Beyond Institutional Fragmentation – a Framework for Analyzing Dominant Discourses and Practices: the case of REDD+ monitoring

Fariborz Zelli, Tobias Nielsen and Wilhelm Dubber

(all Lund University)

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1 Introduction

Institutional fragmentation or complexity has been increasingly accepted in the scholarship on international law and international relations as an inherent structural characteristic of global governance (cf. Biermann et al. 2009; Zelli and van Asselt 2013). Environmental domains are a particular case in point: due to their complex and cross-cutting nature, they often overlap with the subject matters and jurisdictions of institutions, both public and private, from various other issue areas.

This emerging scholarly consensus notwithstanding, a remarkable terminological diversity has developed that, apart from fragmentation, denotes this institutional phenomenon, as, for instance, governance experiments (Hoffmann 2011), polyarchic or polycentric governance (Ostrom 2010) and regime complexes (Keohane and Victor 2011; Orsini et al. 2013; Raustiala and Victor 2004). But while researchers may differ on the best conceptual framing or labeling, one should rather speak of one single research program.

We hold that what is largely lacking across these literatures are more fundamental theoretical approaches that can help us understand underlying and connecting aspects of a fragmented governance architecture, e.g. by relating different institutions or mixes thereof to constellations of power, interests, knowledge, norms and discourses. Such theoretical approaches may provide a common language and coherent framework that cut across the terminological and conceptual fragmentation of the research community. And they may help us to better explain or understand varying degrees of fragmentation for different governance architectures, and the consequences thereof for effectiveness and legitimacy.

In this article, we introduce key aspects of one such theoretical approach. We argue that institutional complexes are embedded in overarching discourses that shape and reproduce the mix of public and transnational institutions, their different thematic centres of gravity and patterns of dominance. We develop this argument building on the tradition of argumentative discourse analysis (cf. Fischer and Forester 1993; Hajer 1995). Adapting this theory to the problem of institutional complexity, we hold that 1) discourses, 2) the evolution and mix of institutional complexes, and 3) practices of environmental governance are mutually constituted (cf. Zelli et al. 2013).

Starting from this assumption we introduce an analytical framework in this article that can help us explore fragmented governance architectures and detect underlying discursive structures by asking: Which perspectives, or rather, which discourses, are co-constituted with a particular institutional landscape? Which ones are dominant in this landscape, across a diverse set of institutions, which ones are secondary or neglected?

Doing justice to the assumed mutual constitution, we develop our analytical framework through both deductive and inductive steps. On the one hand, we introduce general elements of our framework that could be geared towards different fields of global governance: our theoretical starting point of argumentative discourse analysis, its key concept of discursive storylines and our methodical approach to identify them (section 3). We then substantialize our framework for a particular policy field, forest governance, by deductively linking certain types of discursive storylines to specific practices of forest carbon monitoring that are promoted by key institutions (section 4). Finally, we provide a first explorative application of this 'match-making' between the three dimensions – institutions, discourses and practices – for the global governance architecture on REDD+ ('Reducing Emissions from Deforestation and Forest Degradation').[1] REDD+ is one of the major elements in a series of incentive-based mechanisms for climate and forest governance that have been developed in the last 15 to 20 years (Bernstein 2002). We focus our brief analysis towards one of the major sensitive issues in the REDD+ debate, namely the design and practices of monitoring forest carbon changes. With the help of our approach, we reveal dominant storylines and monitoring practices across the fragmented REDD+ governance architecture (section 5). Before engaging in these consecutive steps of theory-building and exploration, the next section provides a brief empirical overview of the institutional complexity of REDD+ governance today.

2 Fragmented REDD+ Governance

As this section briefly shows, the global REDD+ architecture is complex and fragmented, with a very diverse mix of global public institutions, bilateral arrangements and non-governmental approaches (cf. Gupta et al. 2013). While REDD+ is only gradually taking shape at UNFCCC meetings, a series of international REDD+ (funding) initiatives and market-based approaches emerged outside of the UNFCCC umbrella (Wertz-Kanounnikoff and Angelsen 2008). Adding to this, REDD+ pilot projects are already up and running in different regions across the globe (Angelsen et al. 2012).

[1] The '+' refers to conserving and enhancing forest carbon stocks, and sustainably managing forests

A series of institutions have addressed REDD+ and monitoring-related issues outside the umbrella of the UNFCCC (cf. Corbera / Schroeder 2011; Thompson et al. 2011). Given REDD+'s incentive-based nature, financing initiatives are central. This includes established financial mechanisms like the Global Environment Facility, and regional banks that administer their own funding mechanisms such as the Amazon Fund or the Congo Basin Forest Fund. In addition, three major multilateral REDD+ funding initiatives have been created: the Forest Carbon Partnership Facility (FCPF) of the World Bank, launched at the UNFCCC–COP 13 in 2007; the Forest Investment Programme (FIP); and UN–REDD+ (United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation). Recently, the UNFCCC's Green Climate Fund (GCF) has become a potential future financing option for REDD+ projects, assuming that it will be endowed with the envisaged annual 100 billion US$ from 2020 (GCF Decision B.08/08).

