Forest conservation through markets? A discourse network analysis of the debate on funding mechanisms for REDD+ in Brazil

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Abstract

One of the most contentious issues surrounding the forest conservation program REDD+ is the question whether it should be funded via international carbon markets. The controversy between market supporters and opponents has been especially marked in the public debate in Brazil, one of the main potential beneficiaries of REDD+ payments. In a remarkable shift of policy, the Brazilian Federal Government gave up its long-standing opposition to market-based funding in the run-up to the COP15, following several years of competition between two main discourse coalitions and their preferred story lines. These were analyzed here with discourse network analytical techniques. Brazil's policy change may in part be explained by the failure of market opponents to employ positive arguments about alternative funding mechanisms, such as a public fund model; and by the increasing discursive dominance of a third emerging discourse coalition, which adopted major arguments of both sides in the debate. The research presented here thus provides more general insights on the dynamics of public debates, discourse coalitions, and the impacts of discursive strategies on policy-making, as well as on the value of discourse network analysis as a research method.

> Moutinho defends the implementation of REDD as a compensatory market mechanism […]: "How can we guarantee sustainability without markets?" […] it is already difficult enough to obtain money for humanitarian interventions in Africa. Now imagine, to save forests in Brazil.
>
> (Escobar, 2009a, translated)

Introduction

Ten years ago, Brazil witnessed an intensive public debate around suitable funding sources for REDD (*Reducing Emissions from Deforestation and Forest Degradation in Developing Countries*), a policy mechanism first proposed at the UN climate change conference COP11 in Montréal in 2005, to combine the benefits of forest conservation with climate change mitigation (Cerbu et al., 2011).[1] The main objective of REDD is to compensate developing countries financially for maintaining their forests standing, with the intention to reduce global greenhouse gas emissions (Alexander, 2018). As such, REDD (or nowadays REDD+, which has a wider scope)[2] belongs to the group of carbon-based conservation mechanisms within the wider family of Payments for Ecosystem Services (PES) schemes (Corbera, 2012). While there is a diversity of definitions and on-the-ground variation in the implementation of REDD schemes, they are generally built on the idea that funders from developed countries make a payment to governments or conservation projects in developing countries in

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[1] At COP11, the mechanism was initially abbreviated as "RED", which was expanded to "REDD" to include forest degradation at COP13 in Bali 2007 (Cerbu et al., 2011).

[2] REDD+ stands for "reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries" (Alexander, 2018: 616).

exchange for a guarantee to conserve a clearly defined area of forest, and in this way, provide the regulating ecosystem service of carbon storage (Corbera, 2012).

Carbon-based conservation has attracted widespread interest and controversy among policy-makers, academics, and potential beneficiaries in developing countries. While in principle, the objectives of forest conservation and climate change mitigation are universally accepted, there has been considerable debate about how to best achieve these, and whether REDD schemes constitute a viable and desirable option (Cabello & Gilbertson, 2012; Corbera, 2012; Lederer, 2011; McGregor et al., 2014). In the official definition of REDD+, the term "conservation" is included as a separate term alongside other terms and forest management strategies (Alexander, 2018), yet in this article, all REDD/REDD+ activities are interpreted as ultimately seeking to contribute to "conservation" of forests and carbon stocks. In this sense, REDD is seen as one option among several other forest conservation mechanisms, for example integrated conservation and development projects (ICDPs), despite the special focus on reducing deforestation and forest degradation rates (Angelsen, 2008).

A number of concerns regarding the conservation of forests by reducing deforestation and forest degradation rates as envisioned by REDD proponents have been voiced. Among others, these relate to the technological difficulties in quantifying and monitoring carbon contents and compliance with conservation agreements (Herold et al., 2011; Olander et al., 2012); the risk of managing for carbon conservation only to the detriment of other ecosystem functions, as well as biodiversity (Harrison et al., 2012; Paoli et al., 2010); unclear sources of permanent funds to ensure conservation beyond the end of project contracts (May & Millikan, 2010; Peskett et al., 2011); the displacement of environmentally harmful activities to other areas not covered by conservation agreements, also known as "leakage" (Atmadja & Verchot, 2012; Kuik, 2014); the challenges in distributing payments equitably among local people in forest communities, considering that communities are far from a homogenous actors (Kariuki et al., 2018; Krause et al., 2013); the problem that much deforestation is already illegal anyway and payments for not breaking the law would be legally and morally questionable (Angelsen, 2008; Pearce, 2008); more general ethical and moral concerns about changing people's relationships with the natural environment through the adoption of a utilitarian logic implicit in REDD and PES (Benjaminsen & Kaarhus, 2018; Sconfienza, 2017); and about changing rural people's relationships with the state (Gebara & Agrawal, 2017).

Brazil hosts the world's largest contiguous area of tropical rainforest in its Amazon region. It has also been battling with the issue of deforestation for decades, due to illegal logging, the advance of cattle ranching, expansion of agricultural areas, road construction, and mining, among other factors (Fearnside, 2005; Moran, 1993; Perz et al., 2008). As such, Brazilian perspectives and policies on REDD carry additional weight in the global debate about carbon-based forest conservation, and the idea has attracted significant attention among Brazilian academics and policy-makers. One crucial question for REDD, that continues to be of relevance today, is the source of funds that will pay for forest conservation. While economic valuation exercises regularly produce high estimates of the monetary worth of e.g. the Amazon rainforest (Strand et al., 2017), in practice, available funds for forest conservation are much more limited.

