

International Journal of the Commons

Vol. 13, no 1 2019, pp. 637–659

Publisher: Uopen Journals

URL: <http://www.thecommonsjournal.org>

DOI: 10.18352/ijc.913

Copyright: content is licensed under a Creative Commons Attribution 3.0 License

ISSN: 1875-0281

Understanding institutional bricolage: what drives behavior change towards sustainable land use in the Eastern Amazon?

Maria Fernanda Gebara

Department of Development, Agriculture and Society, Federal Rural University of Rio de Janeiro, Brazil

mfgebara@gmail.com

Abstract: Institutional perspectives and theories have shaped how problems related to individual and collective choices in forest landscapes are perceived. This article explores the social impacts of the Rural Environmental Cadastre (CAR) in the municipality of São Félix do Xingu (SFX), in the state of Pará, Brazilian Amazon. CAR is an environmental compliance intervention to reduce deforestation and achieve sustainable land use in the Brazilian Amazon. With a focus on smallholders, the article provides insights on how to better understand institutional bricolage and behavior change in the context of social practices. Results suggest that CAR implementation is still too limited to adequately reflect the heterogeneity and complexity of reducing deforestation in the Eastern Amazon. The SFX case shows that land users responsible for pursuing environmental compliance normally draw on existing traditions – styles of thinking, sanctioned social relationships, power dynamics – to respond to changing situations. Neglecting such social processes and practices can decrease the long-term effectiveness of interventions such as CAR. This is usually a result of unforeseen interactions among activities practiced by the range of different actors in forest landscapes. Concluding remarks argue that, unless we shift our approach from focusing on changing individuals' behavior to changing the interaction of elements that constitute social practices, we will remain blind to the conditions that actually drive behavior change towards environmental compliance and sustainable land use.

Keywords: Behavior change, eastern amazon, institutional bricolage, rural environmental cadastre, social practices

Acknowledgement: I am deeply grateful to the families of SFX and surrounding areas for their strength and inspiration, but also for their patience and generosity in sharing their time and extensive knowledge. Local organizations, especially

ADAFAX and SEMMAs, were also key in enabling this research. Pierre Clavier (in memorium), for his example as a visionary and his dedication to smallholders; Raimundo Santana for guiding me on the intractable roads of SFX; Celma Oliveira for her feminine energy; and the students of the Rural Familiar House, prospects of a generation marked by the challenging history of SFX. Angelica Toniolo, Rane Cortez, and Edenise Garcia, together with other TNC members, were crucial and always accessible in sharing their pilot program experiences. Special thanks to field research assistants: Gisele Aparecida Monteiro, Leonela Guimarães and Rodrigo Calvet. Finally, my profound gratitude goes to the Xingu River (Xin – House; Gu – God; in Japanese), for being my harbour in difficult times and for allowing moments of meditation on the magnitude of nature.

1. Introduction

The creation and implementation of viable governance systems for forest landscapes face many challenges, prompting researchers to explore ways to explain the inherent complexity of such multiple systems (Poteete 2012). The implementation of conservation policies and measures in a multilevel governance “occurs at different spatial scales and through different actors who have unequal influence and values” (Forsyth 2009, 14). Although much has been learned from practices to understand what drives behavior change over the past few decades, persistent knowledge gaps continue to constrain the development of balanced forest governance systems (Reed et al. 2014). Many of these shortcomings concern the institutional analysis and social impacts of policies and measures applied to the governance of forest landscapes. In this article, I use the concept of institutional bricolage (Cleaver 2002, 2012) to look at how the Brazilian Rural Environmental Cadastre (CAR) is being adopted by land users in the municipality of São Félix do Xingu (SFX), in the state of Pará, Eastern Amazon. In so doing, I focus on smallholders and draw on local perceptions to analyze the social impacts of CAR, while providing insights on which elements should be considered when designing interventions aimed at environmental compliance, such as CAR. With such an aim I look at local agency to capture how processes of bricolage developed in the case of SFX, with attention to how agency is being shaped by power relations that emerge from CAR implementation.

The concept of bricolage enables us to challenge the view of actors as powerless victims of institutional change, once it stresses the agency of actors and their strategic improvisation and adaptation (Cleaver 2012). Bricolage then involves how people actually link structure and agency through their actions and provide a framework for empirical research. I define ‘land users’ as those whose sources of livelihood are derived from their work in agriculture and forest lands. The term ‘bricoleurs’ implies that actors creatively combine elements from different institutional contexts into a new institutional arrangement (Christiansen and Lounsbury 2013). Land users are therefore institutional bricoleurs in the sense that they are

able to re-arrange the standardized CAR-logic in order to ‘fit’ their own local social context by producing creative and adaptive responses to it.