Next to these multilateral bodies, a series of bilateral activities (by Norway, Germany, and Japan in particular) contribute significantly to REDD+ financing. Voluntary carbon markets also provide funding for REDD+ pilot projects (Hamilton / Chokkalingam / Bendana 2010; Intergovernmental Taskforce 2010). But while only a fraction of the sums raised by such markets is associated with REDD+ projects,, other market-based approaches, and careful linking of domestic and sub-national markets, may considerably boost these figures in the next years. One example is the Governors' Climate and Forests Task Force that included 29 states and provinces in 8 different countries by January 2016.

The picture becomes even more complicated when other institutions and treaties are taken into account that relate to REDD+ but do not primarily focus on it. A full depiction of the broader institutional embeddedness is beyond the scope of this article. We suffice her with two examples of such bilateral treaties for the case of Peru, which after Brazil holds the largest share of the Amazon. Peru's bilateral trade agreements with both the EU and China explicitly mention links between forests and climate change, and a direct reference is made to REDD+ in the EU–Peru agreement. This practice of including environmental concerns in commercial agreements can have mixed implications, such as facilitating general environmental safeguards or further commodifying environmental goods and services (Bernstein 2002).

Nearly each of the aforementioned institutions contains ideas or even regulations on particular sub-issues, such as, for instance, allocation criteria for funds, social and environmental safeguards, and monitoring of forest conservation and related carbon emission reductions. These and other issues open up several sensitive questions in their own right. Allocation criteria relate to the (fair) distribution of funds, but also to aspects of conditionality of donors via recipients. Environmental and social safeguards refer to possible co-benefits of REDD+ projects beyond the mere reduction of carbon emissions, e.g. the protection of biodiversity (also of forest fauna) and the social inclusion of indigenous groups and other forest users in decision-making, project implementation and revenue distribution (cf. Pokorny et al. 2013; Savaresi 2013). Monitoring, in turn, touches upon issues of sovereignty, the level of ambition of forest protection, and again on questions of involving

particular stakeholders. What fragmentation does to these and other sub-issues is to provide different platforms for different types of approaches and perspectives on them. Bilateral and multilateral financing institutions, for example, may differ considerably in their allocation criteria and their handling of social and environmental safeguards.

Since we can only provide an illustration of our framework, we will concentrate our analysis on the specific issue of monitoring, i.e. measurement, reporting and verification (MRV) of REDD+ projects and their effects. While this focus blanks out other interesting debates, it does not avoid the crucial topic of safeguards, since MRV modalities give us a key indication for the importance of certain co-benefits as requirements for REDD+ project development and respective funding.

We will explore which monitoring approaches are recommended or required to what extent across REDD+ governance architecture, *what* they measure (carbon, biodiversity or socioeconomic aspects) and what they do not measure, *why* they measure it (climate change, sustainable forest management), *how* they measure (satellites or local communities) (cf. Lovell 2014). As we will further explicate in the next section, these questions not only imply a look at multilateral institutions and their key documents, but also at how countries plan to implement these requirements on the ground.

3 Theoretical, Conceptual and Methodical Background

3.1 Theoretical Basis: Argumentative Discourse Analysis

The aforementioned patchwork of institutions, and the actors participating in them or affected by them, rely on different ideas, rationales and understandings to make sense of REDD+. This leads to a range of different meanings, some evident, others more inconspicuous. The different meanings actors attach to the loss of tropical forests, the degradation of ecosystems or the livelihoods of people are an important part of the type of governance structures that emerge and change over time (Fisher 2003; Yanow 1996).

Discourse analysis can reveal such meanings that are not palpable at first glance. It studies how actors make sense of issues and have (competing) meanings on, for example, deforestation. Discourse can be defined as "a specific ensemble of ideas, concepts, notions and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities." (Hajer 2009, 60).

In this way discourse represents a shared way of apprehending a phenomenon. It enables those who subscribe to it to interpret bits of information and put them together into coherent stories or accounts (Dryzek 2013). Discourses construct meanings; they help define what is legitimate knowledge, and set a limit on the range of responses we have to certain problems (Litfin 1994; Dean 1999). Moreover, discourses are not free-floating; they are embedded in institutions and organizations and play an important role in structuring the relations of power within them (Fairclough 1992).

But, as the definition above alludes to, the relationship between discourses and institutions is not a one-way street. Certain institutional practices such as innovations in remote sensing can in turn shape certain discourses. We argue for a dialogical understanding in which neither the actors nor the structures are omnipotent (cf. Giddens 1984; Wagenaar 2011). Hence, actors are not 'free' to choose the meanings they attach to monitoring, nor do we see the products of discourse as an 'iron cage' in which individuals and institutions have no option other than to act in a particular way.

This paper uses an argumentative discourse analytic approach (ADA) (Fischer and Forester 1993; Hajer 1995; Hajer and Versteeg 2005). ADA places emphasis on the construction of meaning and aims to unravel the argumentative structures and linguistic regularities in documents and other written or spoken statements as well as the practices through which these utterances are made (Hajer and Versteeg 2005). Language is seen not as a neutral messenger of given interests and preferences, but it influences their very formation. Moreover, it enables and limits the range of practices and interactions in which actors can engage (Dryzek 2013). As such, ADA offers a way to analyse political struggles over meaning (Wagenaar 2011).