In Brazil, as in many other countries, debates about funding for REDD centered on the question whether market-based funding sources would be desirable and appropriate, or whether REDD should instead be paid for by public funds, managed by government institutions. Such public funds would principally emerge from developed countries, as part of their commitments in mitigating global climate change (van der Hoff et al., 2018). While most carbon markets are also managed by the public sector, payments are typically made by the private sector in exchange for greenhouse gas emission permits (Newell et al., 2014). In Brazil, NGOs, academics, government representatives, and

other relevant stakeholders were divided on this matter, and vocally supported or opposed the idea of either carbon markets or public funds for REDD.

During most of the build-up to the Copenhagen climate change conference 2009, the Brazilian Federal Government led by President Luiz Inácio "Lula" da Silva opposed the idea of carbon market-financed forest conservation. Instead, the government favored the creation of voluntary incentives for reducing deforestation, unrelated to the emission reduction goals of industrialized countries. This eventually resulted in the creation of an "Amazon Fund" in 2008, which manages donor funds from Norway and Germany to implement REDD+ projects in Brazil (van der Hoff et al., 2018). However, the governors of nine Brazilian states located in the Amazon Basin protested against the Federal Government's REDD strategy in an open letter in June 2009, demanding Brazil's participation in international carbon markets. This led to the creation of a task force composed of members of different government agencies in mid-2009, which recommended the adoption of multiple funding mechanisms for REDD, including carbon markets allowing the compensation of industrialized countries' emissions via REDD (May & Millikan, 2010). In a remarkable turn of events, the Federal Government dropped its opposition to international carbon markets, and supported a restrictive integration of REDD into carbon markets at COP15 in Copenhagen. This would have allowed the compensation of up to 10% of an industrialized country's emission reduction goals via REDD carbon credits from Brazil, if that country had already met at least 70% of their emission reduction commitments from the Kyoto Protocol (Ninni, 2009).

Even if we now know that a breakthrough for a global climate treaty was only to be achieved several years later with the Paris Agreement, it is still worth interrogating how such a significant change in the Brazilian government's policy position on REDD was possible in Copenhagen, a conference widely expected to produce a binding global climate change treaty at the time. Not least, the Brazilian government's change of position has also had practical impacts as a bill was introduced to the Brazilian congress in 2010 to allow private landowners to market carbon credits from avoided deforestation (May & Millikan, 2010), even if the many practical issues associated with the implementation of REDD (summarized above) have prevented it from becoming a widespread forest conservation strategy in the Brazilian Amazon to date.

The role of markets for environmental conservation lies at the heart of many debates between academics, conservationists, and policy-makers today (Humphreys, 2009; Martin-Ortega et al., 2019; Pirard, 2012; Robertson, 2004), and has led to ideological splits between supporters and opponents of such a funding and environmental management model. Supporters of market funding view it as an efficient and effective solution to the problem of insufficient funds for environmental conservation, including forest conservation (Engel et al., 2008). Opponents are often concerned about the risk of commodification of the environment, in the wider context of neoliberalization (McAfee, 2012). Crucially, preferences for or against markets as funding sources for public policy are generally interpreted as a matter that transcends various political actors' rational and substantive interests e.g. for more or less environmental protection (Sabatier & Weible, 2007). Thus, the topic lends itself to an analysis primarily based at the level of ideas, frames, thoughts, and narratives, as pursued here.

The present article seeks to contribute to the analysis of debates around the role of markets for carbon-based forest conservation by presenting a case study on the public debate on REDD in Brazil in the period between 2007 and 2009. Despite a considerable body of academic literature on REDD and carbon markets, there is much less research about public views on funding mechanisms for REDD, as expressed by statements made by relevant stakeholders in the media. Objectives of the study presented here are: to empirically identify narrative elements of this debate; to understand how they are linked with each other and with the actors who participate in the debate; and to explore how

such relational dynamics between discourses and stakeholders may have contributed to a shift in the Brazilian Federal Government's policy preferences, which may offer insights on the characteristics of "successful" discursive strategies. Theoretically, this study is based on discourse analytical approaches, especially the idea of "discourse coalitions", originally proposed by Hajer (1995), which refers to groups of actors that employ similar discursive strategies and their preferred narratives. To identify these discourse coalitions, "discourse network analysis" is used as a method, which represents an application of the techniques of social network analysis to the level of ideas, frames, and narratives in public debates (Leifeld, 2018). Here, the *Discourse Network Analyzer* (DNA) software was used for the analysis of 71 newspaper articles on REDD published in four Brazilian newspapers during the study period (see further details below). Overall, the article shows how different discourse coalitions employed various story lines in the public debate on funding mechanisms for REDD, and in this way, may have contributed to the policy shift in the Brazilian Federal Government's official position at the COP15 in Copenhagen 2009.

Theoretical background: discourse analysis and discourse coalitions
Many different theories for explaining policy change exist (see e.g. Béland & Howlett, 2016; Mintrom & Norman, 2009; Sabatier & Weible, 2007), and it is clear that no single approach can explain shifts in governments' positions alone. Nevertheless, it is worth analyzing specific elements of the public policy process, which may at least partly explain such change. In the present study, the analytical focus is placed on the discursive level, based on the rich theoretical tradition of discourse analytical approaches (e.g. Fischer, 2003; Hajer, 1995; Humphreys, 2009; Leifeld, 2018; Rantala & Di Gregorio, 2014). It has been argued that discourses may be particularly relevant for explaining policy change where policy issues are highly politicized and controversial (Leifeld & Haunss, 2012), as has been the case in the debate around funding mechanisms for REDD in Brazil.

