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# From Governance Experiments to Low-Carbon Transformations:

## The Political Institutionalization of Climate Change Mitigation in Emerging Economies

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## 1. Background and state of the art

This project aims to analyze the processes and conditions of political institutionalization of climate change mitigation in the high-carbon intensive sectors of agriculture and energy in emerging economies. We depart from two findings that stand out in the literature: First, we witness the emergence of numerous **governance experiments** that are aimed at reducing *greenhouse gas* (GHG) emissions (e.g. [Bulkeley & Castán Broto 2013](#); [Hildén et al. 2017](#); [Hoffmann 2011](#); [Turnheim et al. 2018](#)). These experiments are undertaken by a variety of state and non-state actors as an “*approach to governing*” ([Huitema et al. 2018, 144](#)) with the objective of learning and policy adaptation ([Fuhr & Lederer 2009](#); [Fuhr et al. 2018](#); [Hickmann 2013, 2017](#); [Hildén et al. 2017](#); [Hoffmann 2011](#); [Huitema et al. 2018](#)). Second, various authors describe the need for ambitious, inter-sectoral and all-encompassing, societal **low-carbon transformations** to maintain the economic and social development within planetary boundaries ([Jackson 2011](#); [Lederer et al. 2019](#); [Leggewie & Welzer 2010](#); [Scoones et al. 2015](#); [WBGU 2011](#)). From these literatures, we know who does what and why and, to some extent, how successful governance experiments have been. We also have a clear understanding of what is needed to reach low-carbon transformation. However, what we do not know is under which conditions we can close the gap between governance experiments and low-carbon transformations.

In **our own research**, we have focused for a long time on carbon governance arrangements in the Global South ([Fuhr & Lederer 2009](#); [Fuhr et al. 2018](#); [Lederer 2014 2015](#); [Lederer et al. 2018](#); [Lederer et al. 2019](#)). In a **previous DFG project** (Reference Numbers: FU 274/11-1 and LE 2644/4-1; Project Number: 270088441) we have analyzed the evolution and impact of two important climate governance experiments – *Reducing Emissions from Deforestation and Forest Degradation* (REDD+) initiated in a top-down fashion, and *Transnational City Networks* resulting from bottom-up activities – in Brazil, India, South Africa, and Indonesia. In particular, we investigated how these initiatives are reconfiguring public authority through recentralization or decentralization ([Hickmann et al. 2017](#); [Höhne et al. 2018](#)), and what kind of organizational and policy changes are being triggered in the respective policy fields ([Lederer et al. Forthcoming](#); [Lederer & Höhne under review](#); [Stehle et al. 2019](#)). We found that governance experiments were taken up very differently across countries, sectors, and even within countries and sectors, and that there was a high variation in terms of the political institutionalization, particularly at the subnational level ([Elsässer et al. 2018](#); [Hickmann et al. 2017](#); [Höhne 2018](#); [Lederer et al. Forthcoming](#); [Stehle et al. 2019](#)). We found that various interesting developments are occurring, regarding both policies and organizations (e.g. the establishment of REDD+ agencies at the national and provincial level in Indonesia and East Kalimantan, the moratorium on new forest concessions in Indonesia, and the launch of the Green India Mission as a domestic substitute for REDD+ in India). While some policy makers initiated highly ambitious projects (e.g. the Corridors of Freedom Project in Johannesburg or the Forest Carbon Partnership Facility Project on REDD+ in East Kalimantan), other initiatives showed very little progress (e.g. C40 engagement in Indian cities, such as Bangalore or New Delhi or Curitiba in Brazil), became stuck or even collapsed once the government changed (e.g. Central Kalimantan on REDD+ or increasing GHG emission trends despite existing climate policies in Sao Paulo).

Hence, we witness a **micro-macro paradox** similar to that of reform processes in international development cooperation ([Andrews 2013](#); [Andrews et al. 2017](#); [particularly in state reform, see Campbell & Fuhr 2004](#); [Grindle 2007](#); [Levy 2015](#); [OECD 2018](#)) and we are thus interested in understanding the conditions under which governments move towards low-carbon transformations. Some authors claim that governance experiments scale up and are being entrenched in political dynamics ([Bernstein & Hoffmann 2018](#)) or by the diffusion of new policy instruments ([Jordan & Huitema 2014](#)). However, these literatures stay rather vague on the necessary or sufficient conditions for such processes to take place. As we will elaborate further below, we assume that **political institutionalization is the missing link** in overcoming “political aspects of carbon lock-in” ([Bernstein & Hoffmann 2018, 194](#)). Interestingly, this coincides with our own findings, namely that single governance experiments rarely resulted in disruptive developments towards transformation. Instead, we found that context mattered crucially, and that we need to look for more fundamental political dynamics to understand (non-)institutionalization of climate change mitigation ([Lederer et al. Forthcoming](#); [Lederer & Höhne under review](#); [Stehle et al. 2019](#)).

The institutional change literature **defines institutions** as “a set of rules, formal or informal, that actors generally follow, whether for normative, cognitive, or material reasons, and organizations as durable entities with formally recognized members, whose rules also contribute to the institutions of the political economy” ([Hall & Soskice 2001, 9](#); [see also North 1990](#)). **Institutionalization** is thus the process of developing formal and informal rules (including organizations) and changing previous existing formal and informal rules (including organizations) ([see Pasquini & Shearing 2014, 287 for a similar perspective](#)). Institutionalization can occur inside the political system (i.e. in terms of polity, politics, and policy) and outside of it in the broader society (i.e. in terms of social and economic structures, processes and content). In the following, we focus only on institutionalization in the political (and administrative) system, as political dynamics are decisive ([Bernstein & Hoffmann 2018](#)).

