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Institutionalizing climate change mitigation in the Global South: Current trends and future research

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ABSTRACT

Following the Paris Agreement, states and non-state actors have pledged countless commitments to mitigate climate change. Yet, translating these words into tangible action and institutionalizing mitigation efforts remains a key challenge in post-Paris climate governance. This is particularly prevalent in the Global South, where carbon emissions are expected to grow most significantly over the next decades. Besides, efforts to tackle the climate crisis compete with other human development priorities. With this review, we explore the prospects and challenges of institutionalizing climate change mitigation in the Global South. We (1) map the field in terms of concepts, methods, regions, sectors, and topics; (2) suggest a differentiation between reform-oriented, transformative, and failed attempts to institutionalize climate change mitigation, and (3) propose a future research agenda. We conclude that a stronger emphasis on institutionalization as a political, societal, and discursive challenge is crucial for implementing, sustaining, and enhancing climate change mitigation in the Global South.

1. Introduction

Adopted in 2015, the Paris Agreement marked a significant milestone in international climate politics when member states to the United Nations Framework Convention on Climate Change (UNFCCC) expressed their will to prevent global temperature increase beyond 1.5 °C above pre-industrial levels. Governments developed country-specific ‘Nationally Determined Contributions’ (NDCs), and non-state actors announced countless pledges, initiatives, and projects under the post-Paris climate governance regime (Marquardt et al., 2022). The NDC process allows countries to define individual decarbonization targets and increase their climate commitments over time, reflecting the ‘highest possible ambition’ (UNFCCC, 2015). The relatively loose legal character of this process provides each country the freedom to implement and institutionalize its obligations in a highly context-specific manner. However, successful implementation, that is, translating climate action into effective policies and institutions, remains the core challenge in the post-Paris climate governance landscape (Röser et al., 2020). The complex process of institutional remaking in times of climate change involves not only the introduction and uptake of novel institutions, but also the dismantling of established – primarily fossil-fuels

dominated – institutions as well as institutional stability and interplay with institutions in other policy domains, often marked by overlapping jurisdictions (Elsässer et al., 2022; Patterson 2021).

Fulfilling the ambitions outlined in Paris requires an “urgent and unprecedented transformation away from today’s carbon- and energy-intensive development paradigm” (Stoddard et al., 2021, p.654). Yet, transforming societies towards a climate-friendly path becomes more and more challenging, as outlined by the Intergovernmental Panel on Climate Change (IPCC 2022). Achieving net-zero emissions globally by 2050 requires substantial cuts in greenhouse gas (GHG) emissions not only in the Global North but also in the Global South, where ambitions to mitigate climate change are highly contested and compete with other development needs. Commitments have long been discussed, but lack implementation despite various announcements and initiatives to mitigate climate change in the Global South (Chandler et al., 2002; Fuhr 2021). These attempts date back to at least 2007, when climate change mitigation efforts were formalized and, eventually, institutionalized as ‘Nationally Appropriate Mitigation Action’ under the UNFCCC in 2007.

Until today, the question of how climate change mitigation projects, initiatives, and experiments in the Global South might help institutionalize low-carbon development has not been addressed

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comprehensively. However, various studies dealing with specific countries and sectors have assessed questions related to the *process* of institutionalization – albeit often under different labels. More recently, a special issue (Dubash 2021) has explored the institutionalization of climate change mitigation efforts in countries like China (Teng and Wang 2021), India (Pillai and Dubash 2021), Brazil (Hochstetler 2021), and South Africa (Tyler and Hochstetler 2021). We take stock of these and other studies dealing with climate change mitigation projects, initiatives, and experiments in the Global South to systematize the field through an institutionalization perspective, identify dominant themes, and formulate remaining research gaps. Our contribution is threefold: 1) We first provide a systematic overview of the field by mapping relevant literature related to the institutionalization of climate change mitigation in the Global South, thereby categorizing keywords, journals, sectors, methods, levels of intervention, and cases. 2) Based on an extensive coding of 148 articles in terms of their scope, modes of change, and the conditions under which institutionalization occurs, we identify three general approaches toward political institutionalization. We categorize these as reform-oriented institutionalization, transformative institutionalization, and institutional resistance. Reform-oriented institutionalization refers to institutional change within existing institutions. Specific measures include market incentives, investments in new technologies, and forms of stakeholder participation to mitigate climate change. In contrast, transformative institutionalization refers to broader socio-political shifts such as toward climate justice, democratic participation, or a redistribution of resources which point at structural changes to prevalent power structures beyond existing institutions. Finally, institutional resistance summarizes issues of no-change or inertia put forward in the literature. 3) We end this review by outlining a future research agenda that focuses particularly on recommendations for studying climate change mitigation in the Global South under the premise of institutionalization as a primarily *political* challenge, where climate change mitigation efforts hinge on discursive shifts, power relations, and socio-political contexts.

We refer to institutions as “a set of rules, formal or informal, that actors generally follow, whether for normative, cognitive, or material reasons” (Hall and Soskice 2001, p.9). Following Pasquini and Shearing (2014), political institutionalization is defined here as the process of developing, changing, and establishing new formal and informal rules and procedures in terms of politics, policies, and polity. Broadening this goal-oriented perspective, we review a multitude of attempts that formulate at least the intention to institutionalize climate change mitigation, such as policy reforms, the establishment of new technologies, or the empowerment of relevant stakeholders. Literature dealing with climate change mitigation efforts and the aim to trigger effects beyond the initial project scope are thus at the center of this review. These efforts can promote the replication of good practices, reform established systems or create new routines along the complex institutionalization process. We thus explore what existing literature on specific cases tells us about political institutionalization and related concepts such as policy diffusion, upscaling, or structural transformation. These changes or, in more normative terms, ‘institutional improvements’ (Patterson 2021) and ‘pathways for sustainability’ (Scoones 2016) can be fueled by markets, led by the state, driven by civil society initiatives, or pushed through technological progress.

Institutional aspects are broadly covered in the literature, yet often in a fragmented and inconsistent manner. Scholars are not always explicit about institutionalization but focus on changes in organizational structures, new policy mechanisms, or the introduction of innovative technologies. Yet, they all deal with the challenge of how to integrate these changes into existing institutional frameworks and potentially catalyze decarbonization efforts. In the following, we first provide arguments for focusing particularly on the Global South as a collective when studying the institutionalization of climate change mitigation (section 2). We then explain our methodology (section 3) before mapping the literature (section 4) and analyzing the field’s diverse contributions in terms of

scope, modes of change, and conditions for institutionalization (section 5). Finally, we propose a typology for institutionalization (section 6) and outline a future research agenda on how to institutionalize climate change mitigation in the Global South (section 7).

2. From calls to action to climate change institutions in the Global South

Over the last decades, scholars have investigated myriads of projects, initiatives, and governance experiments to mitigate climate change (Bulkeley and Castán Broto 2013; Hoffmann 2011; Turnheim et al., 2018). Focusing on learning, knowledge exchange, and policy adaptation, states and non-state actors have experimented with climate change mitigation measures as an ‘approach to governing’ (Huiteima et al., 2018, p.144) with varying degrees of success. While some managed to introduce new policies or shape organizational structures, others failed to reform sectors and institutions or collapsed after political changes. These ‘seeds of transition’ (Seto et al., 2016, p.435) have had diverse effects across countries and within complex domestic contexts at the subnational level (Elsässer et al., 2018; Hickmann et al., 2017; Höhne 2018).

Although policy-makers stress the need to institutionalize efforts to combat climate change and advocate for long-term commitments, scholars have rarely explicitly conceptualized the challenges and prospects of such a cumbersome endeavor. As an exception, Göpfert et al. (2019) present a framework for institutionalization based on bureaucracies’ four distinct features: their organizational structure, goals and visions, actors, and technologies. For Patterson (2021, p.40), institutionalization or ‘institutional production’ refers not only to the introduction of new institutions (‘novelty’), but also includes their adoption (‘uptake’), mainstreaming and continuation by political actors (‘stability’), significant interactions with institutions in other domains (‘interplay’), and a destabilization of established institutions (‘dismantling’). Aylett’s (2015) survey on institutionalization and climate change highlights the importance of local governance structures, and Ochieng (2017) underlines the significance of discourses and narratives. Despite these fragmented attempts to engage with institutionalization in climate politics, there is a lack of knowledge about “how states organise themselves internally to address the challenge of climate change [and] there is limited empirical exploration of national climate *institutions*, versus climate policies.” (Dubash 2021, p.2) – particularly in the Global South.