Hajer (1995: p. 60) defines a discourse as "a specific ensemble of ideas, concepts, and categorizations that is produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities". A widespread contemporary example is the "sustainability discourse". The widely used concept of discourse coalitions (e.g. Bulkeley, 2000; Rantala & Di Gregorio, 2014; Rennkamp et al., 2017; Steinfeld, 2016), in turn, also includes the actors who voice specific discourses (and who may or may not actively communicate with each other). It is defined as an "ensemble of (1) a set of story lines; (2) the actors who utter these story lines; and (3) the practices in which this discursive activity is based" (Hajer, 1995: p. 66).

Discourse analysts typically stress that discourses are not merely means for the communication of actors' interests or underlying belief systems, but should instead be understood as various definitions of reality, which can obtain novel meanings in discursive exchanges and which may have practical implications. In this context, the development of new policies is interpreted as the result of an argumentative competition between several discourse coalitions of public and private actors, who are all competing for hegemony in their interpretation of reality (Hajer, 1995; Leifeld & Haunss, 2012). In this sense, the idea of discourse coalitions is conceptually close to "advocacy coalitions", as proposed by the "Advocacy Coalition Framework" (Sabatier & Weible, 2007). These are groups of political actors who share certain beliefs and compete with other coalitions for the adoption of their preferred policy.[3]

To achieve hegemony, the various elements of a discourse, which Hajer (1995) calls "story

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[3] There are also some theoretical differences between the two types of coalitions, see Bulkeley (2000) for a detailed discussion.

lines", need to have certain positive characteristics, such as a credibility and acceptability, should be associated with trustworthy sources, and ideally, support a variety of different political positions. The rhetorical elements of a discourse are not narrowly defined, but can broadly refer to metaphors, ideas, stories, and specific arguments. As such, they may also include what sociologists have called "frames" (Leifeld & Haunss, 2012), i.e. shared interpretations of reality that simplify and condense "the world out there" by offering problem definitions, corresponding solutions, and associated strategies (Benford & Snow, 2000).

Crucially, discourse theories assume that discourses are relatively consistently made up of given sets of arguments, frames, or story lines, and that mentioning one of the elements implicitly invokes the other elements of a discourse (Hajer, 1995). This suggests that studying interlinkages between various arguments is relevant and necessary to understand discourse hegemony, and the "success" of discourse coalitions. Indicators for success are, among others, their stability, in the sense of their members and associated story lines, their distinctiveness from other discourse coalitions, and the number of stakeholders that subscribe to their discourses. Moreover, they use the central arguments of a debate, connect them to a consistent story line, and employ a broad, but not overly broad spectrum of arguments (Leifeld & Haunss, 2012). Nevertheless, it is important to highlight that an individual case study using discourse network analytical techniques does not produce conclusive or incontestable findings regarding the factors that determine such discursive "success". Instead, it serves to generate plausible explanations or general "hypotheses" on the basis of empirical data that could subsequently be "tested" through a meta-analysis of a large number of discourse network analyses.

Methodological approach: discourse network analysis and the *Discourse Network Analyzer*
Discourse network analysis and the associated *Discourse Network Analyzer* (DNA) software represent a relatively recent methodological approach for the empirical analysis of the role of discourses, ideas, and frames in political decision-making processes (Leifeld, 2018). This method allows the operationalization of discourse analytical theories by tracing the relationships between different concepts (i.e. elements of discourses), as well as between concepts and political actors (i.e. discourse coalitions) in written material such as newspaper articles. To do so, the researcher codes contents of a text into "statements", which may represent an individual argument in a discourse. Every statement is also assigned to a certain actor, for example, an individual person or a specific organization. This technique generates network analytical information, as some arguments will be frequently employed by the same actor, or some actors will frequently employ the same arguments. Using the DNA software in conjunction with a network visualization software such as Visone (Brandes & Wagner, 2004) allows to represent these connections as concept or actor networks in the form of (usually highly complex) graphs. These can be interpreted visually, as well as mathematically, with quantitative indicators developed for social network analysis (Wasserman & Faust, 1994). This way, discourse network analysis adds a more formal methodological toolkit to the broader family of discourse analytical approaches (Muller, 2015). Not least, the visual representation of networks allows to condense highly complex information about connections between people and ideas into an accessible format, which would be impossible to achieve in the form of qualitative descriptions or more conventional, hypothesis-testing statistical approaches (Stoddart et al., 2017).

For the present case study, the DNA software was used to identify relevant statements of actors in the public debate on funding mechanisms for REDD in Brazil in the run-up to the COP15 in Copenhagen 2009. 302 statements were identified in 71 articles from four different Brazilian newspapers (*O Estado de S.Paulo*, *O Globo*, *Folha de S.Paulo* and *Valor Econômico*). These are all

general daily national newspapers which had an estimated daily readership above 1,000,000 people at the time (May et al., 2011). An exception is *Valor Econômico*, which specializes in news about the economy, and was selected to complement the more general newspapers due to the research focus on funding mechanisms. Thus, criteria for the selection of newspapers were their nationwide circulation, general importance, and their coverage of REDD during the study period (see also May et al., 2011). The 302 statements were made by 45 different actors (see appendix 1) and classified as three policy preferences and 21 categories of arguments (see Figure 1 below). As an example, the quote by Paulo Moutinho cited above was coded twice with the DNA software: First, as a policy preference (integration of REDD into carbon emission markets) and second, as an argumentative category justifying this policy preference (in this case "sustainability, financial incentives, and security through markets").

