# Polycentric Climate Governance and the Amazon Tipping Point
## *Indigenous Climate Governance in Acre-Brazil and Ucayali-Peru*

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## 1 RESEARCH PROBLEM

Due to its high complexity and uncertainty, climate change is an example of a ´wicked´ problem (Incropera 2015); there is no silver bullet or one-size-fits all solution. Next to the climate challenge, we also face a need to feed an increasing world population. Land use change for agricultural expansion has facilitated meeting the increased need, but it challenges the ecosystem´s capacity to maintain biodiversity and regulate the climate (Foley 2005). The Earth System is facing boundaries to high anthropogenic pressures and, in order to create a safe operation space on earth, the Planetary Boundary (PB) Framework has estimated nine global boundaries (Rockstrom et al. 2009). Drawing upon scientific research, the PB Framework quantified seven of the boundaries and estimated that the boundaries for climate change, biodiversity loss and changes to the nitrogen cycle have already been passed (Rockstrom et al. 2009). Although the PB Framework, provides us with a "planetary playing field", critics have pointed to the Framework´s missing "social dimension": It describes a *safe*, but not necessary a *just* operating space (Raworth 2012). With the 17 Sustainable Development Goals (SDGs), adopted in 2015 at the UN Summit, researchers updated the PB Framework and placed it into the social context of the SDGs (Steffen et al. 2015). However, they did not provide pathways for just development inside the boundaries.

Related to the PB Framework are the Tipping Points: planetary thresholds that, when crossed, may drastically change ecosystems or even lead to collapse (Lenton et al. 2008). One of the global tipping elements is the Amazon, where complex interactions between local land-use change and global emissions determine potential future scenarios: forest dieback might turn the forest from carbon sink to carbon emitter (Nepstad et al. 2008). Modeling studies show that the Amazon is facing two different tipping points, one related to global climate change and one to local land-use change. The first tipping point happens if the global temperature increases with 3-4°C; The second if more than 40% of the forest area is deforested (Nobre & Borma 2009). Both threats may compound each other and should therefore be considered together when planning and implementing climate policies in the Amazon (Betts et al. 2008).

Deforestation for agricultural purposes is one of the main drivers of increased emissions and accounts for three-quarters of all tropical deforestation (Barker 2007). Reducing emissions from deforestation, while at the same time keeping up agricultural production, is a major challenge for environmental governance. Top-down strategies fail to align the diverse levels and sectors of government and exclude local stakeholders from the process (Ostrom et al. 2010). Nobel Prize winner Elinor Ostrom introduced a bottom-up form of climate governance with polycentric patterns (Ostrom et al. 2010). The concept of polycentric governance, a form of multi-level governance, assumes multi-actor and multi-sector decision-making under a general system of rules leading to a productive arrangement. It highlights the importance of vertical and horizontal integration as well as learning-by-doing for effective climate governance.

The future of the Amazon is a topic of global concern: It sustains about 40% of the world's remaining tropical rainforests, making it an important provider of environmental services (Fearnside 2008). In the recent past the region was perceived as a "cowboy economy", symbolic for its illimitable natural resources and associated with reckless, exploitative behavior (Boulding 1966). Studies on the relationship between territory, development and governance, have changed this conceptualization of the Amazon as one big homogenous green space (Becker 2005a). The Amazon faces an exogenous and endogenous current: the exogenous current sees the Amazon as a source of natural resources for Brazilian and foreign private sector actors, the endogenous current on the other hand, represents the various local institutions



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in the quest for a form of local development (Abdala 2015). Brazilian geographer Bertha Becker introduces a new pathway for the Amazon that strives towards a new development model with an important role for the Amazonian people (Becker 2013). This PhD-project intends to answer the question to what extend polycentric climate governance with spatial justice, can prevent the Amazon tipping point and lead to more inclusive and just development.