In this sense of a mutual constitution of language and practices, ADA is particularly suitable for our analysis, since we argue that the shape and dominance patterns of the institutional architecture, the choice and dominance of certain monitoring approaches, and the existence and dominance patterns of certain discourses are mutually constituted. ADA can help us to navigate and make sense of a patchwork of institutions, as it can reveal hidden, overarching connections between institutions, actor coalitions and their practices. The at first glance often too intricate and complex institutional architecture on REDD+ may become 'readable' in terms of discursive storylines and the hierarchy among them. In this understanding, a discourse can be seen as glue that holds together the mismatch of actors, ideas, issues, forums of decision-making and levels of governance that characterize the institutional fragmentation of REDD+.

3.2 Conceptual Tool: Discursive Storylines

Following ADA, we use the concept of discursive storylines to identify discourses underlying monitoring practices on REDD+. Such storylines can be understood as recurring figures of speech that dominate public understanding and rationalize and naturalize the existing social order (Hajer 1995, 268). In more pragmatic terms, they are condensed statements, summarizing more complex narratives, which people use as a kind of shorthand in discussions (Hajer 2006).

This use of storylines, or statements, as proxies for discourses also shows that, unlike post-structuralist discourse theories, ADA puts stronger emphasis on the role of agents. Agents use certain storylines by drawing on specific discourses to give meaning to physical or social phenomena, such as climate change or, in this case, forest carbon monitoring practices. Storylines do not just represent given phenomena, but actively construct these phenomena by changing the way in which actors see and govern them (Hajer, 1995; Hajer and Versteeg,

2005; Vijge, 2015). They are brought to 'life' by a set of actors known as discourse-coalition, i.e. groups of actors using and promoting a set of storylines over a particular period of time and in the context of an identifiable set of practices (Hajer 1995).

We argue that certain underlying storylines and discourses shape the different perceptions on *how* forest carbon is monitored, by *whom* and *what* it focuses on (e.g. carbon or non-carbon elements). This helps to reinterpret the monitoring techniques as manifestations of discourse, connecting monitoring technologies and procedures with institutions and underlying dominant discourses. In section 4, we will deductively link different monitoring approaches to different storylines, before further exploring this link inductively for selected institutions and countries in section 5.

3.3 Methods and Material

In light of the mutual constitution of discourses, institutions and practices, distilling storylines is an interpretative and iterative process. We sought to accommodate the open and moving character of storylines through a sequence of a deductive and an inductive step.

First, we composed an *ex ante* idea of what key storylines might be. Although the climate and environmental governance literatures do not have a commonly accepted typology of climate discourses, we could identify recurring patterns and narratives and further built on our own previous typological work (Bäckstrand and Lövbrand 2006; Clapp and Dauvergne 2011; Dryzek 2013; Nielsen 2014). We assigned these key governance storylines to the two main groups of MRV approaches that we identified in international and domestic documents on REDD+ monitoring: remote sensing and national forest inventories. We introduce our framework with this deductive linking of storylines and approaches in section 4.

In a second step, we applied this framework to different types of material, to provide a first illustration on how certain storylines are more or less influential across institutions and practices in the fragmented REDD+ governance architecture – but also to identify the need for further refining the framework. We studied this material with its references to technical, ecological and social aspects and benefits from our different disciplinary backgrounds and expertise in political science and physical geography.

Given the limited and explorative character of our study we had to concentrate on 1) selected institutions and 2) practices related to these institutions in selected countries. As for the former, we chose to focus on the following multilateral funding institutions: UN-REDD, FCPF, FIP, REDD+ Partnership and GCF. To analyze these five multilateral funding organizations we studied their home pages, blogs, reports, monitoring guidelines (see Table 1). These institutions represent the bulk of the finance on REDD+ and have stepped in with operationally defined monitoring approaches including on safeguards. UNFCCC negotiations have the strongest ambition to frame the debate on a global level and the GCF can be expected to develop into a key funding organ. Currently however, with their considerable funding volume – by far outspending the private sector and other public institutions – it is FCPF, FIP and UN-REDD that shape the actual practices of REDD+ on the ground, i.e. in

recipient countries. These three funding initiatives base their practices on UNFCCC guidelines, but with considerable room for interpretation, especially when it comes to implementing REDD+.

Thus, to gather a more concrete picture of how monitoring practices are planned on the ground and how storylines play out there, we complemented our analysis by examining reports of selected countries to the three currently operating funding institutions, in particular to the FCPF, as they were most elaborate. We chose eight countries – Argentina, DR Congo, Ethiopia, Laos, Mexico, Nigeria, Peru and Viet Nam – based on the following criteria: membership of the country in at least two of the three financing institutions; geographical balance between Africa, Asia and South America; availability of national documents; variation in GDP. While we do not (need to) aim for generalizability for this discursive study, basing our selection on these geographical and economic factors may allow us some additional insights.