Institutionalization is **different from policy integration** insofar as the latter focuses predominantly on the coordination and collaboration between silo-administrative structures. Some authors assume that better

policy integration leads to better performance, even though evidence on this is scarce ([Candel & Biesbroek 2016](#); [for an exception see Persson et al. 2016](#); [Tosun & Lang 2017](#)). By contrast, our focus is less on procedural aspects, but rather on the **conditions** that lead to the outcome of institutionalization as the very substance of (non-)change. As we will explain below, we borrow from the literature on structure (i.e. geography, markets, political-administrative set-up, and normative orders), agency (state and non-state leadership), and multi-level politics (i.e. inter-/transnational and domestic politics) (see *Section 2* for further details). We thereby follow the argument recently raised in the literature on policy integration, which has acknowledged that more fundamental political aspects preclude transformational change ([Ravikumar et al. 2018](#)).

The **(global) environmental politics literature** so far knows very little about the conditions under which entire policy fields can be transformed, particularly when it comes to climate change mitigation in the respective policy fields (for notable exceptions, see [Rüdinger et al. 2018](#); [van der Heijden 2013](#)). Previous research has primarily focused on analyzing the level of domestic climate change ambitions ([Burck et al. 2018](#); [Climate Action Tracker 2017](#); [Rüdinger et al. 2018](#)), indicating that progress in formulating rigorous climate policies has always been highly uneven across countries (e.g. [Bernauer & Böhmelt 2013](#); [Tobin 2017](#)). This body of literature has neither explained the conditions for success and failure ([for a first attempt to evaluate the credibility of ambitions, see Averchenkova & Matikainen 2016](#)) nor the observable differences *within* countries, namely between subnational jurisdictions or across policy fields. Furthermore, scholars dealing with climate governance experiments have neither included issues of timing and sequencing in their research ([Rüdinger et al. 2018](#)), nor have policy sciences included “insights into how experiments affect [...] policy change” ([Huitema et al. 2018, 156](#)). By contrast, research on societal and economic transitions has highlighted that innovations emerge in specific niches, and that economic and technological aspects have to come together to foster change ([Geels 2011](#)). But these literatures have left governance issues and the role of governments largely at the margin ([Meadowcroft 2011](#)). Moreover, most explanations for ‘radical climate policy change’ are based on policy models that essentially reflect the domestic structures and lessons from the US, and are limited in their application to the global North ([Carter & Jacobs 2014](#)). Furthermore, most of these case studies do not integrate global governance developments sufficiently ([Lederer 2015](#); [Purdon 2015](#)) and only a few focus on particular aspects of climate change institutionalization in the Global South in a comparative manner ([Held et al. 2013](#); [Urban & Sumner 2012](#); [Urban 2014](#)). Our project will contribute to filling this gap by providing new insights into the conditions that are necessary and sufficient for political institutionalization to set us on a path towards low-carbon transformations.

## 2. Objectives and Work Program

The project’s **objective** is to explain why the political institutionalization of climate change mitigation advances at different speeds, and why in some instances there has been little progress or even a reversal of former achievements. Our **research question** is: Under what conditions does climate change mitigation become politically institutionalized in the high-carbon intensive sectors of energy and agriculture at the subnational governmental level of democratic emerging economies? This focus is of **theoretical relevance**, as our research project contributes to the literature on domestic political institutionalization (outcome/ dependent variable) in the field of global policy-making (for similar approaches, see [Bernstein & Hoffmann 2018](#); [Rüdinger et al. 2018](#)) and brings it together with the literature on agency, structural impediments as well as multi-level politics (conditions/ independent variable). It is therefore potentially relevant beyond the field of global climate politics. **Empirically**, we go beyond the existing literatures on governance experimentation and low-carbon transformations by focusing on the processes through which climate change mitigation becomes gradually institutionalized at a defined governmental level, and within a certain high carbon-intensive sector. **Methodologically**, our research project is innovative as we will use QCA

(*qualitative comparative analysis*) that will enable us to investigate sets of necessary and sufficient conditions.

The dependent variable, or the **outcome** we are interested in, is the (non-)existence of the political institutionalization of climate change mitigation in two high-carbon intensive sectors at the subnational level: energy and agriculture. More specifically, we are interested in the advancement of solar energy (as part of renewable energy) and forest-related climate smart conservation agriculture (as part of climate smart agriculture) as they present specific sector solutions for moving towards low-carbon societal transformations. We scrutinize subnational polities within four democratic emerging economies (Brazil, India, Indonesia, and South Africa) and focus on the period between 2005 and 2021.