Naming of categories of arguments followed both inductive and deductive procedures, as is common in discourse network analysis (Hurka & Nebel, 2013). While some categories were named deductively after existing arguments from the academic literature on REDD in Brazil (e.g. "leakage" or "permanence"), the majority of categories were compiled inductively during the analysis of newspaper articles. Policy preferences were classified into three categories: (i) a *public fund for REDD*, i.e. a voluntary funding model based on donations from developed countries, which was initially favored by the Brazilian government; (ii) *integration of REDD into carbon markets*, which would allow the unlimited sale of REDD carbon credits in the international trade of emissions permits; and (iii) *restrictive integration of REDD into carbon markets*, which would impose certain restrictions on the trade of REDD carbon credits to reduce potential negative effects. This last label included the final proposal of Brazil's Federal Government at the COP15 as described in the introduction above. Furthermore, it was recorded whether an actor supported or opposed the respective policy option.

While the overall number of articles on REDD in the above-mentioned newspaper articles at 289 significantly exceeded the number of articles used for the discourse analysis presented here (71), the vast majority were unsuitable, as they did not contain statements on preferred funding sources for REDD. Another issue were duplicates or repetitions between several articles, were journalists relied on the same original source of information. Articles were identified with the keyword REDD on the respective newspapers' websites – an additional search with keywords such as "deforestation" did not produce any further results, given that no newspaper article could report on funding sources for REDD without also using the acronym.

All articles were published between 2007 and 2009. News reports about COP13 on Bali marked the beginning of the covered period, since REDD was first officially proposed there. The period ends with news about COP15 in Copenhagen, where the shift in the Brazilian Federal Government's policy position occurred as the variable of interest here, which could not have been influenced by discussions that continued after COP15, and indeed continue until the present day. Since expectations for an agreement on a new international climate change treaty were especially high in 2009, most articles were published in that year (i.e. 77%). Also, there was a much larger number of events and conferences on REDD in 2009, and consequently, a larger number of actors participated in the debate. In general, not only statements by Brazilian actors were coded, but also international and foreign actors were included in the database, given that coverage of their views on funding for REDD in the Brazilian media made them part of the public debate on REDD in Brazil. This is further supported by Kasa's (2013) finding that the Brazilian debate on REDD was strongly influenced by statements made by international actors.

Results: story lines, discourse coalitions, and policy change

This section presents and analyses the empirical findings of the conducted discourse network analysis. First, it identifies the main arguments used in the Brazilian debate around funding mechanisms for REDD, and discusses how these can be interpreted as two main contrasting story lines either in favor or in opposition to market-based funding mechanisms. Second, it outlines the evolution of discourse coalitions in the public debate, which began with an argumentative struggle between market opponents and supporters, and evolved towards a more fragmented scenario with three main discourse coalitions (including a neutral, compromise-seeking coalition) participating in the debate. Third, it discusses a number of potential explanations for policy change, based on the empirical findings about the public debate on REDD in Brazil presented here.

Story lines

Story lines are groups of arguments that are frequently linked in public debates and discourses, and in this way, form a coherent story. Thus, it is often sufficient to mention one argument in a debate to implicitly invoke the other arguments that are typically used alongside it (Hajer, 1995). Story lines, made up of arguments or frames, thus serve to reduce the complexity of reality in public debates, and to signal the political position of an actor. Whereas there is continuing debate in how far discourses can be understood separately of the actors voicing them or not (Arts & Buizer, 2009), story lines are located entirely at the conceptual level.
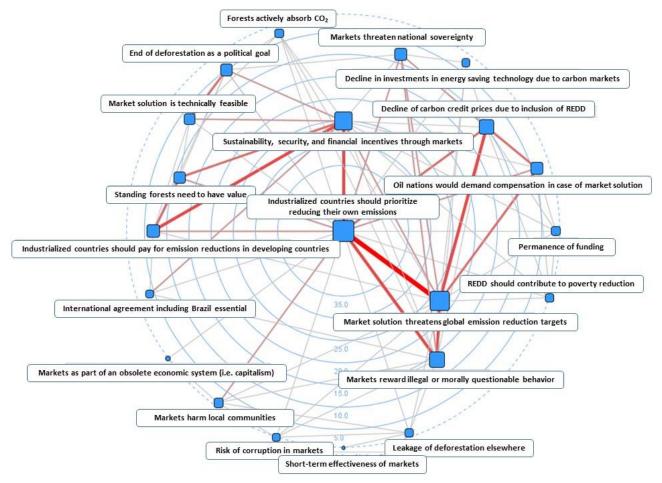

Figure 1: Arguments used in the debate on funding mechanisms for REDD in Brazil 2007-2009. Each node represents one argument used in the debate and each line linking two nodes means that at least one actor used both arguments. Frequency of use is indicated by position, with frequent arguments in the center and rare arguments on the margins. Node size indicates the degree (i.e. number of links with other arguments). Line weight indicates number of actors sharing two arguments.

For the present study, a "concept congruence network" was generated from the empirical data on REDD funding in Brazil (Figure 1). In this type of network, lines are drawn between two concepts or "nodes" (here, arguments used), if they were both mentioned by the same actor. The Visone software allows to visualize the strength of connection between two arguments by color gradient and line width, i.e., the thicker and darker a line, the higher the number of actors who used a combination of both arguments to defend their policy position. A weight of 3, for example, indicates that three actors have shared a specific set of two arguments.