Deforestation in SFX declined considerably between 2008 and 2011, remaining stable between 2012 and 2014. This stability can be mainly attributed to two initiatives that require the adoption of CAR by land users: the Municipal Embargo and the Municipal Pact to Reduce Deforestation. The main hypothesis is twofold: first, that the introduction of CAR through these initiatives has changed the local social context; second, that the long-term effectiveness of these measures will depend not only on the willingness of land users to change their behavior, but also on how they perceive CAR, as well as how easily it can be adapted to meet their needs. A second hypothesis, derived from the main one, is that CAR is reinforcing social inequalities in the municipality, because it fails to provide the necessary conditions for behavior change. These inequalities are perceived by research participants as differences in access to natural resources, in the exercise of power, and in opportunities for social change among diverse local actors, resulting in a decrease in wellbeing among smallholders.

The following sections explore these hypotheses fully. Section 2 gives a brief analysis of different models used to study institutions as applied to forest landscape governance and explores the nuances of institutional bricolage and its possible practical outcomes. Section 3 presents the methods used in this analysis. Local agency, perceptions and social impacts of CAR are analyzed in Section 4, and Section 5 explores the process of institutional bricolage in SFX. Finally, the article concludes with insights on how to better understand institutional bricolage and behavior change in the context of social practices.

2. Institutions

The study and analysis of institutions developed in part as a reaction to the behavioral movement (Powell and Dimaggio 1991). Conceptually, institutions are highly abstract and often invisible to the political environment. Scott (1995) provides a definition of institutions that recognizes and integrates different elements relevant to institutional analysis. For Scott (1995, 33), institutions consist of “cognitive, normative, and regulatory structures that provide stability and meaning to social behavior. Institutions are carried across multiple vehicles – cultures, structures and routines – and operate at multiple levels of jurisdiction”.

In the case of institutions applied to the governance of forest landscapes, there are basically three contrasting models in the literature; each includes different assumptions about agency, action logics and social change (Arts et al. 2014). The first two, ‘rationalism’ (Hardin 1968; Lakatos 1974; Becker 1976; Eggertsson 1990; Vatn 2005) and ‘new institutionalism’ (Ostrom 1990), are important models used to understand the management of natural resources. They have been criticized, however, for being both timeless and apolitical (Agrawal and Yadama 1997; Mosse 1997; Agrawal 2002). These approaches focus heavily on rules and how rules work to shape and limit human behavior, while failing to adequately explain

the power dynamics and context in which rules are embedded (Jentoft et al. 1998; Ribot et al. 2006). The third, ‘critical institutionalism’, on which I concentrate my analysis, is relatively new and offers a less optimistic but undoubtedly more realistic approach to understanding human behavior and social change.

Critical institutionalism has its origins in sociological and historical institutionalism (Cleaver and de Koning 2015). As argued by Cleaver (2012), the set of assumptions put forth by both rationalism and new institutionalism do not necessarily occur in practice, and the related political emphases can be misleading. Cleaver (2012) also shows that agents do not simply follow the rules, but reformulate them in practice through ‘bricolage’ processes, or reject them based on socially embedded beliefs and conventions. Institutional processes, in this sense, are dynamic and occur in very different ways in diverse contexts (Cleaver and Franks 2005). The following sub-sections explore the possible outcomes of institutional bricolage.

2.1. Institutional bricolage: the role of practice and agency

Any institutional system interacts with a complex context of values and practices at various levels of social organization. Cleaver (2002, 2012) argues that institutions are formed in the necessary improvisation of daily practice. Practice corresponds to a method, procedure or process used in a particular context (see, for example, MacIntyre 1981). Practice theory describes how practices are recognized and exist as concepts in their own right, and that individuals simply replicate practices. Both social order and individuality result from practices (Schatzki 1996). Social reality then corresponds to a mosaic of interpenetrating, interdependent, and shifting practices (Giddens 1991). According to this perspective, social change is quite difficult to presume or predict, not only because the different values and principles that people adopt cannot be changed from one day to the next (Chan et al. 2016), but also because human improvisation is in large measure uncontrollable (Arts et al. 2014).