In the **agricultural sector** we focus on the **promotion of forest-related climate smart conservation agriculture**. REDD+ projects and policies are massively influenced by domestic pressure groups in the agricultural sector ([Lederer et al. Forthcoming](#); [Solymosi et al. 2013](#)), and they can only succeed within a broader inter-sectoral approach that holistically understands forestry as part of a broader landscape ([Lederer 2012](#); [Turnhout et al. 2017](#)). This is now being conceptualized as *climate smart agriculture* (CSA) ([Arakelyan et al. 2017](#); [FAO 2018](#); [Harvey et al. 2014](#); [Totin et al. 2018](#)).<sup>1</sup> We will focus on the political institutionalization of forest-related conservation agriculture ([Harvey et al. 2014](#)) as one specific form of CSA, as it refers to practices that also relate to the protection of tropical forests, which is critical for most rainforest nations at the agricultural-forest-frontier in the Global South. In the **energy sector**, we investigate the **promotion of solar energy**. This sector has a huge potential in the Global South and will be of crucial importance for low-carbon transformations. Solar energy is very promising and less environmentally harmful than hydropower and bio-fuel ([Edenhofer et al. 2012](#); [Gibson et al. 2017](#); [Pimentel 2008](#)). In our previous research project, which also analyzed the role of transnational city networks, we found that transnational efforts to promote renewable energy (RE) were hampered by institutional structures within nation-states, particularly by the overall lack of competences and resources of city governments and vested business interests ([Elsässer et al. 2018](#); [Hickmann et al. 2017](#)). Revenue and expenditure authorities often resided exclusively with higher levels of government, such as provinces or states, limiting the range of local climate action. However, some initiatives succeeded and progressively attempted to broaden their scope – and are thus likely to provide interesting evidence for our research.

We **operationalize the political institutionalization of climate change mitigation** through four different types of changes which relate to the formal and informal rules in respective sectors under investigation: (i) rhetorical and discursive changes, (ii) organizational changes, (iii) policy changes, and (iv) changes in implementation (see *Table 1*).

Political institutionalization does not only represent a process. It is also a specific outcome that can be measured at the end of the investigation period by tracking the changes in rhetoric, organizations, policies and implementation that have occurred since the starting point ([Bernstein & Hoffmann 2018 speak of scale up and entrenchment which is certainly close to what we have in mind, but we believe institutionalization is the better term](#)). All four types can be understood along a continuum that ranges at one end from no change to small and major change, and finally to radical change at the other end ([Capano 2009](#); [Hall 1993](#)). This draws on the results of our previous research where we analyzed reconfigurations of authority focusing on the build-up of capacities as well as on the initial signs of policy changes for urban climate change issues and forestry ([Lederer et al. Forthcoming](#); [Lederer & Höhne under review](#); [Stehle et al. 2019](#)). However, as we are focusing on institutionalization and lock-in effects over time, we include rhetorical change as a very initial phase, and implementation plus roll-out as a highly advanced phase of political institutionalization. Rhetorical

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<sup>1</sup> CSA aims at “transform[ing] and reorient[ing] agricultural systems [...by] sustainably increasing agricultural productivity and incomes; adapting and building resilience to climate change; and reducing and/or removing greenhouse gas emissions” ([FAO 2018](#)).

changes can be important signals to societal actors for shifting towards low-carbon transformation, e.g. investing in solar energy or moving towards forest-related climate smart conservation agriculture.

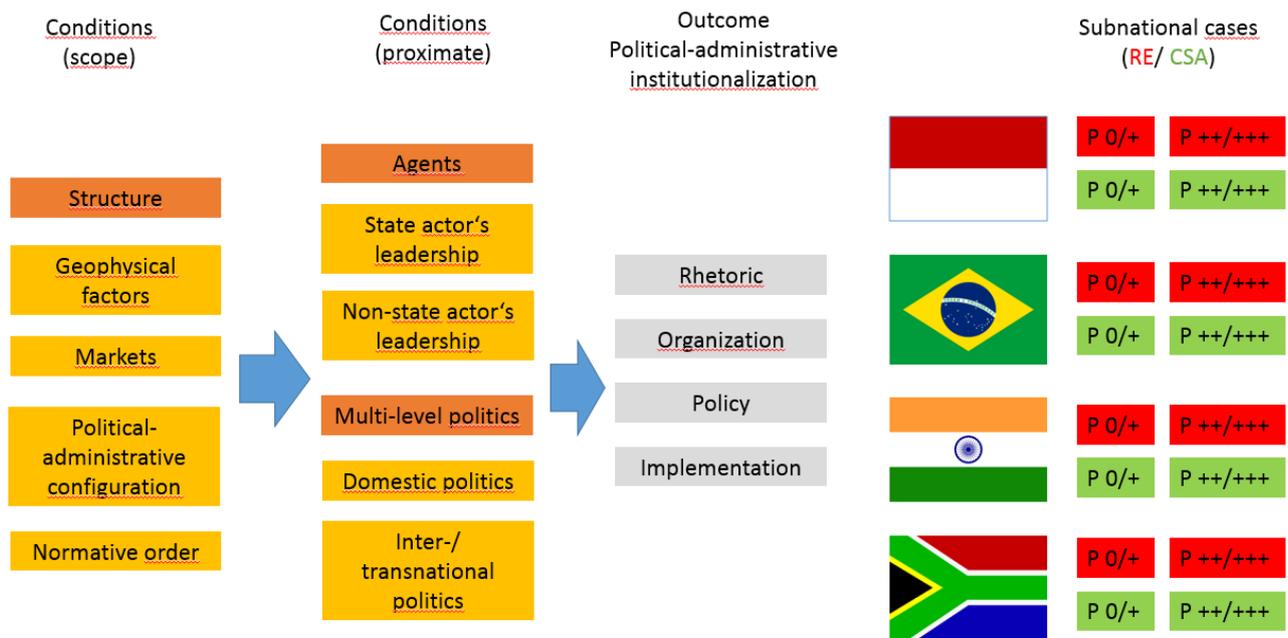
**Table 1:** Operationalization of Political Institutionalization of Climate Mitigation in High-Carbon Intensive Sectors