Figure 1 suggests the existence of two main separate story lines in the debate on funding mechanisms for REDD in Brazil, in which a number of arguments are connected with each other by lines with a weight of at least 2. The two story lines can be linked to two policy positions, either in favor or in opposition to market-based funding for REDD (see Table 1). One core argument is used as part of both story lines (i.e. that industrialized countries should prioritize reducing their own emissions), which suggests that most actors felt the need to use it to achieve credibility. In the words of Hajer (1995: p. 64), its power may lie in the fact that it "sounds right"; i.e. one would not intuitively disagree with this argument. In sociological terms, it could be understood as a "master frame", that is, it is generic and flexible enough to allow multiple interpretations (Benford & Snow, 2000). On the one hand, it could be interpreted as a moral argument about the historic responsibility of industrialized countries for causing climate change (see also Müller et al., 2009). In the analyzed newspaper articles, the moral dimension of this argument is often emphasized by replacing the words "industrialized countries" and "developing countries" simply with "the rich" and "the poor" (see also Zhouri, 2010: p. 261). On the other hand, it can be interpreted as a practical argument about the need to reduce emissions where they are highest (i.e. in industrialized countries). While this argument does not preclude the idea of REDD (since even if industrialized countries reduce emissions in their own country first, reducing deforestation in developing countries can still be seen as a worthwhile additional activity), it still has stronger links with arguments against integrating REDD into carbon markets.

Table 1: Story lines used in the debate on funding mechanisms for REDD in Brazil 2007-2009

Story line 1: 'pro markets'	Story line 2: 'against markets'
Industrialized countries should prioritize reducing their own emissions	
Sustainability, security, and financial incentives through markets	*Market solution threatens global emission reduction targets*
Industrialized countries should pay for emission reductions in developing countries	*Markets reward illegal or morally questionable behavior*
Standing forests need to have value	*Decline of carbon credit prices due to inclusion of REDD*
Market solution is technically feasible	*Oil nations would demand compensation in case of market solution*
End of deforestation as a political goal	
International agreement including Brazil essential	

The "pro-markets story line" unites a diverse range of arguments, with a number of functions. The claim that industrialized countries should pay for emissions reductions in developing countries attributes blame, and is again based on the idea that industrialized countries are historically responsible for climate change. It makes use of intuitive and pragmatic arguments, which are open to

multiple interpretations, such as that standing forests need to be valued (cf. Strand et al., 2017), and that an international agreement including Brazil is essential. It also offers a solution and concrete strategy to a political problem, i.e. it suggests that a market solution for REDD is technically feasible, and may end deforestation in Brazil. Not least, it also incorporates the universally popular "sustainability" buzzword, here linked to its financial dimension, which may be seen as lending credibility to the arguments. These strengths may have contributed to eventually swaying the Brazilian Federal Government towards accepting market funding.

In contrast to that, the "story line against markets" uses a mix of moral arguments and warnings about potential practical risks, such as that markets would reward illegal or morally questionable behavior (because only 20% of a forest within any private property in the Amazon can be felled legally anyway; May & Millikan, 2010) or that the inclusion of REDD credits into carbon markets would cause a decline in prices. Such a decline in prices would then render carbon markets ineffectual, and in this way, threaten global emission reduction targets. In newspapers, this line of arguments was sometimes simplified by the expression "the numbers don't add up" (*a conta não fecha*; see e.g. Escobar, 2009b), i.e. suggesting that global emissions would increase if REDD credits could be used to avoid some emission reductions in industrialized countries. A further risk towards a decline in prices is highlighted by the argument that oil nations might feel emboldened in their claims for integration of credits for avoided emissions from not exploiting known oil reserves into carbon markets, see e.g. the debate about Ecuador's Yasuní-ITT initiative (Espinosa, 2013; Larrea & Warnars, 2009). It is noteworthy that the story line against markets only highlights negative consequences of integrating REDD into carbon markets, but does not mention the positives of alternative policy options, such as e.g. a public fund model.

Overall, it appears that arguments both in support and opposition to market-based funding for REDD are well represented in the two main story lines, and that neither side is obviously dominant, even if arguments in favor of markets appeared more varied. To understand the impact of these story lines on policy, it is thus necessary to investigate their linkages with political actors (see section on discourse coalitions below). Due to limitations of space, the further arguments used in the public debate will not be discussed here. It is nevertheless interesting to observe that central arguments of the academic debate on REDD, such as leakage of deforestation elsewhere, the issue of finding permanent funding sources, or discussions about Brazil's national sovereignty and control over the Amazon region (e.g. Lahsen, 2009; Zhouri, 2010) are relatively insignificant in the public debate.

Discourse coalitions

Discourse coalitions consist of story lines *and* the actors voicing them. They compete with other discourse coalitions for hegemony of their interpretation of reality (Hajer, 1995; Rennkamp et al., 2017). In the present study, the subject of this competition is evidently the role of carbon markets for funding REDD projects in Brazil; and "success" would be defined as shaping Brazil's official policy position on funding mechanisms for REDD at the COP15. From this, three discourse coalitions can be constructed, which differ based on whether they hold positive, negative, or neutral attitudes towards carbon markets as a potential funding source for REDD. To some extent, these attitudes are implicit in the arguments used to construct the two dominant story lines outlined in the preceding section.

Nevertheless, here, actors were classified into these three discourse coalitions via their explicit policy preferences (see appendix 1 for the exact classification of actors), as stated in the analyzed newspaper articles, and linkages between actors and arguments were identified entirely based on the empirical material as well. This, because the change in the Brazilian government's policy preference

was the main "dependent variable" of interest, to be (partially) explained by the "independent variable" of the dynamics of the public debate. Where actors agreed to both public funds and markets as funding mechanisms, this was classified as a neutral attitude, since it appeared that the actor did not have a strong preference either way, and rather emphasized the need to find a funding source at all. Similarly, if an actor supported a restrictive integration of REDD into carbon markets (which suggests neither full support nor opposition), then the actor was allocated to the neutral coalition. No attempt was made to identify the strength of support or opposition or to further distinguish sub-groups of actors within coalitions.

