018, p. 2447) noting "policy actors generally tend to choose from their existing repertoire of institutional procedures, technologies and organisational forms." And some authors look at routine practices for livelihoods, from farming to water management, through which groups "apprehend climate" (Geoghegan & Leyshon, 2012; Velempini et al., 2018). Organizational and professional logics then determine the accepted "toolbox" of analytical and decision-making strategies and actions available. Institutions tend to rely on their embedded logics and turn to "proven" tools and practices in conceiving how to respond to climate change.

Fourth, *gender* in institutions—"how gender relations and the construction of femininity and masculinity are entrenched in daily institutional processes and practices" (Mersha & Van Laerhoven, 2016)—is argued to mediate how different genders perceived climate change, and their strategies for responding (Ravera et al., 2019). For example, climate science and policy is demonstrated to strengthen or weaken gendered roles in agricultural institutions; modifying worldviews, values, logics, and risk acceptance (Ravera et al., 2019). Gender is not widely discussed in the corpus, but there is a sizable literature on gender and climate change and it is distinct enough from other cultural elements to list separately.

Fifth, institutional cultures influence climate *risk acceptance* and framings of uncertainties. McNeeley and Lazrus (2014, p. 507) assert that, "it is the social organization of institutions, rather than the threat itself, that determines what risks are recognized." Some authors analyze institutional risk management practices that downplay distant or low probability risks to emphasize short-term performance (Rickards et al., 2014), while others look at conflicting climate risk perceptions and communication between institutions (O'Riordan & Jordan, 1999; Shackley et al., 1999). Risk definition is also a means of exerting power within institutional spheres, either by privileging certain evidences of risk (Brinkman, 2017), or by taking away groups'—like indigenous peoples—agency to "define their own risks" (Lyons et al., 2019). Related to worldviews, logics, and values, risk impacts why certain aspects of climate change and interventions are (not) seen as a problem. It also impacts the magnitude, timing, and type of actions that are seen as appropriate. For instance, it can impact what level of evidence is required to take precautionary action, or willingness to experiment with novel approaches.

Sixth, the *objects* and technologies used in institutions—the material culture—mediate how people know and communicate climate change. Galappaththi et al. (2019, p. 8) discuss how indigenous communities combine traditional knowledge with, "technical know-how to elaborate new knowledge and skills, such as using satellite images, drones [...] and underwater cameras." Others like Robin et al. (2014, p. 220) discuss how, "the museum gallery is taking new forms," for representing the Anthropocene. And others (e.g., Gibson et al., 2016) look at how technologies shape climate communication, arguing that on-line news has compromised independent climate journalism. This site is practical and related to logics and practices, impacting how institutions facilitate engagement, information exchange, and deliberation on climate change among actors. The corpus discusses avenues of how it might open up institutions to novel interpretations and approaches.

Seventh, institutions are infused with *power* and politics, shaped by the social–political struggles playing out within them (Nightingale, 2017). At their core, institutions deploy structural power, defining how nature and society are symbolized (Sheridan, 2012), and who is deserving of consideration in climate adaptation (Nightingale, 2017). Within institutional settings, powerful groups manipulate culture to fit their interests and control climate governance. Authors study the geopolitical influence of the Intergovernmental Panel on Climate Change on epistemological sovereignty for instance (Mahony & Hulme, 2016; Shackley et al., 1999). Power and politics can modify the timing and nature of climate action that is taken, because institutional responses take place in the context of a multitude of other interests. It impacts whether those responses can lead to transformations or risk repeating existing vulnerabilities, and how flexible institutions might be in responding and reshaping.