Type of Change	Operationalization	No change (0)	Small Change (0.3)	Major Change (0.7)	Radical Change (1)	Reversal
<b>Rhetoric</b>	Evolution over time of discourse by actors on climate change mitigation	Rhetorical rejection	Only few actors argue in favor of climate change mitigation	Statements are divided with regard to climate change mitigation	Rhetorical statements are fully aligned with regard to climate change mitigation	Backsliding to former political positions in statements with regard to climate change mitigation
<b>Policy</b>	Set-up of laws, regulations, and development plans	Policy rejection	Change of level of a policy instrument	Change of policy instruments	Change of hierarchy of goals of a policy	Backsliding to former political positions in policies
<b>Organization</b>	Set-up and changes in bureaucracies and capacities within a sector	Organizational rejection	Few people work on the issue	Small units set-up	Large department set-up	Backsliding to former organizational structure
<b>Implementation</b>	Implementation orders, resource provision, and enforcement	Implementation rejection	Small amount of funding allocated and disbursed; policy change mostly un-enforced	Medium amount of funding allocated and disbursed and policy change mostly enforced	Large amount of funding allocated and disbursed; policy change completely enforced	Backsliding to former political implementation status

Source: Own Compilation based on policy literature ([Capano 2009](#); [Hall 1993](#)) and own research ([Höhne 2018](#); [Lederer et al. Forthcoming](#); [Lederer & Höhne under review](#); [Stehle et al. 2019](#)).

We will adopt a **two-step approach**. First, we will undertake a **cross-country comparison** analyzing variation at the subnational level in four democratic emerging economies (Brazil, India, Indonesia, and South Africa). In each country, there are subnational jurisdictions with differing degrees of political institutionalization of climate change mitigation in the sectors of energy and agriculture. For each policy field and each country, we analyze two subnational jurisdictions. Altogether, we scrutinize 16 subnational jurisdictions and compare them with each other (see below our criteria for case selection and how we will use QCA methodology). Second, we will undertake **in-depth case studies** focusing on the causal mechanisms within the configurations and solution pathways identified in the first step.

When it comes to the **conditions** that enable or hinder institutionalization, out of the many possible variables we focus on **eight key conditions** within the following three clusters: (i) agency, (ii) structure and (iii) multi-level politics. They are based on two complementary sources: First, on our own research, in which we have found evidence for their relevance ([Elsässer et al. 2018](#); [Höhne 2018](#); [Höhne et al. 2018](#); [Lederer et al. Forthcoming](#); [Lederer & Höhne under review](#); [Stehle et al. 2019](#)). Second, on the literatures that have stressed the importance of (i) agency through state and non-state leadership ([Finnemore & Sikkink 1998](#); [Keck & Sikkink 1998](#); [Lieverink & Wurzel 2017](#); [Mintrom & Luetjens 2017](#)); (ii) structures through markets, political-administrative configurations, normative orders, and geophysical conditions ([Checkel 1999](#); [Risse et al. 2013](#); [Smoke 2015](#)); and (iii) multi-level politics through domestic and international support or constraints ([Hooghe & Marks 2001, 2003](#); [Weibust & Meadowcroft 2014](#)). The latter has also been shown in the literature on the Global South's dual transitions towards democratic market economies ([Haggard & Kaufman 1995](#); [Merkel 2010](#); [Nelson 1989](#)) and in the norm literature on human rights ([Keck & Sikkink 1998](#); [Risse et al. 1999](#); [Schapper 2017](#)). We argue that these eight conditions are most likely to play a role in specific configurations and thus we do not formulate mutually exclusive hypotheses. In short, our research design is represented in the following graph:



Explanation: RE = renewable energy (solar energy) / CSA = climate smart agriculture (forest-related conservation agriculture); P = Province/subnational state; P 0/+ = Province/subnational state with no or small change; P ++/+++ = Province with major or radical change; progress, stagnation or reversal of institutionalization can occur in any case over the period of investigation.

**Structures** are often assumed to be very important for policy change. First, geographic conditions matter. They affect the development of solar energy or instruments for forest-related climate smart conservation agriculture. However, we know not only from Germany but, for example, also from the roll-out of wind energy in India, that natural factors cannot explain the differences in performance at the subnational level ([Benecke 2009](#)). Second, we consider domestic market development, which determines the prices of available technology and the relative market prices of low carbon solutions (e.g. solar energy, forest-related climate smart conservation agriculture) in comparison to high carbon solutions (e.g. coal energy and conventional agriculture) ([Kern et al. 2014](#)). Third, we analyze the existing political-administrative configuration of subnational governments. Subnational governments that lack meaningful powers, financial resources or capacities in a specific sector will not be able to take meaningful action towards institutionalizing climate change mitigation ([Stehle et al. 2019](#)). Capacity is a particularly important factor for countries of the Global South, since it tends to be low in subnational administrations (Fuhr 1999, [Bersch et al. 2017](#); [Risse et al. 2013](#)). Finally, we scrutinize the normative order of the respective domestic political economy. This includes their shared norms and ideas regarding the way of economic development ([Blyth 2002](#)). New normative understandings need to resonate with preexisting domestic normative orders to realize their political institutionalization ([Checkel 1999](#)). Domestic legitimacy must be given so that ownership can develop as a prerequisite for any policy change ([Krasner & Risse 2014](#); [Lederer 2018](#)).

While our research design acknowledges that these structural elements are of importance, they might not be sufficient for institutionalizing climate change mitigation. We will, therefore, examine these four variables as context conditions, assuming that they have indeed to be present in certain combinations, and up to a certain degree without determining the success of institutionalization (see *Table 2*; if several indicators apply, then we will take the average of the resulting value).