We know much less about the institutionalization of climate change mitigation in the Global South compared to those processes in advanced, industrialized countries. Studies on the Global South come with various conceptual, methodological, and empirical caveats. In fact, ‘the Global South’ has become a ‘booming meta category’ to frame research across disciplines and academic outlets (Haug et al., 2021), although there is no single all-encompassing definition of the term. Instead, scholars attach different and often conflicting understandings to it. In this review, we are mobilizing the category of the Global South as a reference to largely socio-economically marginalized parts of the world. The Global South thus mainly “comprises all countries outside the ‘high-income’, ‘advanced economies’ or ‘very high human development’ strata” (Haug et al., 2021, p.1928). Translated to the international climate change regime, such an understanding is inherent to the differentiation between ‘Annex 1’ and ‘Non-Annex 1’ countries to the Kyoto Protocol (UNFCCC 2018), with the latter being the focus of this literature review. Despite apparent differences among ‘Non-Annex 1’ countries in terms of their economic, political, and societal status, they also share several significant commonalities, such as human development priorities, comparable material circumstances, a shared experience of colonialism and resource exploitation, as well as international dependencies which warrant the focus on a seemingly heterogeneous group for various reasons.

First, the Global South’s contribution to global GHG emissions has increased significantly over the last three decades due to economic development and a rising energy demand combined with a high

dependency on fossil fuels. Since the 1990s, more than half of all GHG emissions have been emitted by Global South countries due to shifts in production and welfare. In 2020, all non-OECD countries in Africa, Asia, and South America combined accounted for almost 60 percent of global greenhouse gas emissions, excluding emissions from land-use change and forestry (Global Carbon Project 2022).² Given higher growth projections, energy intensity developments, and rising numbers of middle-class consumers, their contribution to global GHG emissions is expected to further increase in the future. This is particularly prevalent for emerging economies like China and India, but may also apply to other Global South economies that exhibit similar development trajectories and population growth (Fuhr 2021).

Second, there has been a largely unified identity of the Global South in the context of global climate negotiations (Williams 2005). Attempts to integrate environmental and developmental goals are frequent, as are requests for funding, technology transfer, and longer implementation timelines (Allan and Dauvergne 2013). Despite the group's high diversity, their disproportionate access to benefits and opportunities within existing climate institutions, which are primarily dominated by policy interests of 'Annex 1' member states, have frequently fostered coalition building among Global South countries to challenge current power structures and demand a fair and equitable climate change regime. Historical institutionalists have argued that shared realities along political, ideological, and socio-cultural dimensions have influenced the identity-building process of the Global South *vis-à-vis* the Global North (Hernández 2014). This entails, for example, experiences of (post-)colonialism and oppression by imperialist powers, an alienation of 'third world' countries during the Cold War, and the wide-spread effects of globalization on the economy, politics, and culture.

Third, and connected, climate change mitigation efforts in the Global South face severe challenges that exacerbate institutionalization as most countries need to balance their climate ambitions with other development goals such as economic growth and poverty eradication. These challenges include difficulties enforcing new rules and legislation by respective state authorities, a poorly developed private sector, a lack of domestic technological innovations, and often constrained civil societies due to state repression. Combined, these issues make it perpetually more difficult for countries in the Global South to challenge vested interest groups, substitute established political forces, foster institutional change (e.g., by placing an explicit price on carbon emissions), avoid climate rent-seeking, and ensure just and inclusive transitions towards low-carbon development.

Broadening our understanding of climate institutions in the Global South is crucial for a more holistic understanding of how to address climate change more effectively at a global level. Given the extensive research on climate change mitigation focusing on the Global North – originating primarily from research institutions in the Global North – we already know much about the prospects and caveats of tackling climate change in industrialized countries. However, considering the above-mentioned characteristics of the Global South, this knowledge is not readily applicable to the rest of the world. With this literature review, we aim to complement research on the institutionalization of climate change mitigation efforts by assessing recent contributions that look into the challenges for Global South countries. An extensive body of research dealing with climate change mitigation, policies, and discourses – mainly on a case study level – allows us to build on a rich field of literature. Such work on climate governance experiments, low-carbon transitions, and development projects has demonstrated how climate change mitigation efforts succeed – or fail. Here, we contribute to understanding how such mitigation efforts can be perpetuated by studying the different concepts, methods, regions, sectors, and topics pertaining to their political

institutionalization.

3. Methodology

With this inductive literature review, we (1) summarize research dealing with the challenges and prospects of climate change mitigation efforts in the Global South, (2) systematize our findings, and (3) outline a future research agenda. Beyond providing a quantitative overview, we identify patterns, structures, and forms of contestation emerging from the literature (Brocke et al., 2009). Following a primarily explorative approach, we draw on data extracted from the *Web of Science* database. After a prior screening of the literature, we compiled a comprehensive search string defining the scope and depth of our review. Next, we scanned through selected exemplary articles which we consider highly relevant to the field of inquiry. After several adjustments, we decided on the following search string that combines conceptual keywords related to institutionalization (topic 1) with sectoral keywords related to climate change mitigation (topic 2) and area keywords focusing on the Global South (topic 3):

Topic 1: (institutionali* OR transition OR transformation OR policy change OR policy implementation OR policy integration OR policy learning OR internalization OR mainstreaming OR governance OR path dependen* OR critical juncture OR diffusion OR upscal* OR social tipping point OR persisten*) AND.

Topic 2: (carbon lock-in OR carbon neutral* OR climate OR decarbonization OR low carbon* OR mitigation OR zero carbon*) AND.

Topic 3: (Global South OR Developing Countr* OR Emerging Countr* OR Emerging Econom* OR Asia OR Africa OR Latin America OR South America).³

We refined the search to articles written in English between 2016 and 2021 to cover peer-reviewed journal articles published in the aftermath of COP21 in Paris. The Paris Agreement arguably signaled a shift in the modus operandi of the global climate regime, opening up to a myriad of sub- and non-state actors to support climate action alongside nationally determined contributions. Besides, we focus on work categorized in social science fields such as political science, public administration, and development studies. In a final refinement step, we delimited the number of articles by thoroughly screening and evaluating titles and abstracts. We include only articles in our sample that either explicitly relate to the institutionalization of climate change mitigation efforts in the Global South, present particular projects or experiments with the potential to initiate institutionalization, or focus on any kind of

³ To ensure that we are not missing publications without a reference to a region, we expanded this by including all non-Annex I countries in the search string: Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Côte d'Ivoire, Cuba, Korea, Congo, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran, Iraq, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Lao*, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Nicaragua, Niger, Nigeria, Niue, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Korea, Moldova, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, South Africa, South Sudan, Sri Lanka, Palestine, Sudan, Suriname, Syria, Tajikistan, Thailand, North Macedonia, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, Tanzania, Uruguay, Uzbekistan, Vanuatu, Venezuela, Viet*, Yemen, Zambia, Zimbabwe.

² Numbers from "Our World in Data" for all three world regions combined, excluding OECD countries (Japan, South Korea, Chile, Israel).

socio-political innovation such as new technologies, policies, or discursive shifts that hint at institutional development – or the lack thereof.

As illustrated in Table 1, the number of relevant publications was significantly reduced by limiting the timespan of the publications and by focusing only on social science publications. As we are interested in political institutionalization, a focus on political science and neighboring disciplines narrowed the number of relevant results from 8551 to 1762. We then manually reviewed the titles and abstracts of all remaining publications to exclude those that either did not focus on the Global South, tackled other issues such as ‘climate adaptation’, or were unrelated to institutionalization and related concepts. This qualitative assessment led to a refinement that left us with 148 relevant publications. The large number of publications excluded in the final step (91.6%) also indicates the common use of broader keywords such as ‘transition’ and ‘decarbonization’, which only refer to the overall theme or context of the publication at hand. Yet, we decided to include these keywords to derive our sample from a large body of literature. Table 1 illustrates the refinement of our search string.

It is important to note that our literature review focusses on dominant contemporary scientific climate change mitigation discourses based on the selection criteria applied. *Web of Science* features mostly journals and scholars based in the Global North, which implies an underrepresentation of Global South scholars and journals in our sample, as well as the depicted academic discourses more generally. Our focus on articles written in English further adds to this bias. Yet, we decided on that focus for practical reasons and because we aim to portray dominant academic discourses where alternative perspectives may be marginalized. While this approach clearly limits our insights into non-Western thought, e.g., expressed by local scholars in Asia, Africa, or Latin America, it allows us to summarize mainstream debates. Given these constraints, scholars should feel encouraged to challenge and expand the findings provided in this literature review.