While practice theory is still an emerging area of study, models are being developed to describe the elements that come together in a given practice. One of these models is “the three elements of the practice” of Shove et al. (2012), which are: (i) materials (i.e. physical and tangible things, technologies); (ii) skills (i.e. know-how, techniques); and (iii) meanings (i.e. ideas, aspirations, beliefs). Practices then emerge, persist or disappear when connections between these three elements are made, sustained or interrupted. In practice theory, individuals are effectively taken out of the model, leaving practice itself, and the elements that compose it, to be analyzed. Ultimately, practice theory suggests that there may be no need to orient individuals directly; rather, changing the materials, meanings, and procedures that make up the elements of practice is more fundamental (Darnton 2011). This focus on the context rather than on the individual resonates with Uzzell and Rätzsch (2009) argument that in order to effectively influence social behavior it is necessary to focus on conditions that drive behavior, rather than on behavior itself.

The concept of institutional bricolage (de Koning 2011; Cleaver 2002, 2012) acts as a backdrop for critical institutionalism. It helps to examine the complex and heterogeneous nature of forest landscapes governance and has good potential to show how norms are articulated and adapted in practice (Mccay 2002; Mosse 1997), explaining both resistance and institutional change, and enriching the understanding of human action and power relations by questioning assumptions about institutional effectiveness (Fabinyi et al. 2014). Adapted from Lévi-Strauss's formulation on intellectual bricolage, the concept of institutional bricolage was also used by scholars in different contexts (Galvan 1997; Batterbury 2001; Freeman 2007) to be then later developed by Douglas (1986) in the context of institutions.

Bricolage is the combination of practical creativity and challenges in institutional processes. In this way, it is composed of "adaptive processes by which people incorporate configurations of rules, traditions, norms and relations of meaning and authority. In doing so, people modify old arrangements and invent new ones, where innovations are always linked to freedom to create acceptable ways of doing things" (Cleaver 2012, 34). Campbell (2004) also refers to bricolage, when he writes about the causal mechanisms of institutional changes, which are: negative feedbacks and critical moments in the path of historical dependence; bricolage; diffusion and application; the role of institutional or bricolar entrepreneurs; and normative and cognitive ideas about institutional change. The maintenance of institutional patterns depends on the continuous feedbacks promoted by the path dependence in which institutions are embedded (Pierson 2004). However, as negative feedbacks arise and subsequently accumulate until they reach a critical point, they also provoke fundamental institutional changes (Campbell 2004).

According to Sewell (1992), human agency refers to actors' capacity to transpose and extend 'institutional logic' to a new institutional context, where 'institutional logic' is the shared taken-for-granted social prescriptions that guide individual behavior in an institutional context (Battilana 2006). When actors are faced with new situations, they exercise their agency by extending their existing institutional logic and act with whatever is at hand to fit the new institutional context (Baker and Nelson 2005). At the same time, some actors have the capacity to impose their institutional logic as the legitimate view and by so doing become the dominant group (Bourdieu 1989). In this case, a given institutional logic assumes a dominant role (Reay and Hinings 2005; Battilana 2006), reflecting the fact that power relations are necessarily involved in any institutional change.

Bricolers then serve to specify the agent of change in the causal explanation of institutional changes. The performance of bricolers depends basically on two factors, namely their connection with the institution and the availability of repertoires to be combined. As Campbell (2004, 75) points out: "bricolers with diverse social, organizational and institutional connections tend to have more expansive repertoires to work with. In turn, with a wider repertoire, they are more likely to have a bricolage process that is very creative and revolutionary, rather than the opposite". Finally, in accounting for institutional changes, institutionalists focusing on practical theories are paying special attention to the way agents

accept (interpret, identify, internalize, enact, etc.) new ideas and, in turn, change their practices. Through human agency, individuals then transform their habits by reacting to social changes, instabilities or uncertainties.

2.1.1. Processes of bricolage: a rock thrown into a pond

de Koning (2011) tracks three types of practices adopted by local actors that shape the way institutions are formed and altered at the local level. The author describes such processes metaphorically as resembling a rock that is thrown into a pond. As it enters the water, the rock creates a ripple on the surface that widens out. The rock, in this case, is the formally designed institution that has been ‘thrown into a pond’ of locally embedded institutions, knowledge, technologies and conditions. The throwing of a rock in a pond produces a well-known effect: the rock enters the water, sinks and produces ripples on the water surface, in other words, affects the socially embedded institutions. There are, however, at least three possible outcomes of this rock-like item being thrown into the water that relate directly to the identified practices: (i) the rock enters the water ‘normally’ but then dissolves in the water, like sugar; (ii) the water resembles soft ice and the thrown rock leaves a mark or a dent on it; (iii) the rock bounces off the water, as if thrown onto thick ice. In this case, the rock does not enter the water and is forced to go in another direction.