**Table 2:** Operationalization of Structural Conditions

	Geophysical factors	Markets	Political-administrative configuration	Normative order
<b>Non-existent (0)</b>	<i>Highly unfavorable:</i> Very low sunshine duration or small amount of land available for solar parks; No geographic possibilities for	<i>Very high production and use prices</i> of solar energy or CSA products. Solar energy or CSA product prices are well	<i>No or very low political, financial, and administrative resources</i> at the respective governmental and administrative level. No competences for policy-making	<i>Existence of strongly conflicting domestic norms</i> about appropriate behavior with regard to the new

	CSA due to soil quality (e.g. desert) and lack of land. Very high competition over land for other land uses (e.g. industrialization, agriculture, urbanization).	above the average fossil fuel based energy prices or conventional agricultural prices in the country.	or implementation. No sources of own income and no allocation of funding from the central government. Very few people working there.	external norm. No domestic legitimacy given.
<b>Weak (0.3)</b>	<i>Unfavorable:</i> Some duration of sunshine and some land available for solar parks; some opportunities for CSA due to acceptable soil quality (e.g. savanna), weather conditions, and little land available. High competition over land for other purposes (e.g. industrialization, agriculture, urbanization).	<i>High production and use prices</i> for solar energy or CSA products. Solar energy prices or CSA product prices are above the average fossil fuel-based energy prices or conventional agricultural prices in the country.	<i>Low political, financial, and administrative resources</i> at the respective governmental and administrative level. Some competences, mostly for implementation. Administrations are dependent on central government funding and lack own sources of income. Own staff with some knowledge is available.	<i>Existence of conflicting and opposing norms</i> about appropriate behavior with regard to the new external norm. Low legitimacy given by elites and by the people.
<b>Medium (0.7)</b>	<i>Favorable:</i> Medium amount of sunshine duration (e.g. partly savanna/desert) and medium amount of available land. Opportunities for CSA due to good soil quality, weather conditions and available land. Medium competition over land for other purposes.	<i>Medium production and use prices</i> of solar energy or CSA products. Solar prices or CSA product prices overall equal the average fossil fuel based energy prices or conventional agricultural prices in the country.	<i>Sufficient political, financial, and administrative resources</i> at the respective administrative level. Competences are shared with the central government in the areas of policy-making. Competence for implementation available. Administrations have sources of income and receive central government funding. Medium level of staff available with good knowledge of the topic.	<i>No conflicting and opposing norms</i> about appropriate behavior with regard to the new external norm. High legitimacy given by elites and low legitimacy given by the people.
<b>Strong (1)</b>	<i>Highly favorable:</i> High sunshine duration (e.g. desert) and large areas of available land for solar parks. Very good possibilities for CSA given due to high soil quality (e.g. accessible rainforest) and available land and very favorable weather conditions. No competition over land for other land purposes.	<i>Low to very low production and use prices</i> of solar energy or CSA products. Solar energy prices or CSA product prices are well below the average fossil fuel-based energy prices or conventional agricultural prices in the country.	<i>Strong political, financial, and administrative resources</i> at the respective governmental and administrative level. Full competences for policy-making and implementation available. Administrations have own sources of income and do not rely on central government funding. Staff available with very good knowledge of respective topic.	<i>Existence of supportive domestic norms</i> with regard to the new external norm. High legitimacy given by the elites and by the people.

Source: Own Compilation.

Change needs **agents** ([WBGU 2011](#)) and various authors have highlighted the fact that processes for successful institutionalization depend on key actors that push for policy change (e.g. [Finnemore & Sikkink 1998](#); [Keck & Sikkink 1998](#); [Lieberink & Wurzel 2017](#); [Mintrom & Luetjens 2017](#); [Sabatier 1991](#)). On the one hand, we can build on the literature that analyzes the role of political entrepreneurs, which are defined as “advocates for proposals or the prominence of an idea [...willing ...] to invest their resources – time, energy, reputation, and sometimes money – in the hope of a future return” ([Kingdon 1995, 122](#)). In our own research, we have shown that domestic political leadership is especially important in nation-states, which are characterized by a top-down organizational culture ([Stehle et al. 2019](#)). But leadership in subnational governments has also been crucial for triggering and maintaining local innovations (e.g. [Barber 2013](#); [Campbell & Fuhr 2004](#)). However, we know little about the conditions under which political leadership boosts more sustainable solutions ([Tosun & Schoenefeld 2017](#)). On the other hand, we can build on research that focuses on the role of new normative understandings embodied in (international) norms. Scholars in this tradition have focused on the dynamics between the international and domestic levels, and the adoption of international norms through socialization processes initiated by norm entrepreneurs ([Finnemore & Sikkink 1998](#); [Keck & Sikkink 1998](#); [Risse et al. 1999, 2013](#)) or through the localization ([Acharya 2004](#)) and norm

translation of external norms by domestic actors ([Zimmermann 2017](#)). Irrespective of the agents driving the process, however, a change of domestic norms cannot only be contested ([Wiener 2018](#)), it can also be rejected by domestic agents who are engaged as antipreneurs ([Bloomfield 2015](#)). We will make use of both perspectives and analyze politicians, administrators, representatives of the business sector as well as civil society, the media, and scientists. Non-state actors can be agents in the process of political institutionalization by convincing state actors to take action ([Keck & Sikkink 1998](#)), by resisting change ([Bloomfield 2015](#)), or by advancing their own political priorities through state capture ([Richter 2017](#)). The literature on leadership makes rather strong claims about change agents not only being necessary, but even being sufficient for initiating innovations. Whether this can be generalized, and how significant leadership is for the process of political institutionalization, would need to be scrutinized. We will code the quality of leadership in the following way (see *Table 3*).