We started to engage with the remaining 148 publications by first conducting a quantitative mapping of the publications’ keywords and journals. We also assigned variables to all publications in the qualitative data analysis software MaxQDA to classify their conceptual, sectoral, and geographical focus, the number of cases, and their methodological approach. We then coded and analyzed all 148 publications in an inductive, open-ended, and explorative manner. This implies that the analytical categories and dimensions presented below were not predetermined but rather identified in the analysis (Corbin and Strauss 2008). Given the qualitative nature of this study, we did not search for keywords and similarities via automated software. Instead, we read through all articles in depth to extract common themes and patterns in argumentation and coded them respectively using MaxQDA.

During the inductive coding, we focused on conceptual and empirical issues linked to the institutionalization of climate change mitigation but remained open to emerging themes in the literature. We applied the

Table 1
Refinement process of the literature search (*Web of Science*).

Delimitation	Description	Results
Search Query	Topic 1 (institutionalization) AND Topic 2 (climate change mitigation) AND Topic 3 (geographical dimension/countries)	34415
Timespan	2016-01-01 – 2021-12-31	21819
Databases	Web of Science Index: Social Sciences Citation Index (SSCI) or Book Citation Index – Social Sciences & Humanities (BKCI-SSH)	9121
Languages	English	9083
Document Types	Articles, book chapters, or books	8551
Web of Science Categories	Political Science, International Relations, Public Administration, Development Studies, Area Studies, Social Sciences Interdisciplinary, Sociology, Social Issues, Geography, Anthropology	1762
Refinement	Screening and evaluation of titles and abstracts	148

Table 2
Variables, codes, and coding categories.

	Variables (mapping)	Variable groups
0	General metrics	0.1 Journal
		0.2 Methods
		0.3 Cases
	Topical focus	0.4 Keywords
		0.5 Sectors
	Geographical distribution	0.6 Region
		0.7 Scale of intervention
	Coding category (institutionalization)	Code groups
1	Scope of interest <i>What is the field of inquiry, and how broad/narrow is the scope of interest?</i>	1.1 Administrative and governance structures
		1.2 Actor relations and stakeholder engagement (agency)
		1.3 Political economy (structures)
		1.4 Societal context
		1.5 Conflicts and critique
2	Modes of change <i>How and through what mechanisms can institutionalization be achieved?</i>	2.1 Technological advancement and capacity building
		2.2 Market mechanisms and voluntary action
		2.3 Policy reforms
		2.4 Structural changes
		2.5 Discursive shifts
		2.6 Delays and resistance
		3
3.2 Markets, investments, technologies		
3.3 Socio-political factors		
3.4 Knowledge		
3.5 New ideas, discourses, narratives		
3.6 Institutional lock-ins		

‘Gioia-methodology’ (Gioia et al., 2013) to systematize our codes and develop code groups which we eventually categorized into three consolidated dimensions related to institutionalization, namely the publications’ field of inquiry (‘scope of interest’), the mechanisms through which institutionalization can be achieved (‘modes of change’), and the factors that shape the success or failure of institutionalization (‘conditions’). Table 2 summarizes the coding tree that emerged from this literature review (we provide a comprehensive table with all codes in Appendix 1).

4. Mapping a diverse field of inquiry

Most of the articles included in this literature review employ qualitative methods, gain insights from single case studies, and are published in journals dedicated to environmental politics or development studies. The sample spans across all Global South regions, with studies mainly from Asia, Africa, and Latin America – although unequally well-represented in the sample. In terms of topics and sectors, we observed a clear focus on climate change mitigation in general (which includes work on multiple sectors and climate change mitigation efforts beyond a specific sector) and the carbon-intensive sectors of energy and agriculture. The research field can be described as highly diverse in terms of general metrics (journals, methods, cases, topics) and geographical distribution (regions and scale of intervention).

4.1. General metrics: journals, methods, cases, topics

Most of the 148 articles were published in *Climate Policy* (32) and *World Development* (16), followed by *Climate and Development* (13), *Global Environmental Change* (13), and *Geoforum* (8). Articles in these journals are primarily practically-oriented and often formulate policy recommendations, thereby reaching out to a broad readership beyond academics. Although a diverse set of journals are covered in this review,

as described above, it comes with a selection bias partly built into *Web of Science*. As we limit ourselves to research articles written in English and published mainly in journals of the Global North, we cannot cover a wide range of alternative journals and grey literature where additional insights from the Global South may be found. Fig. 1 lists all journals with at least two articles considered in this review.

More than half of the publications we reviewed are based on qualitative approaches (94), often involving interviews and case study research. However, the sample also covers 37 quantitative articles which employ a broad variety of different quantitative approaches such as regression analysis, statistical sampling or modeling, which is reflected in the relatively large share of large-n comparisons. 12 articles follow a mixed-methods approach, and six articles represent conceptual work without a distinct methodology. Almost half of the reviewed articles deal with a single case study in contrast to various comparative analyses (52 in total) and (economic) modeling (10 in total), as shown in Fig. 2.

In terms of topics, the list of author keywords covers a wide range of conceptual, empirical and methodological aspects. Beyond generic keywords like climate change or developing countries, we recognize a concentration on keywords referring to specific climate-relevant sectors like forestry ('REDD', 'deforestation', 'palm oil'), energy ('energy policy', 'energy access', 'fossil fuels'), and emerging economies like India, China, Indonesia, and South Africa. About one-third of the articles deals with climate change mitigation either in more general terms or (in less cases) by covering multiple climate change mitigation sectors. This is followed by work with a clear focus on forestry (33), energy (29), and agriculture (10). Such a sectoral concentration is not surprising given the three sectors' high GHG emissions and therefore crucial role for climate change mitigation strategies. We distinguish between articles dealing with electricity, transportation, and the energy sector more broadly. 'Energy (general)' thereby refers to articles that either take a broad perspective or combine electricity, transportation, and heating aspects. The sector 'environment' includes themes like marine ecosystems and environmental policy-making. Fig. 3 summarizes the sectoral focus of the reviewed articles.

4.2. Geographical distribution: regions and scale of intervention

About one-fourth of the 148 articles investigate countries or sub-national entities in more than two world regions,⁴ but the different regions are not equally represented. While there is a fairly large share of articles in the sample dealing with Eastern Asian (23), Eastern African (20), South American (19) and Southeast Asian (15) countries, less articles have a dedicated focus on Southern Asia (9), Southern Africa (9), and Central America (3). Other world regions are represented only once (Western Asia, Caribbean, Melanesia, Western Africa) or twice (Northern Africa, Central Asia, Middle Africa). Fig. 4 summarizes the articles' regional focus. Similar to the regions, also the countries are represented fairly unequally. While 30 articles deal with multiple countries, emerging economies like China (23), Brazil (9), Indonesia (8), South Africa (7), Kenya (7), India (5), and Mexico (5) lead the field.

As shown by the broad body of literature covered in this review, institutionalization occurs at various governance levels. Almost half of the selected articles (71) thereby focus on the national context and country-specific climate change mitigation measures, e.g., in China (Lo and Castán Broto 2019), India (Gupta et al., 2019), Brazil (Basso 2019), and South Africa (Tyler and Hochstetler 2021). A substantial share of articles (39) scrutinizes domestic contexts to investigate climate change mitigation efforts at subnational levels. There, the role of cities and municipalities (Fuhr et al., 2018), public participation and community

involvement (Delina 2020) as well as local business initiatives and experiments (Deka et al., 2021) reflect central issues. A smaller share of articles deals with the interactions between different levels, in particular between the subnational and the national level (20), and between the national and the international level (10). These articles point at climate action spanning multiple jurisdictional levels, such as top-down steering and orchestration (Furumo and Lambin 2020), or bottom-up learning and upscaling (Delina 2020; Macqueen et al., 2020; Probst et al., 2021). As shown in figure 5, articles with a limited focus on the international or transnational level, including other forms of multi-level interaction, only play a minor role in our sample.

5. Institutionalization as a contested field: scope, modes, and conditions

Research about climate change mitigation in the Global South covers a broad field of inquiry. Through an inductive coding process, we identified patterns, conflicts, and issues of contestation related to the challenges and prospects of institutionalization. In so doing, we followed the Gioia methodology (Gioia et al., 2013) in four consecutive steps: First, we derived 421 first-order codes related to institutionalization after thoroughly reading all publications. We then consolidated these first-order codes by synonymizing redundancies and eliminating codes with only one or two mentions. Afterwards, we grouped these codes and derived a total of eight aggregated themes: (1) concepts and theoretical approaches, (2) the scope of institutionalization, (3) the scale or level of intervention, (4) modes, mechanisms and instruments to achieve institutionalization, and (5) the context within which institutionalization occurs, (6) sectors and industries in which institutionalization materializes, (7) countries, regions, and geographical location, (8) and the methodological approach to investigate institutionalization. Instead of merely describing the geographical focus or the sectors covered in the literature (see section 4 above), we clustered our analysis into three main themes, which summarize the contested nature of the field. These allow us to systematically characterize the literature and identify defining patterns: (1) *scope of interest* (how narrow/broad is the field of action for institutionalization efforts?), (2) *modes of change* (through what mechanisms is institutionalization achieved – or not?), and (3) *conditions* (which factors enable or hinder institutionalization?). As we consolidated these themes, we identified 17 code groups under which we allocated the relevant codes (see Appendix 1).