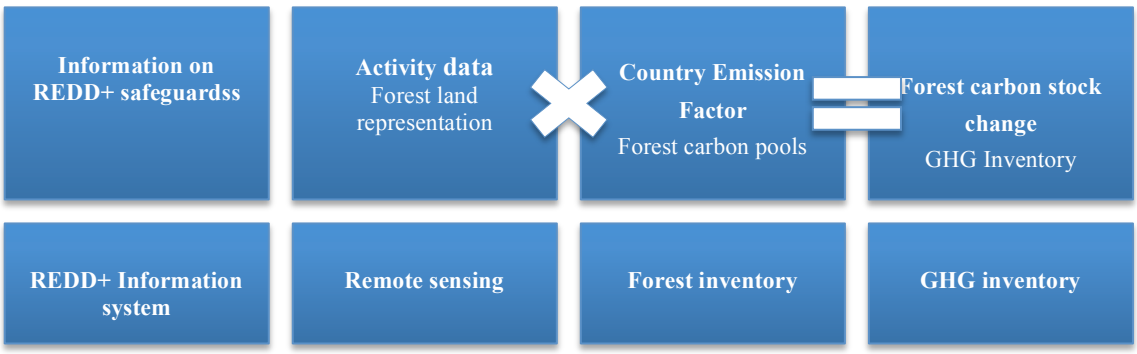
We are aware of the methodical limitations of these explorative steps. A series of other factors may play a role for the choice of monitoring approaches, e.g. the dominance of certain economic sectors like timber, and previous experiences with respective approaches in other contexts. Moreover, to gain a full picture of discourses and monitoring practices, follow-up studies would need to employ a similar focus on overarching storylines to some of the other REDD+ governance and funding instruments mentioned in section 2, as well as conduct research on sub-domestic and REDD+ project levels. This should also imply a broader mix of methods for identifying storylines, such as interviews and field studies.

Table 1 Overview of empirical material

Funding organization	Documents
UN-REDD	Monitoring guidelines, website, policy board meetings, country reports (National Programme Documents)
FCPF	Monitoring guidelines, website, country reports (Readiness Preparation Proposals (R-PP**),** Emission Reductions Program Idea Notes (ER-PIN)**)**
FIP	Monitoring guidelines, website, country reports
GCF	Monitoring guidelines, website, board meetings, GCF Readiness Programme
UNFCCC	Decision booklet REDD+, Paris Agreement, SBSTA reports, expert meetings

Note: We looked at a number of country reports, but in terms of analyzing the different operationalizations of remote sensing and forests inventories we focused in particular on the R-PP reports as they provide more detail on the actual monitoring practices. The different guidelines, as well as other documents (board meetings, website) and country reports provide crucial insights into the institutional diversity.

4. Analytical Framework: REDD+ Monitoring Practices and Underlying Storylines



In the context of REDD+, carbon monitoring aims at estimating CO_2 emissions due to deforestation and forest degradation. This requires establishing national measurement, reporting and verification (MRV) systems, which are based on the 2003 Good Practice Guidelines of the Intergovernmental Panel on Climate Change (IPCC; Decision 2/CP.13).[2] However, the different funding organizations covered in this study have in addition developed their own guidelines, based on UNFCCC negotiations, to provide more details on how to operationalize REDD+. Their basic assumption is to focus on two key variables: (i) area of deforestation and degradation (activity data) and (ii) terrestrial carbon stock densities per unit area (emission factor). These shall be combined to create a national greenhouse gas (GHG) Inventory to report anthropogenic forest-related GHG emissions to the UNFCCC Secretariat (cf. Decision 1/CP.16).[3]

These measurements are used to quantify the carbon 'saved' by REDD+ activities, which ultimately is what such projects receive funding for. At COP 16 in Cancún, and later reaffirmed at COP 19 in Warsaw, it was decided that, in addition to monitoring carbon emissions, countries are encouraged to report on a range of "co-benefits" as a result of REDD+ through the so-called safeguard information system (Decision 12/CP.19). These co-benefits are linked to a set of social and environmental safeguards that were included in REDD+ to address non-carbon issues such as biodiversity and local stakeholder inclusiveness.

Figure 1 Overview of basic MRV system

Country reports and institutional guidance documents largely refer to two key monitoring approaches to assess activity data, emission factor and co-benefits: remote sensing and field inventories (see Figure 1). In the following, we introduce these approaches, their strengths and limitations (see Table 2 for summary), and deductively link sets of storylines to them.

[2] Since 20013, the Warsaw Framework on REDD+ has been the main methodological technical toolkit on how to operationalize REDD+, yet it leaves plenty room open for interpretation and national cicumstances.

[3] In accordance with the IPCC guidelines REDD+ forest inventories can be divided into three levels of complexity called Tiers. Ranging from Tier 1, where methods are simple to use, to Tier 3 that require higher order methods including models and systems tailed to local circumstance. In addition, the need for data on drivers and activities causing forest carbon change and consideration of developing country capacities have been highlighted as central components in the development of REDD+ MRV systems. Modelling may hence be regarded as a monitoring approach in its own right, but, with regard to its currently low practical significance in the REDD+ context (unlike in other carbon monitoring contexts) and the limited scope of our study, we focused here on the two approaches that provide genuine data.

Table 2: Overview of forest monitoring techniques

	Remote sensing	Field Inventory
What	Forest activity Trends in forest cover. Forest quantity Wall to wall coverage of forests. Regional to global	Emission factor Carbon stocks and pools. Forest quality. Patchwork, but more detailed. Local to regional.
Why	Climate change (focused on carbon emissions)	Climate change (carbon sinks, removals, pools) Enables monitoring of social and environmental co-benefits.
Who	Satellites, airplanes, radar. Experts.	Expert-surveyors and community forest monitoring.
Advantage	Covers forests with little/no previous monitoring experience, near real-time trends, comparable data on global scale.	Below canopy data, enables more monitoring objectives, brings forward uniqueness of forests plots, engages with local communities.
Limitations	Limited capability of measuring non-carbon elements), focus on canopy, expert-driven.	Time-consuming, not easily comparable on larger level, limited application in remote areas.