Similarly, there are at least three consequences or outcomes of the different processes of bricolage. Each of these outcomes relates to one of the three practices: aggregation, alteration and articulation, respectively (de Koning 2011). Aggregation refers to the creative recombination of institutions introduced with different types of institutional and sociocultural elements. This process involves mixing the old with the new, in order to create a more useful institutional framework. Alteration refers to adjustments in institutions so that they fit better with livelihood priorities or cultural identity issues. Articulation involves the affirmation of traditional identities and the culture of resistance to the newly introduced institutional arrangements (de Koning 2011). Here, I look at the perceptions and practical agency that emerged from the implementation of CAR (Section 4) to then discuss de Koning’s (2011) different processes of bricolage in the context of SFX (Section 5).

If institutions seek to achieve certain ‘right’ actions at the local level, they can also sustain dominant views, support existing power relations, and channel routine actions to reproduce existing social inequalities. Social theorists usually celebrate the creative ways in which human agency navigates the adversities of social life by using the weapons of the weaker, which usually involves accommodating, negotiating and resisting unequal relationships (Scott 1995). Cleaver (2012), however, argues that this emphasis on the possibilities of the weakest in exerting influence and resisting oppression usually neglects the adversities experienced by many poor and marginalized. Of course, these people have the power to be agents, but their ability to influence governance systems is often thwarted by the effects of inequality in power relations and institutional processes

(Agrawal 2005). Sections 4 and 5 provide information that addresses these issues in the case of SFX, viewed through a critical institutional lens.

3. Methods

This analysis is based on both quantitative and qualitative methods, as well as both primary and secondary data. Data analysis follows a methodology based on 'grounded theory' (Glaser and Strauss 1967). Unlike the positivist tradition, a study using grounded theory has a major focus on the evaluation of primary data, repeated ideas and elements, which are coded and then grouped into concepts or categories that become clearly apparent with analysis (Glaser and Strauss 1967).

The analysis draws on data collected in SFX by the author at least once a year between September 2010 and May 2014. Every visit differed in time with a minimum of 15 to a maximum of 90 consecutive days. Because SFX has diverse actors (indigenous, smallholders and large landholders) and land uses, it provides practical insights on the governance of forest landscapes. Data were collected through various funding and research collaborations with the Center for International Forestry Research (CIFOR), The Nature Conservancy (TNC), the Social Sciences Graduate Program in Development, Agriculture and Society (CPDA/UFRRJ), and the Alto Xingu Association for Agriculture Development (ADAFAX). The once per year data collection helped to build trust with research participants, increase the depth of their perspectives and observe how CAR implementation progressed in the municipality over several years. Field data were obtained directly by the author and research assistants through surveys (124 household surveys; 4 village questionnaires; one proponent appraisal and one survey of project implementation) and focus groups (50 groups; 4 village meetings). In addition, open-ended and semi-structured interviews were conducted with other relevant local actors in SFX, such as government actors (n=7); non-governmental organization (NGO) representatives (n=5) and medium-large landholders (n=4).

This process allowed the identification of the perceptions, agency, interpretations and interests of the participants in relation to CAR, which together inform the material presented in this article. In total, 14 communities were included in the research, with the involvement of 468 participants (a mix of women, smallholders, medium-large landholders and youth). The communities visited (Figure 1) were chosen to include areas with high levels of deforestation and different land-use and tenure categories (agricultural settlements, protected areas and municipal centers). Among other issues, interviews focused on actors' perceptions of the positive and negative aspects of CAR, their main needs for reducing deforestation and how environmental compliance could be improved in the area. With a focus on smallholders, local perceptions were used to evaluate the social impacts of CAR.

Analytical coding procedures were applied in order to produce a coherent analysis focused on the research questions (Ryan and Bernard 2003). NVivo Qualitative Content Analysis Software (QSR International Pty Ltd. Version 10, 2012) was chosen to compile, analyze, organize and reconfigure the data collected.