Eighth, the *relationality* between institutions—their abutting—steers people's responses to climate change. Climate becomes couched in terms of persistent institutional struggles. Much is made in the corpus of the tensions between informal traditional institutions and more formal modern institutions (e.g., Pelling et al., 2008). Several authors describe how modern institutions have come to replace traditional structures through processes of colonialization, or a departure from collectively farming the commons to more individualized and monetized land tenure (Dixon et al., 2014; Gentle & Thwaites 2016; Hirons et al., 2018). This introduces conflict between traditional and modern ways of representing and adapting to the climate, framed by heated political struggles for traditional groups to be recognized (Mathews, 2009). Relationality can impact the level of polarization between different approaches for dealing with climate change, and between multiple institutions that might engage with the topic. This impacts whether institutional responses are conflicting or reinforcing each other, and the level of flexibility and combinations of institutions that might be employed (e.g., through bricolage).

5.2 | Climate change affects institutional cultures

The corpus discusses the effects of climate change on institutions' cultures; both describing this process as entangled with other on-going changes to institutional cultures, and normatively prescribing much-needed jolts out of institutional inertia to tackle climate change.

5.2.1 | On-going changes in institutional cultures

When discussing extant institutional cultures, one observation in the corpus is that these cultures are continuously changing. This is due to, for example, wider structural changes in economic pressures, government structure, environment, demography, legal innovations, cultural and religious structures, accumulation of knowledge and experience, and technological innovations (e.g., Burch, 2010; Connor, 2012; Feola, 2017; Forbes, 2013; Gentle & Thwaites, 2016; Galappaththi et al., 2019; Raymond et al., 2014; Sheridan, 2012; Totin et al., 2018; Velempini et al., 2018). For instance, the shift from colonial to post-colonial rule influenced institutional cultures in many nations, as have moves to neoliberalism and individualization, the changing roles of indigenous cultures and knowledge, or the influx of young workers into organizations.

Institutions and their cultures arise in specific settings and are geared towards operating effectively in these contexts (Alexandra, 2017; Harries & Penning-Rowsell, 2011; Gibson et al., 2016). When the context changes a corresponding change in institutional culture is needed, and problems may arise when context and culture change at different paces. Several authors observe tensions between the reach of climate change and decision-making in siloed, compartmentalized institutions, with rigid disciplinary and organizational cultures, and fixed, ingrained ways of working (Aylett, 2013; Bohman et al., 2020; Burch, 2010; Robin et al., 2014). These super-stable cultures arose in times when "normal" climate was perceived as stable and put value on control, prediction, rational risk assessment, and economic development (Alexandra, 2017; Aylett, 2013; Brinkman, 2017; Schäfer, 2017). But some ambivalence is expressed as well. For instance, authors praise indigenous food systems' ability to change, but also note poverty and marginalization in such systems (Petheram et al., 2010), or observe that an informal "female economy" helps make households more resilient while also highlighting the vulnerability of women to calamities (Deb & Haque, 2017).

Finally, since climate change debates and policymaking involve multiple institutions, these may have different cultures. The *relationality* (one of our eight sites) between cultures in an ecosystem of institutions can be a source of on-going change and/or conflict. For example, Gibson et al. (2016, p. 420) explore professional norms and cultures of scientists and journalists: "between a cautious scientific culture which modulates and hedges knowledge claims and the norms of journalism which amplify conflict and drama…."

5.2.2 | Climate changing culture

Climate change has started to change institutional cultures, first through alteration of societal, cultural, and organizational narratives and *worldviews* (Elliott, 2019; Geoghegan & Leyshon, 2012, 2014; Lejano et al., 2013; Mathews, 2009; Motion, 2019; Raymond et al., 2014; Robin et al., 2014; Schifeling & Hoffman, 2019; Totin et al., 2018). Climate change

upsets the "natural order" as observations of weather and seasonality diverge from the perceived "normal climate" (Sheridan, 2012; Totin et al., 2018). This reduces satisfaction with the social order (Sheridan, 2012) and can lead to reframing and renegotiating the guiding narratives and mental models (Geoghegan & Leyshon, 2012; Raymond et al., 2014; Robin et al., 2014; Sheridan, 2012; Totin et al., 2018). For example, Shackley et al. (1999) observed that the highly politicized nature of climate change influences cultures of scientific institutions, and reconsideration of the roles of scientists in public debate.