Cases run from local small-scale experiments and pilot projects over countrywide programs to the role of global initiatives and institutions. Scholars thereby use procedural perspectives such as experimentation and upscaling as well as disciplinary perspectives from fields like public administration (e.g., bureaucratization, capacity building), economics (technology diffusion, marketization, market transformation), and critical social studies (e.g., embedding, deep decarbonization, discursive change). Several publications apply broader terms like 'low-carbon development' (2019), 'decarbonization' (2017), or 'energy transition' (2020) to point at the overarching challenge, but they rarely explicitly refer to 'institutional change' (Rennkamp 2019), 'institutional collaboration' (De Pinto et al., 2018), or 'institutionalization' (Tyler and Hochstetler 2021). Concerning the articles' scope, a diverse set of perspectives and analytical approaches defines institutionalization on a spectrum between narrowly defined economic and political changes, and broader societal transformations. The differences in terms of scope go hand in hand with a multitude of modes to institutionalize climate change mitigation efforts. These range from specific financial incentives to broader discursive shifts or societal changes. Finally, numerous natural, economic, political, and societal conditions either enable or hinder institutionalization. This means that we are not only interested in formally established political institutions, but also explore how the literature deals with various aspects that enable or hinder processes of institutionalization. Thus, technological innovations and market developments are equally relevant to regulatory reforms and the creation

⁴ We have categorized the countries in accordance with a UN geoscheme developed by the United Nations Statistics Division (UNSD 2021). The scheme divides 249 countries and territories into six regional and 22 sub-regional groups based on the M49 coding classification.

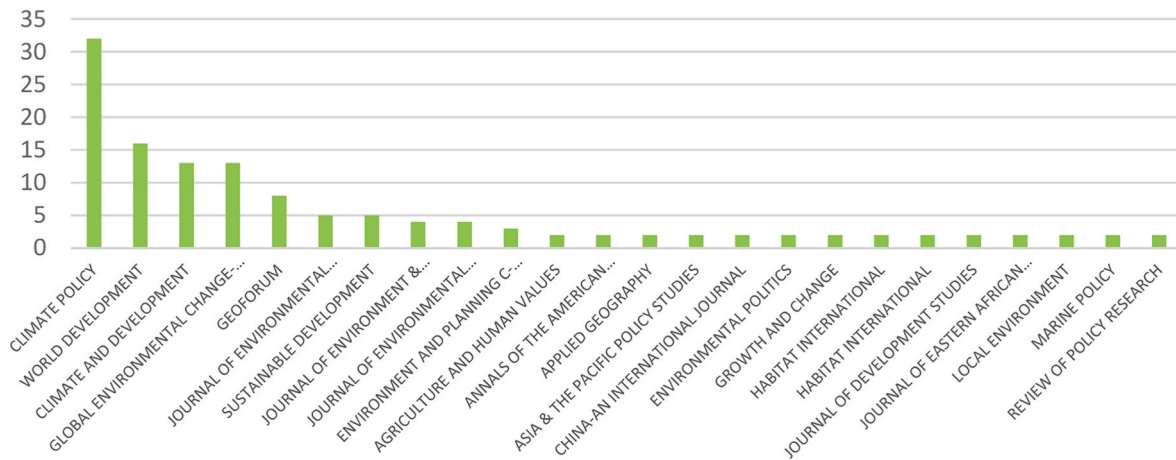


Fig. 1. Journals for reviewed articles (at least twice in the sample).

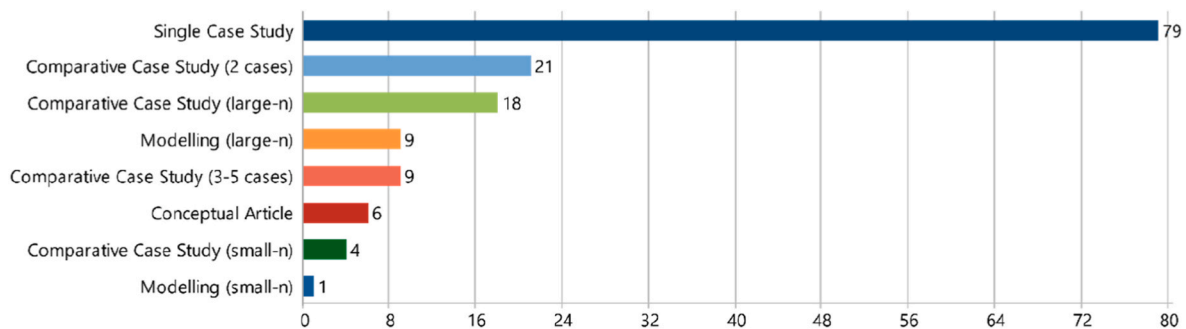


Fig. 2. Number of cases covered in all 148 reviewed articles.

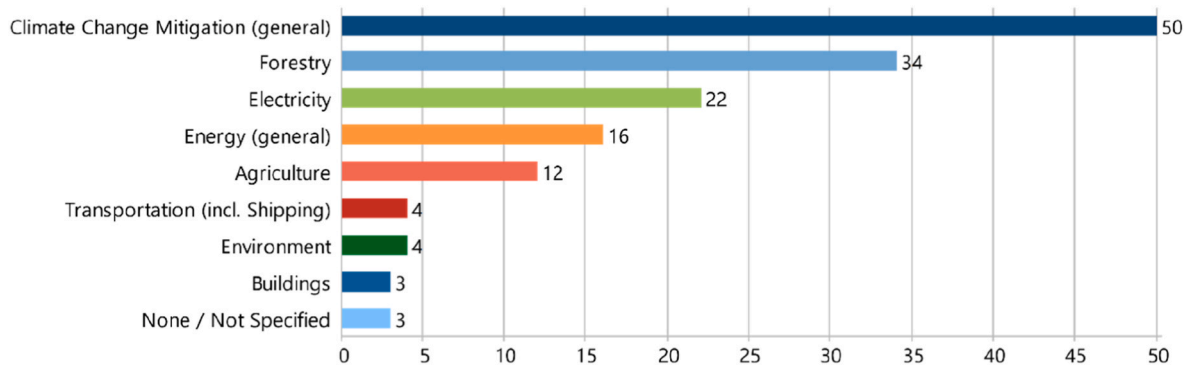


Fig. 3. Sectoral focus in all 148 reviewed articles.

of new political administrative structures.

5.1. Scope of interest

The literature covered here mobilizes a variety of conceptual terms and theoretical perspectives related to institutionalization, ranging from specific concepts like multiple streams, co-production and policy integration to broader fields like political ecology, governmentality, and power theory. As a consequence, the articles' scopes of interest range from specific administrative and governance structures to broader societal contexts and conflicts. The scope refers to the articles' level of analysis or, put differently, the area in which change – or resistance – is investigated. Based on the reviewed articles, we can distinguish between five different types of scope: *administrative and governance structures*, *actor relations and stakeholder engagement*, the *political economy*, the

broader societal context as well as *conflicts and critique*. These categories are not mutually exclusive, but overlap. More than one scope can be present in the same article.