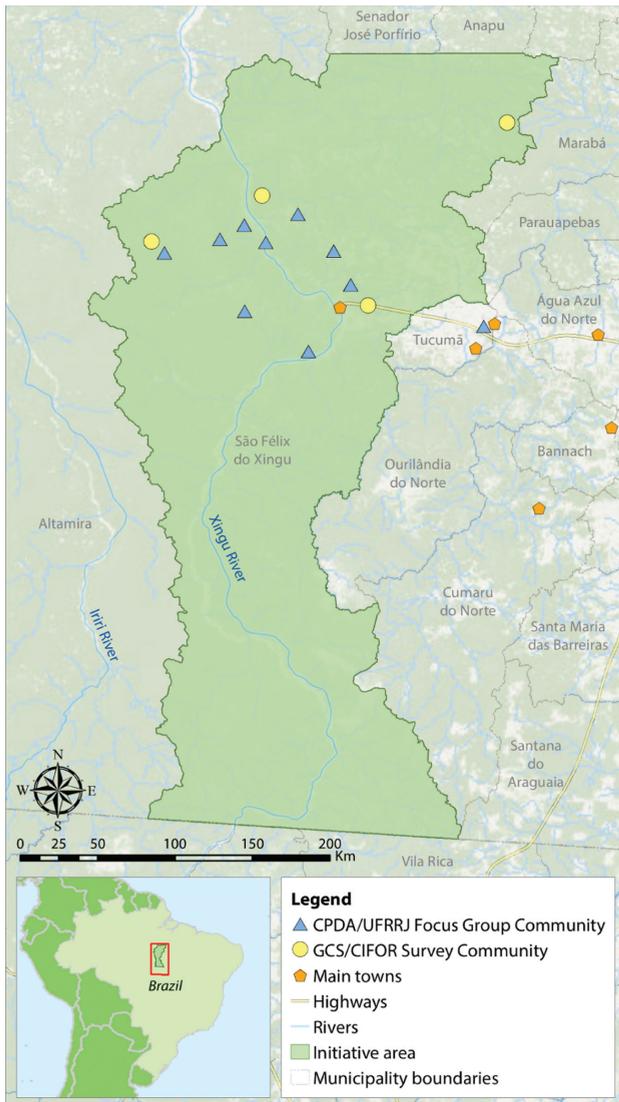


Figure 1: Research communities in São Félix do Xingu, Brazil.

A content analysis was then carried out, involving the use of analytical codes derived from existing theories and explanations relevant to the research focus (Mitchell 2000). This method also allows for the inclusion of themes that emerge from the data (Berg 2009), following the methodology of grounded theory (Glaser and Strauss 1967). For a better understanding of the data collected in SFX, actors' perceptions were initially codified in positives, negatives, obstacles

and suggestions on how CAR can serve to increase environmental compliance in SFX. After this first codification, the perceptions were codified again in order to understand aspects of institutional bricolage, practices, social impacts, wellbeing and behavior change. Results are structured according to such codification.

4. Results

4.1. Context

Since 2004, the Brazilian federal government has made reducing deforestation in the Amazon a policy priority, primarily by increasing command and control through the use of the National Spatial Research Institute (Portuguese acronym INPE) data. Further, by issuing Decree No. 6321/2007, the federal government created a blacklist, resulting in an embargo on areas with illegal deforestation. With cattle ranching as the main cause of deforestation, SFX has been on the top of this list and under a municipal embargo since 2008. As a consequence, land users in the municipality, especially smallholders, have faced restricted access to credit, constant monitoring and inspection of land-use operations, increased enforcement, and restrictions on licenses for activities with environmental impacts. To be excluded from the blacklist, municipalities are required to reduce their rates of deforestation and register at least 80% of their private properties under CAR. More than 80% of private properties in SFX had been registered, as of the end of 2015. These measures helped to reduce deforestation initially, but since 2014 levels have been rising again.

Although CAR is now mandatory due to the 2012 Brazilian Forest Law – the major institution governing private owned lands – the state of Pará has been pioneering its implementation since 2006 to control and monitor deforestation. The Brazilian Forest Law also introduced a new national land registry system (Portuguese acronym SICAR) that is claimed by the federal government as the best way to end illegal deforestation. CAR requires landowners to voluntarily declare the georeferenced boundaries of their landholdings and forest area, and this is common to the main interventions for reducing deforestation in SFX. The Pará state registry system served as a model for SICAR, which is the main tool for implementing the Forest Law. With their properties regularized with CAR, land users can access rural credits, acquire the necessary licenses for their activities, and sell their produce to slaughterhouses and other buyers, as multinational companies agree to stop sourcing from farms with illegal deforestation.