The most important actors of the coalition against markets were the Brazilian Ministry of Foreign Affairs, Greenpeace, as well as several Brazilian NGOs. The most important actors of the pro-market coalition were the subnational governments of states in the Brazilian Amazon, international actors such as the US delegation at COPs, the World Bank, as well as a number of Brazilian and international NGOs. Neutral actors were the Ministry of the Environment, the Ministry of Science and Technology, as well as a small number of actors from other sectors. The position of the Brazilian Federal Government reflected the position of the Brazilian Ministry of Foreign Affairs until August 2009, i.e. it opposed a market solution. Statements made afterwards were classified as pertaining to the neutral discourse coalition, since its position shifted towards that of the Ministry of the Environment. In this sense, the policy shift reflects a power shift towards the Ministry of the Environment as well (see also Lahsen, 2009; Zhouri, 2010).

To identify the argumentative strategies of these three discourse coalitions, "affiliation networks" are most suitable. These are so-called "two-mode networks", i.e. there are two types of nodes (Leifeld, 2018), here, actor groups and arguments. In Figures 2 and 3, actors were grouped into three coalitions, with the lines indicating agreement (in green) and disagreement (in red) with certain arguments. This facilitates the analysis of how arguments were employed by the respective discourse coalition, and which conflicts were present at the discursive level. The size of nodes indicates statement frequency for both arguments and actors.

The two affiliation networks in Figures 2 and 3 cover two different "time slices" (Leifeld, 2018). This serves to verify whether there were changes in argumentative strategies over the course of the debate and whether these might be linked to changes in public policy. The first time slice, from 5 December 2007 to 11 August 2009 can be interpreted as a phase of policy stability, in which the government consistently rejected the integration of REDD into carbon markets. The second time slice, from 12 August 2009 to 17 December 2009 can be seen as a phase of policy change, since a willingness for compromise by the Brazilian government was evident from the fact that it suggested a combination of policies, i.e. of using public funds as well as integrating REDD in emissions markets as first reported by Krieger (2009). This eventually resulted in the known compromise to propose a restrictive integration of REDD in carbon markets. The cut-off date was thus selected based on Krieger's (2009) account of a shift in the Brazilian government's position, which was announced at an informal UNFCCC meeting in Bonn, Germany, in preparation for COP15. In general, the selection of cut-off dates for time slices in discourse network analyses is dependent on the specific dynamics of a public debate and on research objectives (Leifeld & Haunss, 2012).

As can be seen in Figure 2, the first phase was characterized by conflicts at the discursive level, and the previously identified story lines correspond well with discourse coalitions. The conflict concerns mainly two arguments: the argument whether markets would reward illegal or morally questionable behavior, and, to a lesser extent, the argument about threats to global emission reduction targets, which form part of the story line against markets. This suggests that market proponents were trying to dismantle or reframe the Brazilian Federal Government's preferred story line. For example,

a researcher at the Federal University of Minas Gerais suggested that: "Without this type of incentive [i.e. REDD], nobody would comply with the law. Brazil has excellent laws, but they do not match our reality. Those who behave lawfully are penalized, because they are always disadvantaged in comparison with the illegals." (Escobar, 2008, translated).
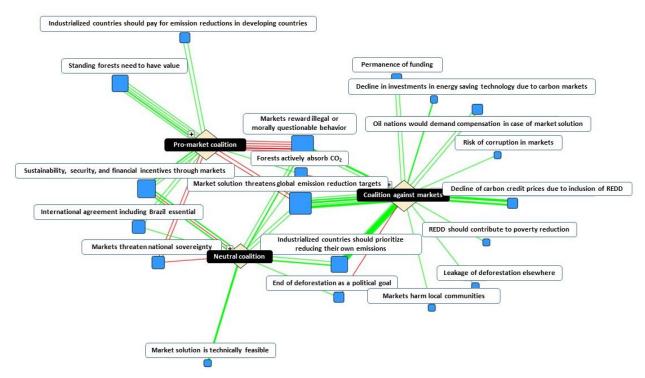

Figure 2: Discourse coalitions in phase 1 (5 December 2007 – 11 August 2009). Actors were grouped into three discourse coalitions according to their policy preferences. Blue nodes represent arguments used in the debate. Node size represents frequency of use of arguments. Green lines indicate agreement of an actor with an argument, red lines indicate disagreement.
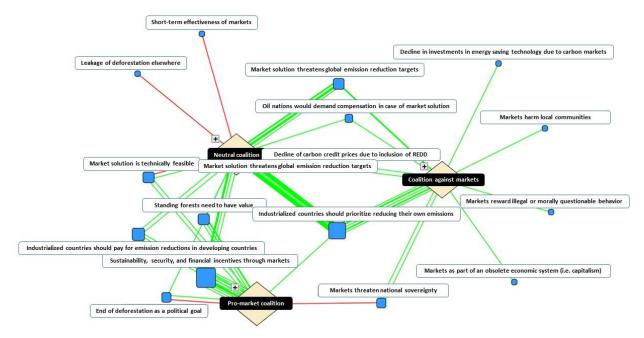

Figure 3: Discourse coalitions in phase 2 (12 August 2009 - 17 December 2009). See caption of Figure 2 for explanations.

In contrast, Figure 3 shows how the neutral discourse coalition took a much more prominent position in the second phase analyzed here. It now connects the central arguments of all coalitions within one group, among others, that markets threaten global emission reduction targets, that

industrialized countries should prioritize reducing their own emissions, and that a market solution would bring sustainability, security, and financial incentives for forest conservation.