4.1 Remote Sensing

Remote sensing consists of satellite-based optical and thermal images as well as radar and aerial photographs. The technique is able to provide, under optimal conditions, complete wall-to-wall information on forest cover changes with high temporal and spatial resolution on a global to regional scale, making it a suitable method for estimating forest activity data (DeFries et al. 2007). The advantages of remote sensing thus include its ability to provide spatially explicit information and frequent temporal coverage, the possibility of covering large and remote forest areas (cf. Grainger and Obersteiner 2011; De Sy et al. 2012), and the potential to use historical data to provide a reference level for deforestation.

The main limitation of remote sensing is the inability to see beneath the cannopy. Information such as soil carbon, biodiversity and socioeconomic factors can only be vaguely linked to certain forest types and regions (e.g. Duro et al. 2007). Cloud coverage can also be a limiting factor, especially in the tropical region where most REDD+ projects are located. Technological and methodological advances in the use of remote sensing such as LiDAR provide promising ways to deal with some, but not all of these limitations (DeSy et al. 2012. In addition the technical nature of remote sensing provides an obstacle for implementing it in

a national monitoring scheme if previous experience is lacking, and makes it less accessible for local communities and non-governmental entities.

Storylines

1. The first storyline underlying remote sensing that we deduct from the literature and our previous work (Nielsen 2014), '*techno-managerial'*, draws attention to the calculative practices that turn stocks and flows of forest carbon into objects of governance (Lövbrand and Stripple 2011; Gupta et al. 2012). New mapping and accounting practices have opened up possibilities for the quantification and management of terrestrial carbon. This framing of global forests as "carbon dioxide emissions" offers to transform even the most lawless, impenetrable frontiers down to a highly "legible" unit, in this case a single chemical element (Boyd 2010). Hence, a key part of this storyline is framing deforestation as a particular type of problem, that of carbon management, amenable to a particular policy instrument, that of emissions reductions. It also promotes a high degree of faith in science and technology. It conveys the message to decision makers on REDD+ that forest carbon is measurable and consequently manageable (Lovell 2014). With continually improved data we may be able to gain a more and more fundamental understanding of the dynamics of deforestation and how to govern it. The storyline privileges scientific knowledge and expertise as the authoritative basis for managing forests.

2. A second storyline is '*commodification of forest carbon*'. A key rhetoric of this storyline is converting tropical forests to a homogenous unit that can be traded on an international market (Corbera and Brown 2010). From an economic perspective, this transforms forests into a perfect commodity, potentially fully fungible without qualitative differentiation. This storyline emphasizes the role of markets and the importance of perfecting and expanding their functioning in order to find cost-effective solutions to environmental problems (Humphreys 2009). As such, deforestation is a problem of missing or false incentives, resulting from a missing valuation of forest ecosystem services in the economic system (Stephan et al. 2014). This storyline connects to the previous one, as it relies heavily on the ability of scientists and foresters to determine the amount of carbon stored in forests and to measure and monitor deforestation. The storyline also carries a neo-liberal notion of achieving synergies between economic, ecological (biodiversity, water purification) and social aspects (poverty reduction, land tenure security) of REDD+ (Stern 2006).

3. The third storyline can be labeled '*global scale'*. Remote sensing allows (or encourages) one to look at tropical forests on comprehensively (Gupta et al. 2012). It promotes local forest cover patterns to be considered a unitary whole, capable of being understood and managed on a global level. The road to REDD+ began with the awareness that the forest sector accounted for more than ten percent of global GHG (IPCC…). This knowledge lies close to the raison d'être for engaging in REDD+ in the first place. By creating "facts on a planetary scale," remote sensing allows particular environmental problems to be understood and approached in ways (and at scales) that differ significantly from previous approaches (Jasanoff 2004). This fundamentally new perspective has profoundly altered our ability to

visualize tropical deforestation and land cover change, providing the basis for a comprehensive, global mapping of forest carbon stocks (Boyd 2010).

4.2 National Forest Inventory

National forest inventory (NFI) monitoring includes measuring tree diameters or volumes and was developed in the 19th century to cater a growing forest industry (Mohren et al. 2012). Since then forest inventories have been tailored to suit different needs. Field sampling is crucial for stratification of remotely sensed forest areas and for connecting them to qualitative properties such as forest biomass. The calculation of country-specific emission factors relies on field inventories where the size and quality of the inventory directly corresponds to different tiers of national GHG accounting. Ground level monitoring is also essential in assessing non-carbon components of REDD+ such as biodiversity, safeguards and sustainable management (Dickson and Kapon 2012; Larrazábal et al. 2012; Visseren-Hamakers et al. 2012). Many countries also want to utilize large-scale multi-purpose NFIs for monitoring commercially related forest properties.

Storylines

1. One storyline we identify for NFI is similar to the first one we mentioned for remote sensing. Forest inventory may also cater to a *techno-managerial* rationale on REDD+. Indeed, most REDD+ projects combine remote sensing with some form of inventory measurement. Although NFI opens the possibility of measuring environmental and social co-benefits, its core aspect of assessing tree diameters or volumes still suggests the message that forest carbon is measurable and manageable. Similar to remote sensing, inventories may provide a prominent role to scientists and experts and suggests that respective technologies and data exist or will be available in due time.