This dissatisfaction with status-quo worldviews in a changing situation can lead to a search for *values* to guide a changing culture. These may be new values, but authors also observe actors turning to traditional values, seemingly "imbu[ing] a society with a nostalgia for its orderly past, when its values, social organisation, and (in this case) its ecology were in perfect harmony" (Sheridan, 2012, p. 240). Several articles discuss indigenous cultures—particularly in the Arctic and Africa—as inherently resilient, through worldviews that accommodate change (perceive continuous environmental change as the norm), social memory, experimentation and reinvention, long time-perspectives, close monitoring of their environment, internal information exchange, mix of formal and informal systems, and drawing on multiple natural resources (Deb & Haque, 2017; Forbes, 2013; Galappaththi et al., 2019; Gentle & Thwaites, 2016; Lejano et al., 2013). However, there is also struggle, as traditional approaches may no longer be viable or socially preferable in a new climate, resulting in a loss of knowledge and expertise, with culture and values drifting (Herman-Mercer et al., 2019; Larsen et al., 2019; Ravera et al., 2019).

Climate change is seen as a highly complex issue that challenges organizational *logics* and practices (Alexandra, 2017; Brinkman, 2017). It spans multiple traditional siloes, in organizations (e.g., municipalities) and institutions and triggers moves to a more innovative culture. Climate change requires creativity, and several articles show how it sets in motion (or accelerates) a shift towards crossing traditional boundaries: moving towards a more collaborative and inclusive culture, stronger norms of reciprocity, reduced internal competition, improved dialogue and trust, and more integrated, networked, multilevel and multifunctional, and holistic approaches (Aylett, 2013; Bohman et al., 2020; Burch, 2010; Deb & Haque, 2017; Dixon et al., 2014; Hirons et al., 2018; McMillen et al., 2014; Pahl-Wostl, 2009; Pelling et al., 2008). This includes horizontal (e.g., multisector, multidisciplinary) and vertical (e.g., spatial scales) integration. But authors see challenges to overcoming the routines and path-dependencies embedded in cultures (Bohman et al., 2020; Burch, 2010).

Climate is likewise changing *risk acceptance*. Authors promote a culture that encourages adaptivity, resilience, and learning in the face of uncertainties; balancing control and freedom (Aylett, 2013). This means shifting from relatively straightforward risk management towards building "capacity for dealing with complex choices, trade-offs and risks" (Alexandra, 2017), to deal with systemic climate risks and their uncertainties and ambiguities (Alexandra, 2017; Brinkman, 2017).

There are mixed observations of how climate is changing the ways institutions and actors engage with politics and *power*. Some authors focus on how new (types of) leaders or "institutional entrepreneurs" gain legitimacy through facilitating, maintaining, and disrupting climate debates (Raymond et al., 2014; Schifeling & Hoffman 2019). Articles capture the creativity and resourcefulness of individuals promoting the climate cause (Faulconbridge, 2013), activists upsetting power structures in organizational fields (Raymond et al., 2014), but also how networks of powerful elites choose inaction to not lose face among their peers (Rickards et al., 2014).

Towards innovation, authors discuss cultural resources—including *objects* and technologies—as being assembled in creative ways to face novel challenges and re-build institutions. Some discuss indigenous groups that combine social memory and experimentation; reinventing and combining knowledge of past experiences with young people's aptitude for new technologies (Forbes, 2013; Galappaththi et al., 2019). And social justice groups' use of pluralistic approaches to problematize the patronage of fossil fuel industries in art institutions (Motion, 2019). Others introduced processes of institutional bricolage (Faulconbridge, 2013; Frick-Trzebitzky, 2017; Schäfer, 2017), whereby actors confront climate change by, "patch[ing] together institutions that are at the same time designed, bureaucratic, formal, informal, traditional, corporate, embedded" (Frick-Trzebitzky, 2017, p. 642).