Explanations for policy stability and change
Discourse network analysis is a method that is especially suitable for the explanation of dynamic processes of change, given that arguments, frames, and ideas used in the public debate are continuously evolving and interacting (Leifeld, 2018). Here, this evolution of arguments used by three different discourse coalitions was mapped for two different periods of time (Figures 2 and 3), which suggested that the change in the Brazilian Federal Government's position on funding mechanisms for REDD between 2007 and 2009 went along with a change in discursive strategies as well.

The comparatively longer phase 1 from 5 December 2007 to 11 August 2009 was characterized by a stalemate between market opponents and supporters as well as policy stability, that is, the Brazilian Federal Government consistently opposed the integration of REDD into carbon markets. Figure 2 suggests that no particular story line dominated the public debate in phase 1, even though the government's position was constantly under attack from multiple influential critics. The policy of opposing market funding represented continuity for the Brazilian government, which had already opposed the mention of avoided deforestation in the context of the Kyoto protocol in 1997 (May & Millikan, 2010), mostly due to concerns of the military and Ministry of Foreign Affairs about maintaining national sovereignty in the sparsely populated regions of the Amazon (Lahsen, 2009; Zhouri, 2010). In the absence of a more powerful story line or framing strategy, the pro-market discourse coalition was unable to induce policy change. Furthermore, its actors lacked the legal and political clout of the Ministry of Foreign Affairs, which was dominant within the Brazilian Federal Government (and the coalition against markets) at the time (Lahsen, 2009).

In contrast to that, the much shorter phase 2 from 12 August 2009 to 17 December 2009 was a period of policy change characterized by a much more intense public debate about funding mechanisms for REDD, with 145 statements coded in phase 2 as opposed to 157 in phase 1. The shift in the Brazilian Federal Government's position is remarkable, given that journalists reported continued opposition of the powerful Ministry of Foreign Affairs against a market solution during this period. This suggests, that other factors, including shifts in the public debate may indeed at least be partly responsible for this policy change, which can be understood as a failure of the coalition against markets to maintain its hegemonic position over time.

On the discursive level, the failure of the story line (and discourse coalition) against markets can be understood as a failure to formulate positive solutions for a pressing policy problem. While they consistently warned about many different risks of markets, they did not use any positive arguments to support e.g. a donation-based public fund model for REDD. Effectively, this meant that their story line against policy change was associated with the status quo rather than an alternative possible future for forest conservation; yet the policies of the status quo in Brazil were not widely perceived as being successful at preventing deforestation (as lower deforestation rates at the time were typically attributed to reduced global demand for agricultural commodities; May & Millikan, 2010), and this may have rendered the story line against markets unattractive. Indeed, several discourse analysts and framing experts have suggested that one of the most severe argumentative failures in public debates is the lack of proposing political solutions or "prognostic frames" of what the future should look like (Benford & Snow, 2000; Fischer, 2003).

A further failure of the discourse coalition against markets may have been its lacking use of arguments that would make reference to Brazilian interests, as opposed to more general global concerns. Especially the emphasis on sustainability and financial security through markets by the pro-

market story line is based on the material interests of Brazil and its forest owners, who were hoping for potentially considerable income streams (Kasa, 2013; Ninni, 2009).

As can be seen in Figure 3, the neutral discourse coalition dramatically extended its range of arguments in phase 2, arguably, to attract wider support for its proposed compromise of a restrictive integration of REDD into carbon markets. This compromise unites arguments of market supporters and opponents. That is, the alleged financial benefits of markets are harnessed, while also assuring that this does not occur at the expense of global emission reduction targets. Not least, such a compromise aligns well with the overall most popular argument or master frame (Figure 1), i.e. that "industrialized countries should prioritize reducing their own emissions" as the imposed restrictions prevent industrialized countries from "getting away with" not reducing their own emissions through the purchase of REDD carbon credits.

The use of a broader range of arguments by the neutral discourse coalition in phase 2 is similar to what sociologists would term a "frame extension" strategy (Benford & Snow, 2000). Political actors extend their argumentation to include the preferred frames of additional actors to win broader support for their cause. While this increases the likelihood of becoming the dominant coalition in the public debate (Leifeld & Haunss, 2012), it also carries the risk that contradictory arguments are endorsed, which may cause intra-coalition conflict. Indeed, the success of endorsing a restrictive integration of REDD into carbon markets at COP15 came at the price of continued tension within the Brazilian Federal Government, especially due to dissatisfaction among members of the Ministry of Foreign Affairs.

Beyond purely discursive explanations, a further factor in the present case may have been the specific historical context. The prospect of the upcoming COP15, widely expected to produce the next globally binding climate treaty at the time, created additional pressure to find a reasonable compromise solution. While the governors of Brazil's Amazonian states could have championed carbon markets independently of the Federal Government at COP15, such a divided Brazilian delegation would have caused diplomatic embarrassment and prevented successful participation in the global negotiations in Copenhagen. In the language of the Advocacy Coalition Framework mentioned earlier, such a scenario is known as a "policy stalemate" (Sabatier & Weible, 2007), i.e. two opposing coalitions are set to lose if no new compromise policy can be found. In such a context, neutral actors or "policy brokers" may win over actors from opposing coalitions, which was indeed the case in Brazil at the time. The director of the NGO FAS (Amazonas Sustainable Foundation), Virgílio Viana, had been the first actor to propose a compromise solution as early as March 2009 (Brücher Camara, 2009), which was eventually adopted in a similar form as Brazil's official policy position in Copenhagen.[4] Nevertheless, even in such a scenario, neutral actors require convincing discursive strategies, which were identified in the present article.