## 2 OUTLINE OF OBJECTIVES

The study´s main objective is to analyze the potentials and pitfalls of polycentric climate governance towards new pathways for a *safe* and *just* operating field in the Amazon. We look for site-specific, dynamic forms of climate governance that are able to provide a more effective response towards the faced threat of the Amazon tipping points. This PhD-thesis has four objectives, visually illustrated by Figure 1:

*1.) To evaluate the impact of polycentric governance on preventing the Amazon tipping point, by analyzing vertical (multi-level) and horizontal (multi-sector) policy and network integration and coherence.*

The red circle in Figure 1 represents the Amazon tipping point that is related to global (orange circle: Climate Change) and local factors (orange circle: Land Use Change).

*2.) To identify a territorial dimension of polycentric climate governance in the Amazon that is sensitive to spatial justice.*

Climate governance in the Amazon entails United Nations programs aimed at Reducing Emissions from Deforestation and Degradation (REDD). The REDD-discourse focuses on the concept of "sustainable landscape", such as a watershed or ecological unit, rather than "sustainable territory", such as a local community (McCall 2016). Figure 1 shows the different discourses with the green circle (sustainable landscape) and blue circle (sustainable territory).

*3.) To assess bottom-up policy pathways for safe and just development, involving local stakeholders.*

Figure 1 shows two triangles that represent top-down and bottom-up governance. The upside-down triangle represents top-down policy pathways (international and national level); the other triangle stands for bottom-up governance (sub-national level).

*4.) To identify local (indigenous) ontologies and epistemologies for safe and just development and their incorporation in Amazon climate governance.*

Figure 1 shows this study´s focus on indigenous governance in the oval inside the triangle.

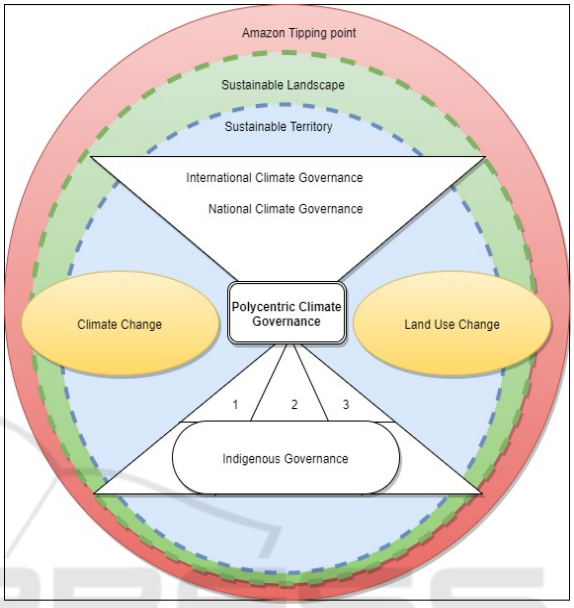


Figure 1: Theoretical framework of this research on Polycentric Climate Governance, showing the Amazon Tipping Point (red circle) and its two inter-related factors Climate and Land Use Change (orange circles); its safe (green circle) and just (blue circle) planetary boundary; top-down and bottom-up climate governance (triangles).

This study has direct links with the 17 Sustainable Development Goals (SDGs), and in particular with SDG 10 (reduced inequalities), SDG 13 (climate action), SDG 15 (sustainable forest management) and SDG 17 (global partnerships). Governance must be a crucial part of the SDGs (Biermann et al. 2014), and this study provides examples of integrating bottom-up climate governance into the goals.