4.2. Fitting CAR into the SFX reality: local perceptions and social impacts

4.2.1. Adhering to CAR: tenure clarification or burden?

CAR was initially positively perceived by most of local land users, especially smallholders, as the first step towards land regularization, which was also the main local demand for reducing deforestation identified by respondents. Most people living in the sample communities came from other regions of Brazil, especially

the central and southern parts of the country. Rising land prices in southern Brazil (relative to the north) were one catalyst for this migration. Because of this occupation process, land conflicts are an intrinsic characteristic of the area (Schmink and Wood 1992). Land tenure was considered secure in the communities located in land reform settlement areas. Residents of the other communities reported feelings of insecurity as they were informally settled on public lands without any land documentation.

CAR has also helped to increase environmental awareness once NGOs, especially The Nature Conservancy in the case of SFX, provided different incentives to cover the initial costs of land users to register with CAR. Because of this initial perception and the requirements imposed by the embargo, there was strong adherence to CAR in the municipality between 2009 and 2013. However, of the 7,389 CARs made in 2015, only 78 have been approved – meaning they have been verified and there is no overlap or misinformation. Further, the increasing of monitoring and command and control actions due to CAR implementation has soured the originally positive perception of the measure among locals. By having their properties mapped through CAR, smallholders started to feel even more controlled. Two other major factors were cited as negative aspects of the instrument: (i) the short period of validity (six months provided by IN 35/2010 at the time of research); and (ii) the immense overlap of properties, which discredits and invalidates the instrument.

According to a Ministry of Environment (Portuguese acronym MMA) consultant contracted under the Municipal Pact for Reducing Deforestation to implement the remaining 20% of the CAR in SFX during 2013, the instrument – in the way it has been implemented – ends up having little effectiveness. The consultant also pointed out that many land users in SFX, especially large farmers, do not need the CAR since they already have financial subsidies and do not rely on the instrument to obtain environmental licenses. Surveyed respondents also pointed out that with increased monitoring through the CAR, many smallholders have chosen not to renew registrations or even not to register at all. According to the MMA consultant, this is because “there is an excess of burden in CAR, which makes it undesirable by local land users”. Results have shown that, in many cases, producers are registering only half of their property, so they can legally sell the cattle, but also clear new areas illegally.

Another relevant issue relates to the settlements. The National Institute for Settlement and Agrarian Reform (Portuguese acronym INCRA) is responsible for CAR’s implementation, but has claimed insufficient human and financial resources. In one of the settlements included in the research, for example, there is no recognition of INCRA’s territorial demarcation and, because of this, residents have decided not to register under CAR. In another case, settlers mobilized against CAR and the instrument had low adherence. An employee from the Municipal Secretariat of Environment responsible for the licensing process admitted that the instrument ends up harming smallholders, since “large landholders do not need CAR and will not pay the Federal Environment

Agency's (Portuguese acronym IBAMA) fines, unlike smallholders who depend on CAR for accessing rural credits and have little chance of appealing fines through a public defender".

In addition, studies indicate a pattern in the state of Pará where deforestation has been particularly high in land reform settlements (Brandão et al. 2013). Many of these settlements were established by the government in the 1970s and 1980s and are now abandoned; smallholders live there largely without government support. Laws against deforestation are difficult to enforce in these areas, because INCRA owns the land, rather than individual households. Moreover, local actors do not have any sort of technical assistance to change their land use. They feel helpless and blame the national government and INCRA for not helping them develop land-use alternatives and land management plans.

4.2.2. Implementing CAR: benefits to whom?

The lack of quality in the CAR database, as well as its disconnection with the animal transport guides and with the federal agricultural management platform created to track cattle production, were also named by different respondents as reasons for the instrument's lack of effectiveness. The MMA consultant and one respondent from the municipal government, for example, affirmed that "CAR only facilitates the role of the middlemen, decreasing smallholders' income and wellbeing". Moreover, as stated by the Municipal Secretary of the Environment, "the biggest problem with CAR is the lack of slaughterhouse control in relation to the size of properties and the number of cattle heads coming from such areas". Many large producers have multiple properties throughout the state of Pará, and were able to adapt to the municipal embargo by attributing production to compliant properties, even if cattle were not raised on these lands. Because there is no attribution of productivity to rural properties, the embargo ends up being ineffective for producers who have several properties. Large segments of the cattle supply chain are still not monitored or tracked (Walker et al. 2013). Cattle often spend time on multiple properties prior to slaughter, and producers can raise and fatten cattle on noncompliant ranches without a CAR or with recent deforestation, and then move the animals to a compliant property before sale to the slaughterhouses. According to respondents, the deforestation cost then falls to smallholders, who need to sell their calves for minimal value to medium and large producers that have a compliant property.