Administrative and governance structures: Administrative and bureaucratic arrangements are a central point of reference for literature dealing with institutionalization in the Global South. They mostly refer to (historical or actor-centric) institutionalist approaches and public policy analysis. Concepts like experimentation (Pinsky et al., 2019) point at the value of a creative, flexible, and innovative governance system in which low-carbon projects can flourish. These experiments, however, require to be well-embedded into their specific contexts, while at the same time be general or broad enough so that they can be applied elsewhere beyond their initial project context (Sengers et al., 2021). For example, climate policy outcomes strongly hinge on the specific institutional settings in which these policies are implemented (Dubash 2021)

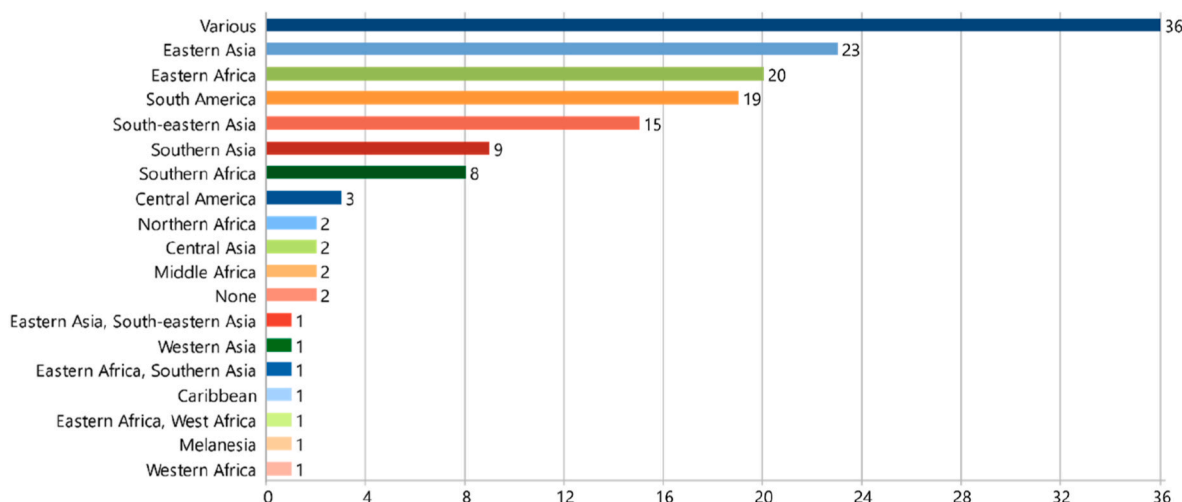


Fig. 4. Regional focus in all 148 reviewed publications.

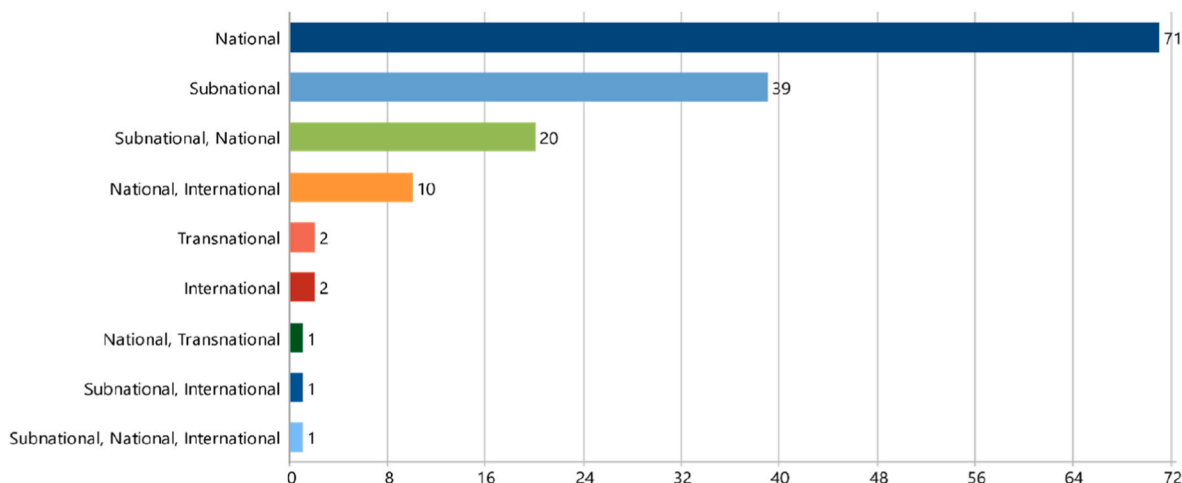


Fig. 5. Analyzed governance levels in all 148 reviewed articles.

and international efforts often fail to acknowledge national political contexts (2017). Approaches like upscaling (Furumo and Lambin 2020), bureaucratization (e.g., Lederer and Höhne 2021), policy diffusion (Goyal 2021), and technology diffusion (Jones and Warren 2021) are then used to trace how institutionalization effects may play out. Broader concepts like capacity building (Upadhyaya et al., 2021), steering (Wei 2021), climate policy integration (Hsu et al., 2020), and climate mainstreaming (Bhandary 2021) point at the factors that help stabilize institutional change. For example, climate policy coherence correlates with the progress in fossil fuel subsidy reduction (Fraundorfer and Rabitz 2020) and climate policy integration largely depends on economic development plans (Al-Sarhi and Mason 2020). Moreover, key institutions like environmental ministries play a pivotal role in this context. Their performance and policy ambitions, however, depend not only on the ministry’s resources and capacities, but also on historical views on environmental policy, international negotiations, and domestic power struggles (Aamodt 2018).

Actor relations and stakeholder engagement: Climate change mitigation represents a complex challenge that involves multiple actors at different levels, including the state (Tanner and Johnston 2017), businesses (Ashraf et al., 2019), local smallholders (Barbier 2020), indigenous people (West 2016), and transnational actors (Gallemore and Jespersen 2016). Discussions about the need for coordination between these actors, collaborative efforts, and multi-stakeholder relations hold this

theme together. Multi-stakeholder formats such as public-private partnerships play a crucial role, particularly in complex sectors such as forestry. For example, experiences from post-conflict Colombia show that governments can orchestrate private zero-deforestation initiatives and thereby align their national priorities with transnational activities (Furumo and Lambin 2020). Moreover, the question how private money can be leveraged through public support represents a reoccurring theme as exemplified by Probst et al. (2021). They claim that Uganda’s feed-in tariff scheme has attracted roughly USD 453 million in three years for 17 small-scale renewable energy projects. Besides, scholars highlight the importance of stakeholder participation at the local level, e.g., when it comes to pilot emissions trading schemes (Stoerk et al., 2019), or deliberation among communities involved in Reducing Emissions from Deforestation and Forest Degradation (REDD+) schemes (Boer 2019).

Political economy: Besides individual actors, structural aspects related to the political economy shape climate change mitigation efforts. These structural aspects include power dynamics in economic sectors like energy or forestry as well as structural advantages for incumbents such as ‘entrenched institutions of the petrostate’ (Kingsbury et al., 2019) or subsidies for fossil fuel industries. Successful institutionalization may then be understood as the establishment of new political-economic patterns that go along with changing actor capacities. This can be achieved through new incentive structures to account for carbon emissions (Wylie et al., 2016), the industrialization of low-carbon technologies

like renewables (Harlan 2018), or more policy-oriented developments such as domestic policy implementation measures (Solorio 2021).

Societal context: These political-economic aspects already point at changes – or the lack thereof – at the societal and ideational level, which represents another important theme in the literature. Justice and equity issues are of particular concern since low-carbon transitions hinge on injustices, structures of inequality, and exclusion (Sovacool et al., 2019). Just transitions in a Global South context go hand in hand with a corresponding commitment to human development aspects like income distribution or educational opportunities, in addition to sustainability concerns like environmental protection and carbon emissions reduction (Swilling et al., 2016). Furthermore, publications mobilizing perspectives in sustainability transition, low-carbon transition, and socio-technical transition literature (Sengers et al., 2021) regard a wider societal transformation as part of the change envisaged. Examples include the emergence of socio-environmental tensions in industrial carbon forestry projects in Uganda (Edstedt and Carton 2018), or the impact of donor-driven projects on inequality and poverty in Brazil (Grover and Rao 2020).

Conflicts and critique: These socio-political aspects are closely connected to the conflicts raised in a variety of publications. Particularly market-driven low-carbon development initiatives and attempts to monetarize forests for climate purposes have come under pressure. Most prominently, international forestry initiatives – often under a global scheme like the CDM or REDD+ – can help mitigating climate change, but they also have negative effects on land cultivation, water scarcity, and eventually negatively impact poverty in the communities surrounding the project (Edstedt and Carton 2018). Climate initiatives can lead to institutional and political disarray (Agostini et al., 2016), increase inequalities (Kemerink-Seyoum et al., 2018), and foster land (use) conflicts (Hunsberger et al., 2018). Scholars therefore argue for a more thorough investigation of tradeoffs from the ‘neoliberalisation of the climate agenda’ (Boer 2017), or the idea of technocentric and ‘post-political’ climate governance (Pye 2019).