## 3 STATE OF THE ART

Planetary boundaries are of great concern for policy-making and require a restructuring of governance arrangements (Folke et al. 2010). Decades of international environmental conservation efforts show that national governments alone cannot ensure conservation; governing climate change is a multi-

level and multi-sector process that needs Multi-Level Governance (MLG) (Ostrom et al. 2010). By including social dimensions to climate change adaptation, governance becomes more inclusive, adding richness and value to the systems (Pelling 2011). Hooghe and Marks (2003) distinguish between two types of MLG. Type I governance (nested approach) shows clear vertical linkages between governance levels with a central role for the nation-state, whereas Type II governance (polycentric approach) jurisdictions operate at numerous territorial scales and are flexible rather than durable (Hooghe & Marks 2003, p.237). Bulkeley et al (2003) present the two types of MLG structures, showing the top-down "Russian doll set of nested jurisdictions" of Type I MLG and the overlapping crosscutting jurisdictions as well as the role of civil society in Type II MLG (see Figure 2).

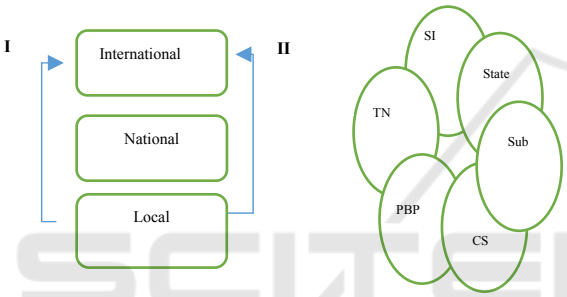


Figure 2: Comparing the structures of Type I-Nested governance with the arrows representing direct representation and transnational networks between local government, national government and international institutions and Type II-Polycentric governance, operating at numerous territorial scales, involving transnational networks (TN), place-based partnerships (PBP), civil society (CS), subnational government (Sub), nation-state (State), and supranational institutions (SI) (adapted from Bulkeley et al, 2003).

The concept of ´polycentric governance´ is used with different levels of precision, and different conceptualizations of its vertical and horizontal forms of differentiation (Dorsch & Flachsland 2017). An example of polycentric patterns for climate governance are subnational governments that drive policy change and self-organize into transnational networks to commit to climate and energy targets and organize policy transfer (Hakelberg 2014; Urpelainen 2013; Bulkeley & Betsill 2016; Hoffmann 2011). Another example is climate change insurance, where fossil fuels are insured, based on insurance principles of precaution, risk assessment and risk sharing, public-private oversight body (Spreng et al. 2016). Others have analyzed new global actors, mechanisms, and interrelations (Biermann & Pattberg 2012) and the growth of transnational climate change governance (Abbott 2012; Andonova et al. 2009; Bulkeley et al. 2003; Bulkeley & Betsill 2016).

Dorsch and Flachsland (2017) characterize four main features of polycentric climate governance: self-organization, site-specific conditions, experimentation and learning and a strong emphasis on trust, which can overcome cooperation dilemmas. Experimentation and learning can lead to innovation and flexible adaptation, as well as the production and diffusion of knowledge and norms. A multi-scale approach to the problem of climate change is be more effective and encourages experimentation and learning (Ostrom et al. 2010). Cole (2015) shows how in a polycentric approach, the enhanced direct communication of individuals positively affects trust levels, which themselves substantially determine levels of cooperation.

More recently, some authors have started elaborating different attempts to actively manage uncoordinated efforts to reduce such potential inefficiencies, through linking or "orchestration" by traditional actors such as international organizations and committed states (Dorsch & Flachsland 2017). Authors are questioning if the polycentric, multiple level approach, is really going to lead to a cohesive response to climate change (Aligica & Tarko 2012). Strong free-rider incentives for some actors will very likely continue to exist (Dorsch & Flachsland 2017). Also, the costs and benefits of an increasingly polycentric approach to climate mitigation governance are difficult to estimate, when compared to top-down approaches (Dorsch & Flachsland 2017). Taking into account a broader group of potentially relevant actors who can contribute to the goal of enhanced climate mitigation comes with a high risk of uncoordinated, or even contradictory, policies and actions (Dorsch & Flachsland 2017)

Research shows the benefits of the polycentric approach in urban politics of climate change (Bulkeley et al. 2014). However, it is crucial to evaluate the impact and effectiveness of polycentric governance more thoroughly .Jordan et al (2015) critically discuss promising strands of the literature on new, dynamic forms of climate governance, but call for scientific and political efforts to strengthen the understanding and effectiveness of these diverse polycentric patterns. Making polycentric governance effective requires ongoing research to refine, revise, and adapt the regime's rules and practices (Spreng et al. 2016). In addition, it requires continuous monitoring to ensure that implementation enables

and demands constructive interactions to make the polycentric governance work properly.