Finally, in recognition of the *relationality* between the complex ecology of institutions active in climate governance, many authors discuss a shift towards a culture of "co-creation"; renegotiating whose voices matter in climate-related institutions, empowering communities and involving a broader set of actors in decision-making (Alexandra, 2017; Bohman et al., 2020; Brinkman, 2017; Connor, 2012; Dixon et al., 2014). It promotes tailored, more nuanced understandings of climate change and climate policy; of what constitutes "value" (beyond financial), of the relation between nature and culture, of our mental models of time (e.g., deep past and deep future, notions such as the Anthropocene, gradual vs. abrupt change), and of formal and informal institutions (Deb & Haque, 2017; Dixon et al., 2014; Elliott, 2019; Geoghegan & Leyshon, 2012; Robin et al., 2014).

5.3 | Temporalities of institutional change in a changing climate

The dynamic interplay between institutions and climate highlights the conflicting temporalities manifested in various cultural expressions (or sites of interaction), and their effect on institutional change. The corpus revealed the crucial role cultures already play in both stabilizing institutional rules and adapting them to ongoing socio-technical and climatic change (see e.g., Forbes, 2013; Galappaththi et al., 2019; Lyons et al., 2019; McMillen et al., 2014; Petheram et al., 2010). The corpus rarely, though, explicitly engages with themes of time and temporality.

However, faced with the speed at which climate-related environmental changes are currently unfolding, the question arises as to whether the temporality of institutional cultures can keep pace with that of climate change? Institutional cultures are often deeply ingrained and may be slow to change. Polanyi (2001) highlighted how accelerating change undermines societies' ability to adapt and leads to major social upheavals. Yet, he also noted that, "[...] the collapse of the traditional system [does not] leave us in the void. Not for the first time in history may makeshifts contain the germs of great and permanent institutions" (Polanyi, 2001, p. 259). On the one hand, this brings unconventional and experimental forms of institutional adaptation such as bricolage into focus, cobbling together the experiences, knowledge and resources within cultures to work with what is available to them. On the other hand, there is the question of how forms of gradual institutional change (Mahoney & Thelen, 2010) can avoid abrupt institutional disruption and, despite institutional path dependencies, allow openings for change, adaptation and even transformation. Answering questions about the dynamic interplay between institutional, socio-technical, and environmental change requires a research trajectory that is historically oriented and culturally situated, in order to be able to evaluate the possibilities of climate action in the field between formal and informal institutions.

6 | DISCUSSION AND CONCLUSION: COHERING WORK ON INSTITUTIONAL CULTURES

6.1 | Institutional cultures matter

This exploratory SLR set out to uncover what work has been done on institutional cultures and climate change, describe how authors approach this topic, and discern common themes or connections across articles around which this field can cohere and develop. In this, it was steered by a particular interest in culture's role in mediating the dynamic interplay between institutions and climate, and identified eight sites of interaction that can steer future research on institutional cultures. The review does not attempt to go further and build an explanatory model of culture's mediatory role, or compare the explanatory power of different articles, mainly because this is as yet an immature field that lacks the accumulated evidence that such models could be built on.

Our review revealed 54 articles, as evidence of a nascent research field on institutional cultures and climate change emerging over the past 10 years. As it stands now, the field is highly fragmented; scattered over a range of disciplines and linking up with varying schools of institutionalism, from New Institutional Economics to Sociological, Critical, and Historical Institutionalism and Cultural Theory. This introduces very diverse interpretations of institutional cultures. At the same time, the field is characterized by a strong empirical focus, involving case studies from both the global north and south, and with particular attention on local-scale climate adaptation. And this limited but growing corpus of studies is beginning to converge on some common observations around the interplay between institutional cultures and climate change, and what this means for institutions, institutional change, and governance. From disparate starting points, these articles arrive at convergent conclusions.