5.2. Modes of change

The vast diversity of the articles’ scope of interest is closely related to how climate change mitigation measures might trigger institutionalization effects, here referred to as “modes of change.” Perspectives range from a rather detailed focus on *technological advancement and know-how* (Delina 2020; de Melo et al., 2021), over *market mechanisms and voluntary action* (Pradhan et al., 2020; Wylie et al., 2016) as well as *regulatory reforms and policies* (Wei 2021), to broader perspectives on *structural changes* (Colenbrander et al., 2019), and *discursive shifts* (Virtanen and Palmujoki 2020). While aspects such as new technologies or market incentives might not per se lead to institutionalization as an output, scholars at least express tentative optimism that these might reform socio-political processes and shape relevant institutions. A smaller stream of literature unpacks which modes may lead to *delays and resistance* and thus prevent the institutionalization of climate change mitigation efforts (Kingsbury et al., 2019).

Technological advancement and know-how: Technological innovations are seen as a key driver for mitigating climate change. Numerous scholars engage with the distribution of technologies and their transfer from the Global North to the South. Yet, Newell and Bulkeley (2017) argue that introducing new technologies needs to be accompanied by policy reforms and sustained market mechanisms to potentially induce institutional change at the same time. Technological advancement is furthermore linked to questions of know-how and expertise. Scholars emphasize the need for additional efforts in research and development (Tang and Popp 2016) and capacity building in host countries (Wylie et al., 2016) to enable and support the technology-driven institutionalization of low-carbon development.

Market mechanisms and voluntary action: A significant part of the literature deals with the role of financial incentives and market

mechanisms in institutionalizing climate change mitigation. For example, incentives for private sector involvement can enhance renewable energy generation by leveraging private activities (Probst et al., 2021). Also, voluntary markets can act as an arena for experimentation. They are claimed to provide an important testing ground for new climate initiatives and trigger new policies that support low-carbon development (Wylie et al., 2016). Most prominently, financial incentive schemes such as feed-in tariffs have been replicated worldwide, especially by Global South countries (Baldwin et al., 2019).

Regulatory reforms and policies: Low-carbon policy frameworks in the Global South need to balance climate change mitigation measures with other development needs such as poverty eradication, industrial development, and social stability (Wei 2021). In this context, market incentives can be part of regulatory reforms to promote low-carbon technologies and institutionalize climate change mitigation efforts while maintaining development priorities (Lo and Yu 2015). These policies are not limited to top-down steering mechanisms by the nation-state (Lo et al., 2020), but they can also emerge as a result of successfully implemented projects at the community level (Santika et al., 2017). Their firm integration and adoption by relevant stakeholders hinge on institutional coordination and exchange across multiple jurisdictional levels (Upadhyaya et al., 2021).

Structural changes: Policy reforms are embedded in complex societal contexts. These structures include the broader social, political, and economic system in which low-carbon development efforts are carried out. Although these aspects represent highly stabilized societal structures, scholars investigate how the status quo can be challenged, e.g., by promoting alternative modes of living such as *buen vivir* (Kingsbury et al., 2019), large-scale planning interventions such as climate-friendly cities (Fu and Zhang 2017), and shifting political priorities through the recognition of climate justice concerns of affected people (McGregor et al., 2019).

Discursive shifts: Narratives of success are essential to reframe climate change mitigation efforts, but they need to be substantiated by practical evidence on the ground, according to Svarstad and Benjaminsen (2017). Deliberation and other forms of participation can support alternative discourses and thereby raise the legitimacy of a low-carbon initiative (Delina 2020). Mechanisms to trigger discursive shifts and promote alternative narratives include establishing knowledge transfer, e.g., through training programs and workshops for communities (Deka et al., 2021). Reversely, a lack of information and data can undermine an initiative, e.g., when technological information is missing (Probst et al., 2021).

Delays and resistance: A smaller number of publications engages with the issues and structures that prevent the institutionalization of low-carbon development. For example, Baker et al. (2021) discuss the tensions between state-owned utilities and market liberalization. They argue that South Africa’s public electricity utility illustrates the lack of accountability of a nationalized state-owned monopoly, making claims for re-nationalization somewhat problematic. Kingsbury et al. (2019) explore how an Ecuadorian initiative to keep fossil fuels in the ground faced severe resistance by “powerful entrenched interests and elites of the Ecuadorian oil industry” (Kingsbury et al., 2019, p.11).

Sengers et al. (2021) describe several mechanisms that lead to an ‘embedding’ of climate change mitigation experiments, i.e., their institutionalization. They refer to ‘replication and proliferation’ as a form of diffusion of initiatives or certain experiments as a crucial mechanism and a condition for upscaling and institutionalization. Mechanisms of ‘expansion and consolidation’ can enable the growth of a single initiative. Both can be regarded as aspects of institutionalization and, according to the authors, require social learning related to a broadening of the respective actor-network. Moreover, ‘challenging and reframing,’ the inclusion of changes in existing rules, and ‘circulation and anchoring,’ which refers to the transmission of relevant knowledge, may be conditional for institutionalization.

5.3. Conditions for institutionalization

The different modes of change are closely related to the conditions under which institutionalization succeeds or fails. They can either provide an enabling or disabling ground for change, and they can or need to be altered during the process in order to accommodate new patterns and thereby allow the institutionalization of initiatives. The conditions covered in the reviewed articles range from geophysical factors (Schmitter et al., 2018) over markets, investments, and technologies (Deka et al., 2021), to broader socio-political factors (Myers et al., 2018), issues of knowledge production (Ojha et al., 2016), as well as new ideas, discourses, and narratives (Setyowati 2020). Critical articles focus on the conditions that prevent change and instead lead to institutional lock-ins (Schmitz and Altenburg 2016).

Geophysical conditions: Climate change mitigation often depends on geographical and physical factors. For example, low-carbon technologies such as solar or wind power (Boamah 2020) and climate-friendly agricultural practices, for instance, climate-smart agroforestry (Brockhaus et al., 2017), depend on aspects like solar radiation, quality of soils, or heights of terrain. These factors can enable or hinder the institutionalization – and already the initiation – of a climate change mitigation project. As an illustrative example, the amount of rainfall turned out to heavily affect the performance of community forest management in Indonesia since dry conditions create additional pressure on the communities responsible for managing forests (Santika et al., 2017).

Economic conditions: Market structures, investment opportunities, and technological advancements are at the heart of a variety of economic conditions that represent an important sub-theme in the literature. Particularly a transparent market, private investments, and economic incentives for low-carbon development are critical to support the introduction of new technologies such as solar PV systems (Boamah 2020). For agricultural initiatives, the existence of a sales market for agricultural products is vital. In the case of sustainable initiatives, this is often related to labels for organic cultivation, which provide entrance to a specific consumer market. Hence, product marketing, including certification and labeling, is crucial for the income of small-farmers initiatives in the realm of sustainable or climate-smart agriculture (Deka et al., 2021, p.9).

Political conditions: Economic incentives are linked to further social and political conditions, which form another sub-theme in the literature. Political factors are thereby often linked to the distribution of power in a given political system and the way powerful actors support or reject low-carbon innovations. Established elites and incumbents may act as veto players and prevent change to secure their privileges (Rennkamp 2019; Sovacool et al., 2019; Tyler and Hochstetler 2021) or instrumentalize and reshape climate change mitigation action to meet their own interests. Sovacool et al. (2019, p.8ff.) refer to processes of financialization when tracing the expansion of financial instruments into new realms, such as climate change mitigation (Sovacool et al., 2019, p.3). This can lead to land grabbing or other forms of dispossession of the general public or specific local communities. To avoid these negative effects, scholars explore ways to shape the socio-political conditions under which climate change mitigation efforts are implemented. For example, states address regulatory needs by modifying or ‘calibrating’ their domestic political-economic patterns to implement international commitments (Upadhyaya et al., 2021).

Knowledge: Issues of knowledge and knowledge production emerge as another condition discussed in the literature. Often derived from specific low-carbon development case studies, relevant aspects range from the availability of accurate data (Stoerk et al., 2019) and techno-scientific expertise (Wylie et al., 2016), to governance capacities (Colenbrander et al., 2019) and (collective) ownership (Sanders et al., 2017). Challenges to access and receive data, or the absence of learning infrastructures and missing feedback opportunities hamper effective modes of documentation and knowledge management (Pinsky et al., 2019). This is particularly relevant for global schemes like REDD + that

must be translated and applied in particular local contexts.

New ideas and narratives: Shifting narratives, discursive changes, and the diffusion of new ideas are often preconditions for changing regimes like the energy sector. However, the line between the discursive modes of change discussed above and the conditions that enable or prevent change are rather blurry. These aspects involve certain practices that may lead to changing and enabling conditions for institutionalization, such as positive discourses surrounding climate-friendly technologies or common storylines about the benefits of climate change mitigation efforts (Rennkamp 2019). Closely related to this, low-carbon imaginaries and visions of the future can facilitate change if a ‘broader, directional and long-term vision’ (Upadhyaya et al., 2021, p.3) gets implemented in its specific local context. Scholars frequently refer to a combination of conditions that may provide some sort of institutionalization or establishment of an initiative.