2. Where NFI differs from remote sensing is what non-carbon assessments it enables and what views of the problem and solutions to REDD+ it accommodates. This can be conceptualized with the '*beyond carbon*' storyline. When forests are rendered legible through their carbon content only, other forest-related values and governance objectives, such as securing biodiversity or local livelihoods, may be obscured (Gupta et al. 2012). With NFI there is the possibility of a stronger emphasis on forest aspects that are less measurable by satellite. These can be grouped as social and ecological aspects that are in this storyline seen as a prerequisite for a successful REDD+ (Angelsen et al. 2012; Krause and Nielsen 2014). The storyline stresses the social dimension as being crucial for REDD+ governance, for involving local stakeholders, enhancing social justice, and addressing some of the underlying social drivers of deforestation (cf. Hajek et al. 2011; Lyster 2011). It acknowledges a key role for local communities in designing and implementing carbon monitoring (Agrawal 2005; Fry 2011). The ecological dimension highlights the importance of monitoring environmental co-benefits. The rhetoric is that if REDD+ projects and treaties do not include clauses on, for example, biodiversity, they will not cover the full picture of the devastation caused by deforestation (Dickson and Kapos 2012).

3. A third storyline is a focus on a '*local view'*. The emphasis on the role of local stakeholders and importance of biodiversity often goes hand in hand with a more local approach to REDD+ governance. This local point of view is further supported by the heterogeneous look on forests that NFIs provide (Mohren et al. 2012). This heterogeneous perspective questions the global and holistic view of forests that remote sensing projects. Such global perspectives, it is argued, ignore invisible and complex on-the-ground realities, which are embedded in local cultural practices and local knowledge (Litfin 1997).

Table 3 summarizes our deductive linking of storylines to the two major monitoring approaches.

Table 3: Overview of forest monitoring techniques and their storylines

Monitoring technology	Storylines	Arguments
Remote sensing	Techno-managerial	- Calculative practices turning stocks and flows of forest carbon into objects of governance
	Carbon commodification	- Turning forests into comparable carbon stocks tradable on a market; - Using market mechanism to govern forests; - Promoting a win-win-win situation.
	Global view	- Enabling a global view on tropical forests; - Converting tropical forests into a single unit.
Forest Inventory	Techno-managerial	- Calculative practices turning stocks and flows of forest carbon into objects of governance.
	Beyond carbon	- Focusing on co-benefits: inclusiveness, local participation, community forest monitoring, biodiversity, eco-systems.
	Local view	Stressing the uniqueness of individual forest lands.

5. Major Findings

In this section, we explore the usefulness of our framework by discussing to what extent, across the institutions and particularly the country reports to them, variations and dominance patters of REDD+ monitoring mechanisms (5.1) coincide with hierarchies between certain storylines (5.2) and what this means for our deductive pairing of both dimensions (5.3).

5.1 Monitoring Mechanisms: Dominance of Remote Sensing

Across the sampled country reports we found a high level of detail in the remote sensing sections, regarding both design and implementation. In fact, there is hardly any variation between countries on this issue. All keep very close to the IPCC guidelines and give very similar accounts of how they will operationalize them. This is not surprising: countries with a high monitoring capacity gap tend to stay closer to the description provided by manuals and give less elaborated descriptions of methodology (cf. Romijn et al. 2012).

Overall, the country reports point to a heavy reliance on remote sensing and its clear prioritization over NFI. Sometimes this preference is explicitly stated, e.g. in the case of DR Congo (DRC R-PP 2010:87). Only one of the studied reports suggests an alternative approach instead of merely using remote-sensing based estimates of activity data (Viet Nam R-PP 2011). Part of the reasoning behind this emphasis on remote sensing is that NFI (and safeguards information systems) take time to develop, while remote sensing images are readily available.

Subsequently, the country reports exhibit, on average, a lower level of detail on the use of field inventories. Several countries indicate little coherent experience with field inventories: "*The only study whose design could be useful for the [forest] carbon inventory…covered only a few forest reserves, and it is still not clear if the plots can be retraced*" (Nigeria R-PP 2010:100).

However, variation is much higher across the reports here, especially on how to operationalize NFI and on how to monitor social and environmental safeguards. We found for our sample that both level of implementation of field inventories and previous experience with them are positively correlated with country GDP. This may well be explained with the potentially more developed forest industries in richer countries and the subsequent demand of forestry-related information. The collection of such information in the NFIs is explicitly stated in several reports of wealthier countries.

There is also a strong focus on carbon over co-benefits. While all country reports mention co-benefits extensively, frame them as quintessential to REDD+ and stress their intent to monitor them, most countries provide little detail on to how they plan to do so (c.f. Ethiopia R-PP 2010; Peru R-PP 2010).[4]. This lack of detail on co-benefits goes hand in hand with a less developed plan for how to implement and operationalize NFI. Only a few countries, those with previous experience with NFI or community forest management, provide lists of suggested monitoring indicators for co-benefits, while most reports at best propose that such a list should be developed. "*Capacity to undertake such monitoring [of co-benefits] is very limited at present and so progress will depend on donor support for funding and for building up capacity*" (Laos R-PP 2010:84).