### 3.1 Moving Beyond

Political science scholars have done extensive top-down research on new forms of climate governance and polycentricity in the developed world (Rayner & Jordan 2013; Jordan et al. 2015; Spreng et al. 2016; Termeer et al. 2011; Bulkeley et al. 2003; Bulkeley & Betsill 2016). However, there is a lack of more people-centered research, to empower the poorest people and countries in their efforts to fight climate change. Climate Justice links human rights and development to achieve a human-centered approach, safeguarding the rights of the most vulnerable and sharing the burdens and benefits of climate change and its resolution equitably and fairly (MRF 2015). This study will move beyond the current studies of polycentric governance, and will combine a geographical and anthropological perspective, for policy pathways towards spatial climate justice in the Amazon.

In the analysis of bottom-up pathways for the Amazon, we will link climate governance with the concept of territoriality. Research points to the importance of new emerging territorialities at different scales, which are not only putting in doubt the primacy of the macro-region for planning, but also the nation-state as the only source of power (Becker 2010). The Amazon´s regional heterogeneity and bio-socio-diversity represent new territorialities resistant to expropriation, such as indigenous people, rubber tappers or family farmers. For diverse reasons, these actors have the presence of the state government as a first demand, highlighting the relevance of sub-regionalization (Becker 2005b). New Amazonian governance experiences show the involvement of populations of different ethnic and geographical origins, using various social and political productive structures, as well as diverse partnerships (Becker 2010). Although its sustainability is still unknown, we can already point to diverse potentialities, such as Extractive Reserves (RESEX), Family Farming Projects, and most important, Indigenous Lands and its People that have become effective regional actors (Becker 2010). In her last work "A Urbe Amazônida", Becker uses the concept of ´sustainable territory´ instead of ´sustainable landscape´ and thereby stresses the importance of the different social actors living in the Amazon (Vieira & et. al 2014).

## 4 METHODOLOGY

This research consists of five tasks and each task will lead to a scientific paper on Polycentric Climate Governance (to be submitted to WoS and Scopus indexed journals). For a description of the five tasks/articles and their methods, go to section 4.2.

In order to assess polycentric climate governance in the Amazon, I will use a triangulation of both qualitative and quantitative methods: a combination of evidence collection, impact evaluation and analytical methods (see Figure 3).

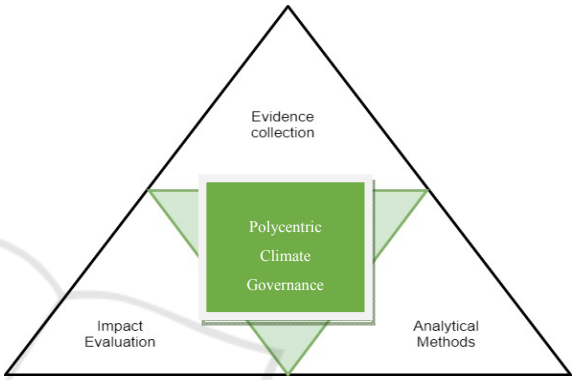


Figure 3: This research´s methodology to assess polycentric climate governance in the Amazon is based on a triangulation of qualitative and quantitative methods.