**Table 3:** Operationalization of Agency Conditions

Quality of Leadership	State Actors	Non-State Actors
<b>Non-existent (0)</b>	Political priorities and engagement not in line with the new objectives; public actors take no initiative	Political priorities and engagement not in line with the new objectives; dominant non-state actors take no initiative in favor of the objectives but tend to try to prevent the advancement of these new objectives through lobbying, state capture or outward resistance
<b>Weak (0.3)</b>	Public actors engage in some discourse through speeches, but lack engagement for policy and organizational change and implementation	Dominant non-state actors engage in some discourse, but do not support policy or organizational change and implementation or even try to prevent these through hidden lobbying or state capture
<b>Medium (0.7)</b>	Public actors engage in some discourse, support and initiate policy and organizational change, but do not ensure the implementation	Dominant non-state actors engage in some discourse, and support policy or organizational change, but do not engage in implementation or even try to prevent it through hidden lobbying or state capture
<b>High (1)</b>	Strong political priorities and strong engagement in line with the new objectives; public actors engage in discourse, initiate policy change and organizational change, and ensure implementation	Strong political priorities and strong engagement in line with the new objectives; dominant non-state actors engage in discourse, support policy change and organizational change, and assure the implementation through continued pressure on the government through lobbying or even state capture.

Source: Own Compilation.

Finally, we will incorporate analyses of **multi-level politics**. Initially used by scholars focusing on the European Union as multi-level governance ([Hooghe & Marks 2001, 2003](#)), scholars concerned with global environmental politics adopted the term and transferred it to the policy domain of climate change ([Lederer 2015](#)). It is now being used to open up the black box of the nation-state and to conceptualize the various processes that link international institutions, national governments, and sub- and non-state actors in global climate policy-making ([Fuhr et al. 2018](#); [Gupta 2007](#); [Höhne 2018](#); [Weibust & Meadowcroft 2014](#)). Recent research has distinguished multi-level politics from multi-level governance and defined the former as “variants of regularly recurring or more sporadic processes of interaction between and among territorially defined governmental and, sometimes, non-governmental actors” ([Alcantara et al. 2016, 38](#)). Accordingly, this can involve interactions, including support or constraints, by domestic or international actors. This is of relevance for two reasons: First, the policies in question are being developed within a global setting and receive much support from international donors, NGOs, etc. We therefore scrutinize whether this second-image reversed mechanism involving international as well as transnational channels plays a role for the domestic institutionalization of policies. Second, and particularly important for the cases we focus on, multi-level politics occur in federalist and decentralized countries through interaction between the national and subnational governments ([Hickmann et al. 2017](#)). These governmental levels comprise varying degrees of political, administrative, and financial powers in a respective policy field ([Smoke 2015](#)) and public actors can engage in uploading or downloading new policy initiatives or innovations to other governmental levels for

policy formulation and implementation ([Höhne et al. 2018](#)). We therefore distinguish between two conditions: inter-/transnational multi-level politics and domestic multi-level politics (see *Table 4*).

**Table 4:** Operationalization of Domestic and Inter-/Transnational Multi-Level Politics Conditions

	Domestic multi-level politics	Inter-/transnational multi-level politics
<b>Non-existent (0)</b>	<i>No flow of information or orders</i> from upper or lower governmental level to the governmental level under scrutiny; institutionalization occurs without mutual coordination and cooperation with other governmental level actors or are non-existent. No allocation of financial resources from upper or lower governmental levels to the respective governmental level under scrutiny.	<i>No flow of information or financial resources</i> from international/transnational organization to the respective level of government under scrutiny.
<b>Weak (0.3)</b>	<i>Sporadic flow of information and/or orders</i> from upper or lower governmental level to the governmental level under scrutiny; institutionalization occurs with weak mutual coordination and/or weak cooperation with other governmental level actors. No allocation of financial resources from upper or lower governmental levels to the respective governmental level under scrutiny.	<i>Sporadic flow of information</i> from international/transnational organization to the respective level of government under scrutiny, e.g. in one-off events or initiatives.
<b>Medium (0.7)</b>	<i>Regular flow of information and/or orders</i> from upper or lower governmental level to the governmental level under scrutiny; institutionalization occurs with mutual coordination and/or cooperation with other governmental level actors. Sporadic allocation of financial resources from upper or lower governmental levels to the respective governmental level under scrutiny.	<i>Regular flow of information</i> from international/transnational organization to the respective level of government under scrutiny, e.g. in regular meetings or working groups. <i>Sporadic flows of resources</i> from international/transnational organization to the respective level of government under scrutiny.
<b>Strong (1)</b>	<i>Regular flow of information and/or orders</i> from upper or lower governmental level to the governmental level under scrutiny; institutionalization occurs with mutual coordination and/or cooperation with other governmental level actors. Regular allocation of financial resources from upper or lower governmental levels to the respective governmental level under scrutiny.	<i>Regular flow of information and financial resources</i> from international/transnational organization to the respective level of government under scrutiny.

Source: Own Compilation.

While none of these **eight conditions** alone can adequately explain why climate change mitigation gets politically institutionalized at subnational level in democratic emerging economies, we are particularly interested in their combined effects. We hence use the method of qualitative comparative analysis (QCA) which is particularly useful for at least three reasons: (i) it captures the complexity of political institutionalization and related dynamics by using non-binary values to code the relevant conditions; (ii) it is well-suited for medium-N research; and (iii) it helps to identify the necessary and sufficient conditions for policy outcomes across a certain set of cases.