One general conclusion is that institutional cultures matter. The corpus indicates that culture is a key interface in the dynamic interaction between institutions and climate change. Institutional cultures form a lens through which external challenges, such as climatic change, are interpreted and taken up into institutional renewal, or ignored. They mediate how institutions are modified, and how institutions engage with climate change impacts and action in practice. In turn, institutional cultures are malleable as well, and our review shows emerging case study evidence that they are beginning to change in response to the specific manifestation of interacting climate and socio-technical change. They also impact science-policy interactions, steering how knowledge is produced and used. Climate change research is increasingly interdisciplinary, produced in and for a context with multiple institutional cultures. For example, "climate services" often involve combining different types of knowledge, and they are intended to be applied in complex "real-
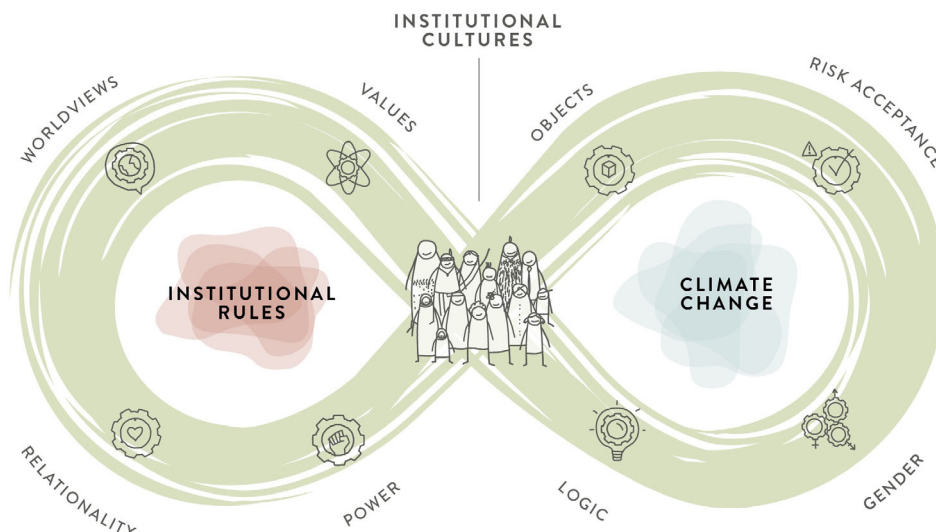
FIGURE 4 Institutional cultures mediate how people relate to institutions' rules in addressing climate change. We reveal eight sites of interaction between climate change and institutions, where cultures affect how climate change is interpreted and taken up in institutions and are at the same time sites where institutional changes take place. *Credit*: Edgar Melitao

life" situations. This requires navigating the logics, worldviews, values, and power (im)balances among actors involved. Together the articles show us that we should not be surprised when climate governance initiatives fail to take effect, if they focus only on formal institutions without attending to how people culturally relate to these initiatives. They argue, in one way or another, that institutional cultures play a key role in determining whether institutions can successfully govern in a changing climate.

6.2 | Cohering around eight sites of interaction

Our review looked at where authors saw climate change (in all its guises) come into contact with institutions and their cultures, and what happens at these sites of contact. We coded for cultural expressions as "sites of interaction," in that it is at these points that institutions and climate change mutually affect each other in a dynamic fashion, and that this temporally defined interaction is somehow determinate of the way in which an institution formally addresses itself to climate change. The mainly empirical observations from these articles converge on eight particular sites where interaction can be differentiated (see Section 5 and Figure 4): worldviews, values, logics, gender, risk acceptance, objects, power, and relationality. These provide promising points of departure for examining, or affecting, the informal or cultural changes that accompany formal institutional dynamics. In other words, we argue that they are key points of interest for expanding future research and policy related to institutions and climate change.

These eight sites are important coordinates for consolidating and developing this emerging domain of scholarship germane to climate governance. They provide conceptual and empirical foci around which this fast-growing field can cohere. Future studies can situate themselves relative to these points of reference. This is important in a nascent field where authors are deploying a highly variable conceptual and methodological toolbox, to study very different institutions around the world. This body of work has the potential to yield important lessons and to have practical applications, but only when it can be grounded in coherent points of comparison. There is room for more explanatory study and conceptualization into how exactly these cultural expressions mediate responses to climate change, whether some expressions are more determinate than others, and the particular dynamics by which institutions and climate change seem to "co-evolve." But this is for another paper. At the same time, and more instrumentally, these eight sites can provide headings for enriching the analysis of institutional cultures in more orthodox institutional analyses for climate governance. This may enable more advanced, structured analysis of how the formal and informal work together over time in a changing climate.