Table 4: Overview of R-PP country report findings

R-PP country report	Carbon monitoring practice	Co-benefits
DRC	High level of detail and focus on remote sensing, low level of detail on NFI	Clear intent, but little detail on how to measure and operationalize

[4] Similarly there are discrepancies amongst funding organizations. They all abide to the UNFCCC decisions, but there are some discrepancies. GCF allows for broader goals than REDD+ (SMF rather than SFM; both mitigation and adaptation) GCF might have different requirements for safeguards. GEF more on environmental, UN-REDD has a slightly more rights based approach than FCPF (McDermott et al. 2012).

Ethiopia	High level of detail on remote sensing, Medium detail on NFI	Medium level of detail, with concrete examples of biodiversity indicators and plans for stakeholder engagement and community forest management
Nigeria	Low level of detail on remote sensing, high level of detail on NFI.	Little details on how to measure and operationalize, some efforts at stakeholder engagement
Laos	Medium detail on remote sensing and NFI. Multiple monitoring initiatives.	Some details on environmental and social safeguards, but little specifics on how to carry this out.
Viet Nam	Low level of detail on remote sensing, Large owner-based NFI	High level of detail with reference to existing experience with social safeguards, less detail on environmental co-benefits.
Argentina	High level of detail on remote sensing, low level of detail on NFI	Low level of detail on social co-benefits. Participatory biodiversity-monitoring.
Mexico	High level of detail on remote sensing, large permanent NFI	Low level of detail on both environmental and social co-benefits.
Peru	High level of detail on remote sensing, low level of detail on NFI	Some details including a list of environmental indicators, but little detail on how to operationalize it.

5.2 Storylines: Dominance of Techno-managerial, Commodification and Global Perspectives

Across all of the funding organizations guidelines and country reports we find a clear presence of the techno-managerial storyline, in particular of the argument that an accurate and detailed MRV is the foundation for implementing REDD+. "*A robust and transparent national forest monitoring system can contribute to strengthen forest governance and to further consider counter measures to deforestation and forest degradation."* (FCPF 2013b:17). Furthermore, forests are often spoken of in terms of carbon pools, sinks, removals, tons of CO_2 or forest area, which helps frame them as a governable unit. All country reports convey a high degree of confidence that the appropriate monitoring of forest carbon changes is achievable through different indicators and monitoring approaches (cf. FCPF 2013), for instance: "*With regard to the reference scenario and the MRV system, the DRC will develop compatible systems with the most demanding carbon reporting criteria*" (DRC R-PP 2010).

The *carbon commodification* storyline is identifiable in most country reports,where REDD+ is framed as a potential significant new source of finance for effective implementation of forest management strategies (cf. Laos R-PP). The win-win-win storyline is also evident as a

key legitimization of REDD+ across all institutions under scrutiny and most country reports.. "*This will ensure that the REDD+ implementation process generates a balance of social, economic, and environmental benefits in forest environments and rural populations that occupy the territory in question*." (Paraguay R-PP 2010: 134).[5] REDD+ is further framed in some country reports as an approach that promotes public and private investment in forest carbon trade, and that is able to secure (financial) incentives for sustainable forest management (cf. Laos R-PP 2010). The financing institutions often aim for countries or REDD+ projects to reach a level where they become fully-fledged 'performance based projects' able to secure their own funding (cf. UN-REDD 2013a): *"…this has not kept a wide array of public and private stakeholders from investing in REDD+ initiatives at subnational (local and regional) level, which suggests that investments could increase substantially if said uncertainties are reduced*." (Peru R-PP 2010:12).

The *beyond carbon* storyline is articulated in different ways, emphasizing the importance of paying special attention to biodiversity, ecosystem services, transparent and effective governance, participation, inclusion of stakeholders and indigenous people's rights (cf. UN-REDD 2012). "*Nigeria is committed to ensuring that forests under a REDD+ regime deliver benefits beyond carbon and avoid potential risks to the environment and social well-being*" (Nigeria R-PP 2010:8). When it comes to securing social safeguards this is often framed in terms of reducing risks, increasing effectiveness and climate resilience, by empowering and including local stakeholders in the decision making and monitoring practices. "*Participatory monitoring will strengthen their [local communities] understanding and commitment while providing a degree of comfort to investors that REDD+ is sustainable*." (Viet Nam R-PP 2010:10). All country reports highlight the importance of safeguards , but clearly in the role of co-benefits to achieving emissions reductions. In other words, while not seizing to pay lip service to safeguards, the reports do not break away from the carbon commodification storyline and its win-win-win rhetoric. This prioritization of commodification over safeguards is particularly evident in the reports' lack of clear information on countries plan to monitor and operationalize safeguards.

Finally, the *local view* storyline becomes visible in the requirement to adjust or account for domestic and local circumstances, national strategies and national policies (cf. Decision 1/CP.16 Appendix 1). The UNFCCC guidelines on how to include safeguards make frequent use of phrases like "in accordance with national circumstances". This rhetoric is echoed in the country reports that often argue for a need to break REDD+ into national and subnational levels or into different forest or deforestation categories, for instance: "*it is necessary to develop eco-regional strategies to address all issues of REDD strategy for the specific conditions of each ecoregion*." (Argentina R-PP 2010:6). Indeed, the multilateral funding institutions can only provide guidance and support, but is is individual countries that implement REDD+ in the end. The hundreds of monitoring indicators provided by the funding institutions need to be adjusted to local circumstances. The sections on NFI in the country reports also often emphasize local knowledge and promote community forest monitoring and the ability to detect different types of forests lands. *"In the case of native*

[5] Moreover, on a wider scale there is a clear mandate for the REDD+ process to be an engine to design and implement a low carbon economy (cf. UN-REDD 2013b; GCF 2014).

communities, their participation in forest monitoring is essential due to their understanding of the land and traditional knowledge, thus enabling efficient and effective monitoring" (Peru R-PP 2010: 125).