Our universe of **cases** theoretically includes all subnational units where climate change mitigation has been institutionalized at least to some extent. We will focus on **comparable subnational units** in four democratic, decentralized, and high GHG emitting emerging economies<sup>2</sup>: Brazil, India, Indonesia, and South Africa. We do this for the following four reasons: First, these countries have all started to become actively engaged by issuing climate change action plans. Second, in all four countries there is significant variation among subnational entities (see *Tables 6 and 7*), i.e. within the same national setting and the same sector, and there are strong differences in performing climate activities that can only be explained by taking subnational features into account. As we will study a total of 16 subnational cases over the period from 2005 to 2021, we will be able to pinpoint phases of progress, stagnation and reversal by focusing on the three time points of 2005, 2013, and 2021, which increases our sample from 16 to 48 units.<sup>3</sup> In this context, we will undertake

<sup>2</sup> Among all countries of the world and including land-use GHG emissions, India was the third largest historical GHG emitter, Indonesia the fourth, Brazil the sixth, and South Africa the fourteenth in 2014 ([World Resources Institute 2018](#)).

<sup>3</sup> In the past, political science literature, such as norm research, has often focused only on successful cases ([but see McKeown 2009 for norm regress](#)). By including “laggards” in our analysis, we hope to better identify constellations that actually make change possible and learn about conditions that hinder or even reverse institutionalization. Furthermore, the use of non-cases has to this

inter-sectoral and intra-sectoral comparisons to highlight differences and congruencies (for each sector, we have 24 units which will be sufficient for QCA as the number of units is higher than the combination of conditions as we first scrutinize the significance for structural conditions with  $2^4=16$ , and then the salience of conditions of agency and multi-level politics conditions with  $2^4=16$ ). Third, we explicitly focus on democratic and largely decentralized countries. This allows us to better explain the role of subnational politics that is, at least to some extent, independent of the nation-state's capital. Finally, and very importantly for QCA ([Berg-Schlosser & De Meur 2009](#)), we have first-hand knowledge from our previous research and can build on our existing analyses.

Regarding **solar energy** across all four countries, subnational governments have at least some jurisdictional authority to promote solar energy. In India, energy is a concurrent subject of central and state governments, in which states can develop their own policies and are responsible for their implementation ([Thapar et al. 2016](#)). In Brazil, energy provision is a Federal subject, but states can come up with their own auctions and strategies. In Indonesia and South Africa, central governments are the owners of the utilities, have the mandate for energy generation and maintain the national grid. This leaves subnational governments with less authority than in Brazil or India. However, Indonesian provinces have their own Energy Agencies, can choose to build their own grid provisioned with their own (solar) energy and have the “power to develop regional master plans and regulations on energy” ([IEA 2007](#)). In South Africa, cities have the mandate for energy distribution, while energy generation is considered a grey area with municipalities being partly dependent on the central government's approval ([Jaglin 2014](#)). Obviously, there is significant variation in terms of the political institutionalization of solar energy in our four countries and this is partially strong at subnational level (*Table 6* shows cases identified so far and their degree of institutionalization).

**Table 6:** Subnational Competences and Cases of Solar Energy<sup>4</sup>

	<b>Brazil</b>	<b>India</b>	<b>Indonesia</b>	<b>South Africa</b>
<b>Solar energy competences</b>	Energy policy is Union subject, but states can have own energy generation auctions	Energy policy is concurrent subject of central and state governments	Energy is driven by national policies. Provinces are mostly involved in some implementation, but can build up their own grid and energy provision	Energy policy is centralized, but municipalities, especially metropolitan areas, can provide their own energy to some extent
<b>Radical or major changes</b>	Minas Gerais (0.7)	Gujarat (1) <sup>5</sup>	East Java (0.7)	Cape Town (0.7)
<b>Small or no changes</b>	Bahia (0.3)	Mizoram (0.3)	West Java (0.3)	KwaDukuza (0.3)

Source: Own Compilation.

Across all four countries, subnational governments have at least some jurisdictional authority to promote **forest-related climate smart conservation agriculture**. However, the responsibilities of subnational governments in the agricultural sector vary significantly across the cases: In Indonesia, responsibility lies with the districts, which give out plantation permits and may propose land use changes, while the central and provincial government can give overall policy direction in forms of strategies, plans and policies ([Setiawan et al. 2016](#)). As we are mostly interested in policy change and have witnessed interesting initiatives at the provincial level in East Kalimantan, we will study provinces instead of districts, even though the latter will ultimately be needed for implementation. In India, agriculture is a state subject, but is also influenced by national policies, such as the Agroforestry Policy ([Pandey & Suganthi 2015](#)). In South Africa ([Republic of South](#)

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point been neglected in the analysis of climate policies. We can, however, build on insights from studies of revolution ([Skocpol 1979](#)) or genocide studies ([Straus 2015](#)), where examining the non-cases has been successfully used.

<sup>4</sup> We present our cases in country tables to underline the subnational variation, which we would like to understand through cross-country analysis. Following the QCA logic we could also present all cases according to their varying institutionalization degrees, irrespective of the country they are based in.

<sup>5</sup> The identified cases and degrees of institutionalization are preliminary findings based on previous results from our field work and based on an additional desk study research which will be reevaluated and, if necessary, adjusted during the first country trip.

[Africa 1996, 135](#)) and Brazil ([The Federative Republic of Brazil 1988 Article 23, VII, VIII; Article 24, VI](#)), the agricultural sector is concurrently managed by national and provincial or state governments. As *Table 7* (with cases identified so far) shows, there is significant variation at the subnational level.