The nine countries that make up the Amazon have very diverse social, political, economic and institutional characteristics, which complicates the evaluation of its regional environmental governance strategies. That is why we will assess polycentric climate governance by looking at two case studies. The case study method enables us to capture the complex institutional context and gain in-depth understanding of interactions and perspectives of different stakeholders to be able to interpret a particular case (Yin & Heald 2016). I will shortly describe the chosen case studies in section 4.1.

### 4.1 Case Studies

To grasp more of the Amazon´s geopolitical diversity, we will assess climate governance in the two countries that hold the largest land area of the Amazon basin, Brazil and Peru. Brazil holds approximately 65% of the Amazon, followed by the Peruvian share that makes up for 10% of the basin (Global Forest Atlas 2018) (see Figure 4).

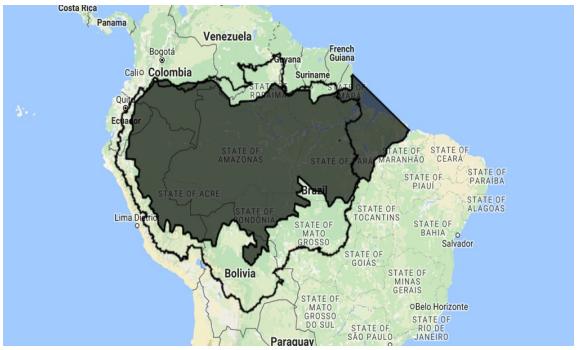


Figure 4: The Amazon is shared by nine South American countries, with its largest parts in Brazil and Peru. The region can be classified as the Amazon river basin (outer line) and Amazon biome (shaded polygon).

Out of Peru´s 24 regional departments, five are part of the Peruvian *selva* (Amazon). The Peruvian department that will serve as our case study for polycentric climate governance in the Amazon is Ucayali. Ucayali is an interesting case study, because research shows the department´s land conflicts with its indigenous populations and climate governance structures where untitled communities are ´hidden´ under investment opportunities(Leal Pereira et al. 2015).

The Brazilian State of Acre, situated on the border with Bolivia and Peru, is one of Brazil´s nine Amazon States. Between 2011 and 2016, I lived in Acre, and could observe the state´s development of its State System of Incentives for Environmental Services: One of the world´s most advanced statewide programs in low-emission rural development (Stickler 2014). The State´s experiments with forest-based development and forest citizenship have led to a comprehensive approach that links policies across sectors, involves civil society and continuously builds institutional capacity (Schminck et al. 2014).

## 4.2 General Protocol

In this section, I will provide a short overview of the five tasks/articles of this PhD-thesis.

### 4.2.1 Climate Governance and the Future of the Amazon

Here I analyze the combined impact of global climate change and local land use change on the Amazon, by looking at primary data and evaluating the coherence of climate policies and programs for the Amazon, using the Climate Policy Evaluation Framework (EEA 2016) and the Policy Coherence Tool (Nilsson et al. 2012).

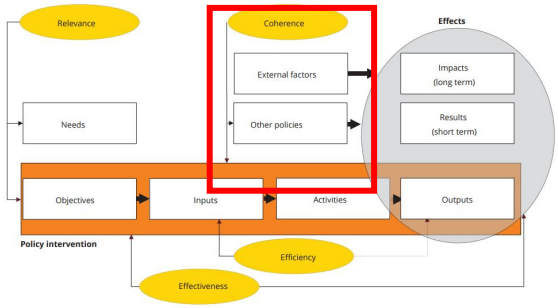


Figure 5: The focus of this article is the coherence of climate measures in the Amazon, making use of the Climate Policy Evaluation Framework of the European Environmental Agency (EEA 2016).

Methods:

- Analyzing climate projections for the Amazon by running simulations from CMIP5 (Coupled Model Intercomparison Project) models under RCP4.5, RCP6.0, and RCP8.5.
- Observing historic change in vegetation cover via the Normalized Difference Vegetation Index (NDVI) for the Amazon Biome.
- Evaluating the coherence of international, national and state climate policies using the European Environmental Agency´s Climate Policy Evaluation Framework (EEA 2016) (see Figure 5).