By definition, a newspaper-based analysis of discourse networks can always only capture simplified versions of the public debate and explanations for policy stability and change. The findings presented here could be complemented with further research, for example a discursive-institutional analysis of the ways in which changes in the discourse were translated into novel rules and social practices (see e.g. Arts & Buizer, 2009) or semi-structured interviews with major stakeholders and decision-makers at the time (see e.g. Lahsen, 2009). Such interviews would be particularly useful to understand the extent to which the described change of policy can be attributed to factors beyond the

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[4] Viana was also instrumental in lobbying for the passing of a "REDD certification bill" in the Brazilian congress in 2010 (Shankland & Hasenclever 2011), which can be interpreted as a form of discourse institutionalization (Arts & Buizer, 2009).

mere strength of arguments and story lines. For example, the role of influential individuals such as Carlos Minc, Minister of the Environment from May 2008 onwards, lobbying activities by agricultural producers and land-owners from the Amazon, or the importance of the creation of the above-mentioned joined task force by representatives of different government agencies in mid-2009 could all be explored (see also Aamodt, 2018; Kasa, 2013; Viola & Franchini, 2014).

Conclusions

The question whether forest conservation should be funded by international carbon markets dominated the Brazilian public debate about REDD in the lead-up to the Copenhagen climate change conference in 2009, and remains controversial and relevant today. The present article presented a case study on the discursive strategies used by supporters and opponents of such market-based funding mechanisms in Brazil. With the aid of discourse network analytical tools and software, two main story lines for and against markets and three discourse coalitions (for, against, and neutral) were identified empirically, based on statements made by relevant political actors reported in 71 Brazilian newspaper articles. During a longer initial phase of policy stability, neither story line gained hegemony, despite constant argumentative competition between the two main discourse coalitions. In a shorter subsequent phase of policy change, however, a third neutral discourse coalition successfully adopted the main arguments of both sides, and achieved a compromise solution, which argued for an integration of REDD into carbon markets, but with some restrictions. The Brazilian Federal Government then adopted this proposal as its official position at COP15, despite having been opposed to carbon markets in relation to avoided deforestation for the preceding 12 years, sidelining the Ministry of Foreign Affairs for the only time at a COP (Aamodt, 2018).

While such policy change is normally the result of many complex factors, it can be argued that the discursive strategy of the neutral discourse coalition represented a (temporary) success. From a theoretical perspective, it was able to extend its framing strategy to extend its power base, making use of the most popular arguments in the debate (cf. Leifeld & Haunss, 2012). Its proposed compromise connected especially well to the most central argument in the debate (as identified by the discourse network analysis), namely that industrialized countries should prioritize reducing their own emissions.

A more general insight potentially gained here is that creating a negative story line alone is insufficient to support a policy position over the longer term, where competitors are able to create a convincing alternative positive discourse. In the present case study, the coalition against markets for REDD expressed many doubts about markets, but failed to mention any benefits of alternative policy options, such as the creation of a public fund for REDD. This is all the more remarkable given that such a fund was set up with donations from Norway and Germany in 2008 (van der Hoff et al., 2018), in the middle of the debate investigated here, and that the coalition against markets had the support of the Brazilian Ministry of Foreign Affairs, which traditionally is the most influential actor in shaping Brazil's international climate policy (Aamodt, 2018; Lahsen, 2009). This suggests that at least to some extent, the level of arguments and discourses may have contributed to a significant change of policy here.

Declaration of interests

The author declares no conflict of interests.

Appendix

Table 2: Classification of actors into discourse coalitions. This was determined based on statements made by actors in the newspaper articles analyzed for this study. If an actor made statements that expressed either support for or against market mechanisms to fund REDD, then the actor was included in the pro-market coalition or the coalition against markets, respectively. If an actor expressed support for markets and also a public fund, then the actor was included in the neutral coalition (since it suggests that the actor was mainly interested in identifying funding sources in general, and was indifferent to the role of markets). Similarly, if an actor supported a restrictive integration of REDD into carbon markets (which suggests neither full support nor opposition), then the actor was allocated to the neutral coalition.

Actor type	Pro-market coalition	Coalition against markets	Neutral coalition
Brazilian Federal Government	Ministry of Finance	Brazilian Federal Government (phase 1 only) Inter-ministerial Commission for Global Climate Change (CIMGC) Ministry of Foreign Affairs (Itamaraty)	Brazilian Federal Government (phase 2 only) Ministry of Environment Ministry of Science and Technology National Institute for Space Research (INPE)
Brazilian Amazon state governments	Acre state government Amapá state government Amazonas state government Amazon state governments (joint public statement) Mato Grosso state government Pará state government Rondônia state government		
Civil society	Environmental Defense Fund Katoomba Group Tropical Forest Group Wildlife and Environmental Education Research Society (SPVS)	Brazilian NGO alliance (joint public statement) Federation of Organizations for Social and Educational Assistance (FASE) Friends of the Earth Brazil Greenpeace	Amazonas Sustainable Foundation (FAS)
International organizations and non-Brazilian actors	Australian COP delegation	European Union COP delegation (phase 2 only)	European Union COP delegation (phase 1 only)

	Colombian COP delegation New Zealand COP delegation	Tuvalu COP delegation	Rainforest Coalition
Science and research	Amazonian Environmental Research Institute (IPAM) Brazilian universities (joint public statement) Global Canopy Program Woods Hole Research Centre	University of São Paulo	
Business sector			Brazilian Association of Carbon Market Entrepreneurs (ABEMC) Brazilian business representatives (joint public statement)

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