**Table 7** Subnational Competences and Cases of Forest-Related Climate Smart Conservation Agriculture

	Brazil	India	Indonesia	South Africa
Forest-related climate smart conservation agriculture competences	Concurrent subject between central and state governments	State subject with national and state policies and state implementation	National, provincial and district policies and district implementation	Concurrent subject between central and provincial governments
Radical or major changes	Mato Grosso (0.7)	Himachal Pradesh (0.7)	East Kalimantan (0.7)	Eastern Cape (0.7)
Small or no changes	Rondônia (0)	Mizoram (0.3)	<i>Central Kalimantan</i> (from 0.7 back to 0)	North West (0)

Source: Own Compilation. Reversal in *italic*.

We are aware that our subnational cases are not exactly alike as they differ regarding governmental level, size, economic strength and powers. Yet, they are **similar** in the sense that they all have a minimum of jurisdictional authority to actually initiate and institutionalize change.

We will use QCA as a Y-centered **methodology** for the following five reasons (for overviews of QCA, see [Beach 2018](#); [Emmenegger et al. 2013](#); [Ragin 1987, 2000](#); [Ragin 2004](#); [Schneider & Wagemann 2007](#); [Siewert 2017](#); [Wagemann 2015](#)) (for recent applications of QCA in different policy fields, see [Brockhaus et al. 2017](#); [Mello 2017](#); [Pahl-Wostl & Knieper 2014](#); [Tobin 2017](#)): First, focusing on at least two subnational entities per country in the two sectors on three occasions respectively, we will have 48 units – a number that can no longer be analyzed with traditional methods of case study research. The span of at least eight years from 2005 to 2013 and from 2013 to 2021 permits us to regard these units as snapshots rather independent from each other ([as also indicated by Siewert 2017, 295f](#)). Cases in which both progressive change and reversal occurred, either from 2005 to 2013 or from 2013 to 2021, will additionally be analyzed in a second step by in-depth single case studies to scrutinize the causal mechanisms of identified solution pathways. Second, existing data for the subnational level is rather sketchy and cannot be compared with statistical tools that focus on individual hypotheses. Third, we expect conjunctural causality as political institutionalization is hardly ever caused by one factor. Fourth, QCA can be helpful for our project as our independent variables (conditions) can most likely be differentiated in ‘necessary’ or ‘sufficient’, and the possibility of separating the analyses of context and proximate conditions seems appropriate for our case. Furthermore, we might observe functional equivalents of necessary conditions (e.g. resources for institutionalization being provided either domestically or by external donors). Finally, we hypothesize that different paths can lead to political institutionalization (equifinality).

We will differentiate the outcomes and conditions in more nuanced ways rather than being dichotomous 0/1, and will therefore apply fuzzy set QCA (fsQCA) with the following specifications:

- To be able to attribute values in fuzzy set analyses, one needs a very good knowledge of these cases and the coding of values must follow the theoretical attributes of the concept (in our case institutionalization, structure, agency, multi-level politics). The attribution follows a mix of deductive and inductive elements. We have so far identified the conditions that we consider important and operationalized them in a preliminary manner (see *Tables 1 to 5*; values are 0, 0.3, 0.7, 1) and we will refine them during our field work, describing each category in a verbal way ([Ragin 2000, 156](#); [Schneider & Wagemann 2007, 177](#)).
- In order to avoid the problem that we might not have enough cases for the number of possible configurations, we will split our analyses, first analysing the structural conditions as context factors ( $2^4=16$  combinations) and then focus on agency and multi-level politics as proximate conditions ( $2^4=16$  combinations) to identify possible causal pathways ([Schneider & Wagemann 2007, 260f](#)) for intra-sectoral institutionalization (i.e. for 24 units) and inter-sectoral institutionalization (i.e. for 48 units).

- QCA analysis will not be the only method used in our research project, as we will also include classical comparative case study research and process tracing ([Collier 2011](#); [George & Bennett 2005](#)) in an effort to identify specific causal mechanisms after the configurations of solution pathways have been established ([Emmenegger et al. 2013, 189](#); [Rohlfing & Schneider 2013](#); [Schneider & Wagemann 2007, 268](#)). This will include deviant cases without a configuration to account for a given outcome, as well as typical cases where process tracing might allow us to identify the causal mechanisms in place.
- We are very aware of the critiques vis-à-vis QCA methodologies (for a good summary, see [Siewert 2017, 293](#); [Tobin 2017, 32](#)) but having a rather large number of cases and insufficient quantitative data, fsQCA seems to be the right choice for us.

We will use the following methods for **data generation**: First of all, we will resort to an extensive literature review of scholarly and grey literature. Furthermore, we will carry out a qualitative content analysis of official documents, such as budget plans, ministerial notes, policy briefings, and media articles (the latter for identifying rhetorical change) ([Mayring 2000](#)). We will also conduct semi-structured expert interviews with state and non-state actors in the respective four countries ([Bogner et al. 2009](#)). Due to a lack of data on most conditions, semi-structured expert interviews will be an important source of information. Therefore, plenty of time is budgeted for interviews in all four countries and we will make sure that we formulate the questions in a fsQSA logic ([Siewert 2017, 287](#)). However, a triangulation approach ([Rothbauer 2008](#)) is particularly important for our empirical research, since we are aware that our research design relies heavily on the scores we give to our conditions, and any measurement errors would distort our empirical results ([Blatter & Haverland 2012](#)).

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