Finally, recent evidence has shown that CAR is being used for land grabbing by criminal gangs in the state of Pará (ISA 2017). In order to explore, rent and sell rural lands, the gangs were registering CARs under the names of "straw-men". In some cases, they created false CARs in order to occupy lands and keep deforesting (Publica 2016). The identification of false CARs was also described by respondents, who affirmed that most of the CARs implemented in the municipality have high levels of misinformation and do not contribute to tenure clarification and environmental compliance. According to an employee from the Municipal Secretariat of Environment, CAR is actually leading to higher corruption between

different levels of governance (i.e. creation of false registries and false sustainable forestry management plans), facilitating illegal deforestation (i.e. illegal logging registered as legal practices), and increasing social conflicts on the ground (i.e. land disputes).

4.2.3. Finding the path to behavior change: wellbeing and power relations

This research also sought to identify which actors were in a vulnerable and disadvantaged position in SFX and what could increase their wellbeing and willingness to reduce deforestation. All responses included smallholders as well as indigenous people and youth as the most vulnerable actors. Results showed that the most important factor for these actors in terms of wellbeing is not an increase in income, but rather access to basic services and needs such as energy, education, roads, food security and technical assistance. Another limitation to improving smallholders' wellbeing is the current mayor of SFX. The mayor is recognized in the county as "one of the most dangerous murderers of the last decades". He was accused of being the principal mandatory of crimes organized by land conflicts in 2003 and is much feared in the region. The mayor has more than 25,000 hectares in SFX and is one of the major producers in the area. Most smallholders said they feared the mayor and felt their "hands were tied" when it came to making demands, demonstrating again the influence of power relations. In 2016, the former Municipal Secretary of Environment was brutally murdered. During his mandate in SFX, where he worked between 2009 and 2012, deforestation levels decreased sharply and his tenure was marked by impartiality and a strong drive to implement environmental legislation, such as CAR.

Another relevant aspect that the research confirmed was the diffusion of slave labor in the region. Large landholders build clandestine airstrips to transport heavy weapons and ammunition in addition to facilitating the transportation of materials and supplies. "There is overexploitation of labor, where many of the workers perform their duties on farms under gun observation", affirmed some of the participants. The Santa Bárbara Group, for example, owner of the largest cattle farm in SFX, has been accused several times of using slave labor on its properties (Reimberg 2009; IHU 2012, 2013). The Ministry of Labor and Employment and the Public Prosecutor's Office have already freed some workers under conditions analogous to slavery on Santa Bárbara's properties. SFX's mayor, according to respondents, supports the activities of the Santa Bárbara Group in the region, in particular the land occupation that has been undertaken by the group within the Triunfo do Xingu Protected Area. "The mayor has been helping to regulate land tenure of the group and thereby strengthens power relations in the area", affirmed one of the participants. As a result, smallholders around the Triunfo do Xingu Protected Area have had their CARs invalidated because they overlap with the area of the group's main farm; as a consequence, they have been forced to move to neighboring areas. Deforestation in the Triunfo do Xingu Protected Area grew steadily in the period between 2006 and 2015 (ISA 2016).

5. Discussion: institutional bricolage in SFX

This section examines the outcomes of local agency and the institutional bricolage that emerged in SFX, categorizing them into the three possible practices defined by de Koning (2011): aggregation, alteration and articulation. Results shows that positive effects from CAR are still very limited, which corroborates the few data available on CAR impacts (Pires and Ortega 2013; Azevedo et al. 2014, 2017). Also, although communities' collective agency was shaped by the cultural context and power relations, it varied according to land tenure categories and the presence of elements that could allow desired behavior change, as discussed in the next sub-sections.

5.1. Aggregation: what drives behavior change?

The initial positive perceptions of CAR by smallholders in SFX shows their intrinsic desire to adhere to the new institutions, to have their lands regularized and to change their behavior towards compliance. However, institutions can constrain and enable practices; if they are not accompanied by specific elements for behavior change (i.e. materials, skills and meanings), they are less likely to generate the results they are designed for (Shove et al. 2012). This suggests that the provision of specific elements is an important feature for changing practices. The change in human agency thus depends on the repertoire of elements they have at their disposition. The Nature Conservancy played a key role in providing some of the elements for land users to adhere to CAR, but not all of those necessary to effectively change behavior were in place (i.e. access to basic services, technical assistance).