5.3 Critical Discussion: Mutual Enforcement of Dominant Practices and Storylines

For a comprehensive picture above and beneath the canopy, REDD+ monitoring must include both key types of monitoring practices (UNFCCC Decision 4/CP.15). The challenge and largely unresolved difficulty is about how to integrate these two practices, each with different definitions about what to measure and how.

Our study indicates that, in key institutions and selected country reports, there is no consistent balance between remote sensing and forest inventory. Remote sensing is clearly dominant across the fragmented REDD+ governance landscape – not only with regard to much more detailed plans for its operationalization, but also in terms of the storylines that it promotes and that, in turn, are promoting it. In other words, we argue that the prioritization of remote sensing is not only due to technical considerations like in Table 2 above. It also caters to techno-managerial, carbon commodification and global views of REDD+.

This signals a more carbon-centric perspective on forests that treats forest as a single homogeneous unity, simplifying tropical forest ecosystems into calculable objects of carbon on a global scale (Gupta 2012; Lovell 2014). And it ultimately implies de-coupling forest carbon from its ecological context and inserting it into new, increasingly global carbon value chains (Boyd 2010).

However, viewing the technological advances of remote sensing as steps towards a more fundamental understanding of deforestation misses the fact that this is a problem that has no single essence or identity waiting to be discovered (Humphrey et al. 2014; Nielsen 2014). One cannot argue for an exercise of forest governance that is highly technical and follows a market rationality without recognizing the social and environmental contexts and the implications for the administration of power. The lack of detail and ambiguity on monitoring co-benefits, risks legitimizing the carbon commodification and techno-managerial storylines, rather than serving as a check on them. The over-reliance on experts, including the ones writing the country reports, and advanced technology set obstacles to a more widespread understanding and support or REDD+.

Compared to remote sensing, NFIs may help constitute a more diverse view on forests. However, a more developed NFI does not in itself lead to a stronger focus on co-benefits. As our framework reveals, and our brief analysis could further specify, quite different storylines are underlying this approach, NFI development might as well further promote a techno-managerial orientation and benefit the local forestry industries rather than other stakeholders. For example, in the case of Mexico's R-PP (2010) there does not seem to be a high level of detail of co-benefits monitoring, in spite of the most developed NFI plans of all sampled country reports. Hence, a well-developed NFI may be necessary for monitoring co-benefits

and balancing the monitoring storylines, but it does not in itself lead to alternative views on forests, deforestation and forest degradation.

6. Conclusions and Wider Implications

In this article we followed the starting assumption that discourses, practices and institutions are mutually constituted. This assumption, we argued, may help us shed light on underlying connections within a complex governance architecture. It can show that, beyond the intricate and messy surface of a fragmented governance architecture, there are patterns of dominance that run across institutions and levels – and that have important political, social and environmental implications.

We further argued that a theory-guided way of making sense of complex governance architectures is much needed, given that the focus of scholarly debates on this phenomenon is still more on the conceptual and terminological side rather than on theory development and application. We should not let institutional complexity obscure our insights into overarching structures and hegemonies. We made our humble contribution to this research gaps by developing such a framework, building on argumentative discourse analysis and its core concept of discursive storylines. We substantialized and explored this framework for the case of REDD+ monitoring by matching specific discursive storylines with two key monitoring practices.

We could illustrate the interaction between discourses and practices that cut across the fragmented REDD+ governance architecture, with the dominance of remote sensing going hand in hand with the prevalence of technocratic, market-liberal and global perspectives. Drawing these lines showed that monitoring practices are not neutral tools, but enable and promote certain discourses that in turn shape certain views within REDD+, with certain information being prioritized over others.

This finding has normative implications that go beyond REDD+. Accounting and reporting of GHG at the UNFCCC is made up of a patchwork of different guidelines. For example, the Clean Development Mechanism (CDM) focuses only on afforestation and reforestation within the forest sector, while REDD+ accounting guidelines include a broader range of forest activities. However, unlike guidelines for Land Use, Land-Use Change and Forestry (LULUCF), REDD+ guidelines do do not cover emissions mitigation from certain land use activities outside of forests. Parties of the UNFCCC have expressed a desire to harmonize and simplify the different land-use sector accounting and reporting methodologies (Iversen et al. 2014; Estrada et al. 2014). As such, discussion over what to include - and what not to include, will become even more relevant in years to come – with the need for making sense of an even more complex governance architecture that covers these various tools and connected institutions.

All this points at the need for more theoretical foundation and application. We are aware that our own framework could only provide explorative insights so far. A comprehensive analysis would need to rely on a larger set of institutions and countries, a longer observation period,

and additional methods like interviews and field studies. And ultimately, the connection of institutions, practices and discourses could be examined for a whole series of other environmental and non-environmental policy fields. We hope that our approach can inspire such research endeavours – academically to help identify the opportunities but also the shortcomings of institutional fragmentation, and practically to make informed recommendations on how to strengthen certain perspectives across arenas.

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