Institutional lock-ins: Finally, a smaller portion of the literature deals with the conditions that prevent a shift from a fossil fuel-based society to low-carbon development. Carbon lock-ins (Boodoo and Olsen 2018) and the dominance of vested interests in the fossil fuel industry (Kingsbury et al., 2019) help to explain why carbon intensive sectors struggle to shift to low-carbon pathways. Innovations, such as new clean energy technologies, are furthermore hindered by path dependencies in complex energy landscapes (Boamah 2020). Besides, actors mobilize narratives and discourses that create tensions between emissions reduction targets and other ‘potentially competing objectives’ (Rennkamp 2019) like jobs creation, poverty eradication, and economic development.

6. Institutionalizing climate change mitigation: towards a typology

Research on institutionalizing climate change mitigation in the Global South is diverse in many respects. While a thematic focus on emissions-intensive sectors like energy, forestry, and agriculture is not surprising, the broad range of terms and perspectives points at a multitude of conceptual entry points and theoretical foundations. Concerning the geographical scope, regions like Eastern and Southern Africa, Southeast Asia, and South America are well represented, while other regions like Central and Western Asia are largely left out, leaving an apparently unbalanced picture. A rather large share of articles applies qualitative methods and/or investigates single case studies, while some also conduct large-scale comparisons. The articles covered here address administrative and technical, political-economic, societal, and ideational dimensions of change, all related to the complex process of institutionalization. Concrete modes and mechanisms related to institutionalization range from technological innovations, financial initiatives, and policy reforms to capacity development and structural changes. Conditions for institutionalization include geographical factors, economic aspects, political issues as well as new ideas and narratives and institutional lock-ins. Publications feature both in-depth case studies with a focus on administrative reforms at the local level as well as broader interventions such as global policy schemes, structural changes in society, or the emergence of new – and disruptive – low-carbon narratives.

Given the literature’s broad diversity in terms of scope, modes, and conditions, we see the need for a more refined conceptualization of political institutionalization related to climate change mitigation. Regarding the scope of interest, the literature does not only refer to different terms to capture institutionalization processes, but also the extent of change that is anticipated differs significantly, ranging from administrative or policy change to broader societal and political-economic shifts, which also recurrently involve non-state actors. Likewise, the complexity of the issue is also reflected in the broad variety of institutionalization modes that are raised in the literature, *inter alia* ranging from mere technological to structural and discursive shifts. Consequently, also the conditions for any kind of institutionalization vary significantly.

We claim that a differentiation between multiple forms of institutionalization is useful to link this broad field of literature to the overarching challenge of institutionalization, explore the links between the different modes of change and the bigger picture of low-carbon transformations, and sharpen a research agenda that explicitly focuses on institutional change. While we perceive varying forms of institutionalization to be located on a continuum, we propose three ideal-type categories of institutionalization related to climate change mitigation measures.

- At one end of the spectrum, a large part of the literature deals with (policy) reforms, market incentives, the promotion of new technologies and modes of incremental change which all aim to promote reforms but operate within established institutional frameworks. We summarize these attempts to foster climate change mitigation measures as *reform-oriented institutionalization*. This category refers to institutional change within existing institutions, such as a reformation of rules, practices, and incentive structures. This ideal-type category includes a variety of market incentives to promote innovations, investments in new technologies, and forms of stakeholder engagement to achieve the ‘common’ goal of climate change mitigation and low-carbon development.
- At the other end of the spectrum, scholars address broader socio-political issues attached to climate change mitigation or societal changes that challenge and go *beyond* existing institutions. Questions of climate justice, democratic participation, or distributional conflicts point at structural changes and a transformation of existing power structures. We summarize these perspectives as *transformative institutionalization*. This category echoes what Burch et al. (2019) describe as “transformative institutional change.” Accordingly, transformations can be understood as shifts that “involve fundamental changes in structural, functional, relational and cognitive dimensions of linked socio-technical-ecological systems” (Burch et al., 2019, p.23). These changes include not only broader global developments, such as urbanization, globalization, digitalization, or a shift towards sustainable and carbon-neutral societies, but also refer to discursive attempts in order to (re)imagine and prefigure desirable futures of a decarbonized world. Questions emerging from a transformative perspective refer to norms (What are desirable forms of social and political order in a decarbonized world?), relations (Who shapes transformations, who benefits and who loses?), and power-related aspects (How is the distribution of power challenged, disrupted or entrenched?).
- Finally, a variety of critical articles highlight the role of conflicts, vested interests, and institutional lock-ins that prevent institutional changes. We subsume these issues of no-change or inertia towards institutional change under the category of *institutional resistance*.

While the boundaries between these categories are fluid and contested, they offer a valuable entry point to reflect upon the various degrees of institutionalization tackled in the literature. They also relate to broader normative debates in climate governance research such as the tension between transitions and transformation or the conflicts between incrementalism and disruptive changes. Table 3 summarizes the three categories in relation to the different scopes, modes and conditions discussed before. The three categories should not be understood as mutually exclusive, but they may also overlap or even depend on each other, e.g., when early policy reforms in fields like energy trigger debates about broader societal changes towards sustainability or vice versa. The proposed typology allows us to evaluate if and how the literature on climate change mitigation in the Global South addresses issues related to institutionalization. In so doing, we conclude that although studies from all three categories appear in the broad body of literature investigated here, the field is dominated by reform-oriented research in comparison to studies with a dedicated transformative perspective.

Institutional aspects are broadly covered in the literature, yet often in a fragmented and inconsistent manner. We detect a need to connect the different scopes and modes of institutionalization with the various conditions under which climate change mitigation efforts can not only occur but also be sustained, or in other words: get *institutionalized*. Institutionalization literature offers not a one-size-fits-all solution to this challenging task, but it provides meaningful categories to evaluate institutional effects – or the lack thereof. Insights from this field of research can therefore shed light on the implementation of the Paris Agreement beyond individual projects, initiatives, and experiments, paving the way to a future research agenda that engages more closely with different aspects of institutionalization.

7. Avenues for future research

Institutionalizing climate change mitigation efforts represents a broad field of scholarly inquiry that has become increasingly important in the aftermath of the Paris Agreement. Implementing commitments in a sustainable manner remains a looming challenge and requires the institutionalization of new practices, policies, and narratives. At a minimum, this necessitates reformist approaches within existing institutions but may ultimately require deep socio-economical changes and transformations as an alternative to the current systems through which we govern climate change. This task becomes especially challenging in countries of the Global South, where carbon lock-in may be detrimental in light of growing energy demands over the next decades, climate justice concerns are raised, and climate change mitigation ambitions compete with other fundamental development needs. Focusing on the challenge to institutionalize climate change mitigation efforts in the Global South, we have mapped a heterogenous field of research,

Table 3
Categorizing the institutionalization of climate change mitigation.

	Reform-oriented institutionalization	Transformative institutionalization	Institutional resistance
Perspective	Achieve decarbonization within existing institutional frameworks	Decarbonization requires deep societal changes and alternative institutional settings	Various institutional barriers prevent decarbonization
Scope	Administrative and governance structures, stakeholder involvement	Political economy, societal context	Conflicts and critique
Modes	Technological innovations and capacity building, market mechanisms and voluntary action, policy reforms	Structural changes in society, discursive practices and shifts	Delays and resistance
Conditions	Geophysical factors, markets, investments and technologies, policy framework	New ideas, discourses and narratives, socio-political factors, knowledge	Institutional lock-ins

systematically clustered it along three core themes, and developed a typology to capture three different approaches, namely reform-oriented institutionalization, transformative institutionalization, and institutional resistance. While such a categorization helps us navigate a growing field of research, it rejects the notion of bold policy recommendations. Instead, we conclude by outlining fruitful avenues for future research.

First, our review demonstrates that we need to better understand the ramifications of institutional shortcomings and political conflicts across multiple levels of governance. We know from the development assistance literature that donors are often faced with clientelism, patronage, and corruption when implementing pilot projects - particularly at the local level. Acknowledging these practices becomes a “form of ‘rule following’ that depends on the behavior of other individuals” (Williams and Dupuy 2019, p.3), especially in the context of global financing schemes like REDD+. Hence, studying the political institutionalization of climate change mitigation requires not only a focus on the changing of formal rules, but must also take into consideration the positive and negative effects that networks of individual entities can have on the continuation and success of climate change mitigation efforts.