### 4.2.2 Polycentricity and Territoriality

This article combines the concepts of polycentric climate governance and spatial justice. Hereby, I aim to look for site-specific dynamic forms of climate governance that are able to provide a more effective response towards the faced threats.

Methods:

- Conducting a systematic literature review on climate governance and spatial justice.
- Mapping all indigenous territories and protected areas in the Brazilian and Peruvian Amazon and their jurisdictional status, with the use of Geographical Information Systems (ArcGIS).
- Crossing data on deforestation in the Amazon (making use of Brazil´s PRODES deforestation monitoring by satellite) with spatial planning data in the Amazon

#### 4.2.3 Environmental Governance and Climate Justice

This article will make use of the richness of available case material on Climate Governance in the Amazon and use the Case Survey Methodology (Larsson et al. 1993) to conduct a meta-analysis on "Amazon Governance" in order to assess its social and spatial implications.

Methods:

- Selection of cases with a WoS and Science-Direct search of peer-reviewed articles related to "Amazon Governance".
- Coding of selected cases using MaxQDA coding software.
- Statistical analysis of coded information using R.

#### 4.2.4 Climate Governance and Indigenous Ontologies and Epistemologies

This article will focus on the role of local (indigenous) perspectives and knowledge related to climate governance in Acre-Brazil and Ucayali-Peru.

Methods:

- Literature review on Indigenous Epistemologies and Ontologies towards environmental governance.
- Participant observation in the case study area in April 2018 and August to October 2018.
- Semi-structured interviews and focus groups with local stakeholders and indigenous leaders in case study area.
- Content analysis of the data gathered using MaxQDA software-program

#### 4.2.5 Climate Policy Network Analysis

This article will focus on climate policy networks in Acre-Brazil and Ucayali-Peru, using social network methodologies (Borgatti et al. 2009).

Methods:

- Climate policy data and information collection for Acre-Brazil and Ucayali-Peru
- Semi-structured interviews and questionnaires with actors involved in climate governance in the study area.
- Policy Network Analysis on cooperation and information sharing, using the software-program *Gephi*.

## 5 EXPECTED OUTCOME

With this study, I expect to provide theoretical advances to the concept of polycentric climate change. By looking at bottom-up experiences in the Amazon, this study will challenge the existing body of knowledge on the potentials and pitfalls of polycentric governance It does not only add the anthropological and geographical perspective to the discussion, but also sheds a light on the link between climate governance and climate justice. In addition, this PhD-thesis adds the "Epistemologies of the South" (Escobar 2016) – local (indigenous) knowledge and strategies – towards a more just and inclusive way of development. It highlights that the Amazon does not only have a high biological diversity, but also a high social diversity that needs to be incorporated in development policy and planning. The Planetary Boundaries framework focusses on the ecological limits of our planet, however thereby it creates another limit; the boundary between indigenous knowledge and scientific knowledge. The basis of Indigenous knowledge are cosmologies that differ from the Western classic distinction between Nature and Culture (Coleman 1998). Their perspectives arise from geographical features mutual recognition, active communication amongst people, animals, plants, spirits and the dead conceived as actors in the same socio-cosmological networks (Viveiros De Castro 2004; de Castro 1998; Schwartzman et al. 2013). This study aims to look at ways to incorporate the Amerindian cosmology into climate adaptation strategies in specific and climate governance in general.

## 6 STAGE OF THE RESEARCH

This PhD-research is part of the Doctoral Program in Climate Change and Sustainable Development Policies of the University of Lisbon in Portugal. The research has received funding from the Portuguese Foundation for Science and Technology (FCT), which started in September 2017. It is a three-year-research and entails two fieldwork trips to the study area: one fieldwork trip in April 2018 and one from September to November 2018. As this research is in its initial stage, its current focus on the revision of literature, testing of methods and initial data collection.

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