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APPENDIX A.: THE SYSTEMATIC LITERATURE REVIEW METHOD AND ANALYSIS TEMPLATE

We drew on a mixed methods approach, combining quantitative and qualitative approaches, following systematic literature review protocols. We started by conducting searches of key terms using the Scopus and Web of Science databases with the following rules: TITLE-ABS-KEY ("climat* change" AND "institution" AND "cultur*") AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (SRCTYPE, "j")).This resulted in 254 results within Scopus and 521 results within Web of Science. Books, conference proceedings and gray literature were excluded. The results were imported into MSExcel where they were merged, and merged for de-duplication of records from the two databases, resulting in a total of 634 English language publications containing the three terms. While there may be relevant publications that do not use these terms in the title, keywords or abstract, we expected that articles with a strong focus on our theme would indicate this focus up front. The publication timeframe was not limited historically and was up until our search in February 2020. We focused on English language publications because institutionalist and climate scholars, independent of their origins, tend to publish in English as a lingua franca. We also limited ourselves to searching for climate change, though searching for other terms like "global warming" might have highlighted other papers.

Our list of 634 publications was then divided up among the five co-authors for a closer manual reading of the abstract and introduction for relevance. To add rigor to this subjective assessment, authors were paired for peer review, and we found some divergence. To address this divergence, we ran a calibration exercise. All five authors focused on a set of 30 articles and discussed why we would include or exclude certain articles from this set, leading to a calibration of our perspectives on this literature and a tightened set of selection criteria. Reviewing the same 30 articles with tightened criteria saw much greater alignment in articles selected. Following this manual reading we arrived at a corpus of 356 articles, with confidence that these were appropriate for analysis. This process highlighted the challenge of database word-searches on themes that are open to diverse interpretations by authors, and likewise invite interpretation of the reader.

We analyzed the 356 publications using a standardized analysis template. This template asked the reviewer specific questions regarding the use of the concepts in question and the insight it provided. It was first pilot tested by the co-authors on a subset of articles and discussed relative to how well it captured the important themes relevant for this review. This pilot and discussion saw us revise the analysis framework. The closer reading, and completion of the analysis template for the 356 articles revealed three categories. One category of 54 "core articles" was squarely within our review's focus, and explicitly discussed climate change and institutional cultures; there was little room for interpretation and it was straight forward to complete the analysis template. Our analysis in this paper focuses on this set of articles. A second category of 154 articles only obliquely engaged with the review's themes and demanded that reviewers "find the relevance" in filling out the analysis template. These texts were analyzed and determined to be bordering but not within the scope of our analysis. A third category of 148 articles were found, on a deeper reading, to be outside of the

focus of this research—it was difficult to complete the analysis template for these—and they were omitted from the corpus. It is worth noting that the apparently close balance between the articles included and excluded at each stage of the review process (Figure 1) is a spontaneous result of the selection process. The reference lists of the final corpus of 54 papers were analyzed both (i) to identify any relevant papers that were excluded from the search, and (ii) to look for cross-referencing between papers in the corpus as a sign that the papers form a coherent body of work. There was extremely sparse (almost no) cross referencing (see Section 3), and no additional papers identified.

Analysis template:

Full reference:			
How are "institutions" understood/defined? What thought collective do the authors appeal to?			
Institution(s)?	Physical location(s)?	Geographical scale?	Timescale (s)?
How are institutional cultures discussed? In relation to this research's broad framing? (*how people perceive, experience, make sense, live and enact social norms and rules*)			
What is the interplay between climate change (CC) and institutional cultures?			
How do we see CC act on institutions cultures?	How do we see institutions cultures act on CC responses?	Does CC enter institutions cultures from without, or emerge from within?	
Does the article employ theories of, or show, institutional change? If yes, which ones?			
Adaptation/mitigation/both/neither?	Empirical/conceptual?		