Second, our findings reveal multiple blind-spots in the literature which reflect the practical challenges of climate change mitigation in the Global South. This includes issues of geographical representation (where least developed countries are underrepresented) and a strong focus on a few sectors (mainly energy and agriculture). These open questions may be partially revealed by more thoroughly engaging with literature that originates predominately from the Global South and non-English publications. These may yield new insights and provide alternative perspectives to the ones we identified. However, this was beyond the scope of this literature review, where we shed light on the dominant academic discourses on the institutionalization of climate change mitigation in the Global South. It is therefore crucial for future research in this field that scholars with respective language capacities challenge these dominant discourses and fill potential gaps. This would also support a more thorough acknowledgment and engagement with the historical and postcolonial contexts of the Global South in which low-carbon development occurs. Colonial legacies affect not only the capacities to tackle climate change but also intensify land-grabbing practices like in Uganda (Carmody and Taylor 2016), manifest established monopolies like for tea plantations in India (Deka et al., 2021), or determine land ownership, e.g., in Latin American cities (Koch 2020). Donors also promote various finance mechanisms to support renewable energy development in the Global South, but their implementation often follows colonial roots without considering local participation and ownership (Haag 2020). In the context of South-North relations, scholars should also scrutinize modes of carbon colonialism in post-Paris climate governance, i.e., the ability of the rich and powerful nations to outsource carbon emissions to the Global South.

Third, in everyday politics, tackling climate change is rarely considered a priority for many Global South countries when juxtaposed with various development needs. Competing and more urgent concerns include issues like poverty eradication, security-related goals, and economic growth, which hamper the ambitions for low-carbon development in countries of the Global South. However, given the rapid destruction caused by climate change impacts, human development has to be linked more coherently with climate change mitigation. This disconnect is also apparent in the literature reviewed in this study, where low-carbon innovations are frequently framed in terms of energy access, local business development, or job creation, but less so as purely climate change mitigation measures. In this regard, there is a growing

need to mobilize different scholarly approaches to investigate the preferences and motivations behind mitigating climate change – or the lack thereof – and explore the tensions but also the potential for synergy between climate change mitigation and other development goals.

Beyond these insights particularly relevant for the Global South, a dedicated focus on institutionalization would also help illuminate connections between climate change mitigation efforts and their institutional contexts more broadly. Institutionalization can run paradigmatically from a rhetorical change at a very initial stage, over policy changes and organizational reforms, to societal effects and robust implementation at a highly advanced stage. While most research about low-carbon development deals with these institutionalization aspects in one or the other way, a dedicated institutional perspective offers an opportunity to connect the dots between the different levels of change and bridge the gap between small-scale changes (often investigated for specific case studies) and the broader changes required for socio-political transformations.

Institutionalizing climate change measures represents a deeply embedded, contested, and complex socio-political process, as it goes far beyond innovative policies, promising technologies, and effective market mechanisms. It challenges established power structures and shapes ideas of social and political order. Questions related to the distribution of power in complex governance arrangements (Marquardt 2017), issues of (dis)empowerment (Avelino 2017), or the (in)ability of social actors to influence climate change-related decisions (Brugnach et al., 2017) provide fruitful entry points to reflect upon the potentials and pitfalls for institutionalizing climate change mitigation. In this regard, studying climate change mitigation efforts should also engage with research on ‘institutional remaking’ (Patterson 2021), ‘institutional collaboration’ (De Pinto et al., 2018) and ‘institutional interplay’ (Elsässer et al., 2022). The latter approach argues that institutions rarely materialize in isolation from exogenous influences, but are embedded within existing institutional environments. Future research should investigate the linkages among emerging institutions and their institutional settings to determine whether and how reformative and transformative approaches alike can be harmonized to overcome institutional resistance and trigger systemic change.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A

Appendix 1: Codes and categories.

Category	Code group	Codes
1 Scope of interest <i>What is the field of inquiry and how broad/narrow is the scope of interest?</i>	1.1 Administrative and governance structures	Central-local relations
		Collaborative governance
		Domestic climate institutions
		Governance practices
		Historical Institutionalism
	1.2 Actor relations and stakeholder engagement (focus on agency)	Intra-governmental linkages
		Policy adoption
		Policy coherence
		Policy effectiveness
		Policy implementation
		Policy integration
		Private governance
		Policy performance
		Public policy analysis
		Regulatory pendulum
1.3 Political economy (focus on structures)	Rural policy adaptation	
	State energy interventions	
	Actor-centric institutionalism	
	Brokerage by central actors	
	Community engagement and participation	
	Cooperation	
	Coordination between actors	
	Elites/Elite Power	
	Firms and businesses	
	Grid authorities	
	Hybrid actors (public-private)	
	Indigenous people	
	Informal relations	
	Local smallholders	
	Ministries	
The state		
1.4 Societal context	Transnational actors and donors	
	Carbon markets	
	Cost effectiveness	
	Distributional conflicts	
	Developmental State	
	Environmental Kuznets Curve	
	Financial and human resources	
	Fossil fuel industry	
	Foreign direct investments	
	Geopolitics	
	Industrialization	
	Investment strategies	
	Macro-economics	
	Political struggles over nature	
	Sub-national competition	
1.5 Conflicts and critique	Stranded assets	
	Climate mobilization	
	Democratic compatibility	
	Just transition	
	Political complexity	
	Poverty and inequalities	
	Power relations and distribution	
	Social capital	
	Social consequences	
	Social infrastructure	
	Socio-environmental tensions	
	State-society linkages	
	Increased inequalities	
	Institutional and political disarray	
	Land (use) conflicts	
Fossil fuel industry		
2 Modes of change <i>How and through what mechanisms can institutionalization be achieved?</i>	2.1 Technological advancement and know-how	Neoliberal critique
		Resources access and degradation
		Weak institutions
		Capacity development and training
		Distribution of technologies
		Research and development
		Technical and scientific expertise
		Technological innovations and patents
		Technology leadership

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(continued)

Category	Code group	Codes
3 Conditions <i>Which factors shape the success/failure of institutionalization?</i> Enabling conditions: + Hindering conditions:	2.2 Market mechanisms and voluntary action	Technology transfer
		Carbon markets/finance/pricing/accounting
		Carbon offsetting
		Carbon tax
		Clean Development Mechanism (CDM)
		Commodification of nature
		Emissions trading scheme
		Energy auctions
		Feed-in tariffs
		Private sector incentives
		Payment for ecosystem services
		Privatization
	2.3 Regulatory reforms and policies	Voluntary markets
		Community-level policies
		Low-carbon policy framework
		Policy learning
		Regulatory environment
		Supportive economic policies
		Top-down steering mechanisms
	2.4 Structural changes	Buen Vivir
		Civilizing markets
		Community forests
		Gendered practices
		Infrastructure access
Project-based development governance		
Socio-carbon cycles		
State-owned vs market liberalization		
Sustainable mode of living		
Territoriality and citizenship		
2.5 Discursive shifts	Alternative world views	
	Create legitimacy	
	Discourses, stories	
	Shape preferences	
2.6 Delays and resistance	Success narratives	
	Integrating fossil fuel industry	
3.1 Geophysical conditions	Marketization, ecosystem services	
	Post-political climate politics	
	Geographical factors (±)	
	Suitability mapping	
	Foreign dependency	
	Market information (+)	
	Marketing, labeling, certification (+)	
	Private sector investment (+)	
	Transaction costs (-)	
	Calibration (+)	
	Corruption/clientelism (-)	
	Dispossession (-)	
3.2 Economic conditions	Distributional conflicts (-)	
	Financialization (-)	
	Local community heterogeneity (±)	
	Multi-level paralysis (-)	
	Neo-colonialist project design (-)	
	Policy fragmentation	
	Policy interventions (+)	
	Political-economic structure (±)	
	Power relations (±)	
	Representation and recognition (+)	
	Social justice co-benefits (+)	
	3.3 Political conditions	Availability of data (±)
Challenge to receive data (-)		
Examples, Diffusion, Replication (+)		
Implementation capacity by the state (+)		
Knowledge and ideas from outside (+)		
Ownership (+)		
Lack of expertise (-)		
Science-policy interaction (±)		
Training and technology (+)		
Awareness (+)		
3.4 Knowledge		Challenges to established belief systems (+)
		Circulation, Anchoring (+)
	Conception (+)	
	Cultural legitimacy (±)	
	Deliberation (+)	
	Discourse/stories (+)	
	Expansion, Consolidation (+)	
	Ideology (±)	
	3.5 New ideas and narratives	

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(continued)

Category	Code group	Codes
	3.6 Institutional lock-ins	Negative perception (–) Reframing (+) Success narrative (±) Carbon lock-in (–) Established discourses (–) Predefined pathways (–) Vested interests (–)

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