Moreover, at the heart of the process of changing behavior is an awareness of the problem that needs to be tackled (i.e. deforestation). The individual's perception of a problem is the first stage of the process (Chan et al. 2016). It is only when the individual perceives the problem as urgent and worries about the negative consequences of it that he or she will think about acting on the issue. One way of seeing this is through Heidegger's (2008) notion of signifying. For Heidegger, signifying stretches from conditions of existence for the sake of which the person acts (ends) to specific actions, which are specified as what to do at this moment in this particular situation for the sake of that condition. If land users in SFX, for example, are convinced that achieving sustainable land use by reducing deforestation is not their responsibility, as many of them expressed during the interviews, and believe that people in urban centers are responsible and should be the only ones to change behavior, they will not change. The individual then assesses the possibility of changing and how. If the necessary conditions that drive behavior are not in place (i.e. technologies, knowhow, ideas) transformational change becomes puzzling. Experimenting with and testing new practices is the next stage (Schatzki 1996). If individuals decide to practice these new activities regularly, and realize that this effort makes a difference, they will permanently adopt and replicate the behavior change.

It is important to note that this is not a linear process; it can be interrupted, suspended or overlapped with others, depending on what favorable factors are achieved (Prigogine and Stengers 1984). The process of adopting a new behavior highlights the importance of removing potential obstacles to the desired behavior. This should call our attention to the importance of tracking collective and individual feedbacks on institutions designed for governing forest landscapes. Techniques of coaching and mediation may be useful to identify the materials, meanings and procedures that need to be changed (Lynch et al. 2006). The complex interactions of human behaviors and motivations makes it very difficult to predict with certainty the impact of institutions (Arts et al. 2014). Individuals are normally resistant to behavior change. As creatures of habit, they tend to focus on the short term rather than the long term (Ogden et al. 2007), and do not necessarily respond well to the fact that they must do something imposed by others (Bourdieu 1987).

5.2. Alteration: “the Brazilian way”

Many have heard about the “Brazilian way” (or “*jeitinho Brasileiro*”, in Portuguese), meaning “a special way of solving any problem or challenge or forbidden situation; or a creative solution to some emergency, whether in the form of conciliation, cleverness or skill” (Barbosa 1992). Brazilians are then bricoleurs in their very essence. In the case of the municipal embargo, for example, through a combination of informal mechanisms and practices, CAR benefited large landholders and facilitated the activities of middlemen, while reducing smallholders’ role and power in the supply chain. This process was further called by Gibbs et al. (2016) as “cattle laundering”, where land users raise and fatten their cattle on properties that are not under CAR, but sell them as though they were raised on a compliant property. This type of bricolage is what de Koning (2011) calls “alteration”, that is, adjustments in institutions so that they fit better with local priorities.

In practice, CAR in SFX has been linked to increased rates in deforestation, since livestock subsidies are facilitated for regularized producers. Balieiro (2013) showed that SFX deforestation increased between 2011 and 2012 in areas that are registered under CAR. In line with these findings are data from the Socio-Environmental Institute showing that 83% of deforestation in SFX in 2012–2013 occurred on properties registered under CAR (Valle and Camargo 2014). As deforestation in some of these areas is directly related to smallholder land-use strategies, with greater deforestation in areas where livestock farming is the primary land use strategy (Pacheco 2009), results suggest that access to information on land use alone does not guarantee environmental compliance (see for example Gould 2006; Robinson et al. 2011).

A clear reflection of the Brazilian way is the new deforestation practices developed consequent to the increased monitoring in rural areas in Pará due to CAR implementation. As observed in previous analysis (Gebara 2015; Gebara and Agrawal 2017), land users adapted their deforestation practices in order to escape satellite monitoring. Through what is locally called ‘the broken method’,

mainly adopted by large landholders, deforestation happens in small polygons. In this process, the forest is cleared by infecting trees' canopies with poison that causes trees to die off in different stages, leaving other trees standing to disguise the deforested area. Another practice, adopted by smallholders, is to first cut smaller trees, keeping the taller ones standing. These are important examples of the bricolage process in which actors with more expansive repertoires and resources, such as large landholders, have adapted local practices to resist new institutional arrangements (Schnegg and Linke 2015). In this case, relations, resources, material goods and social hierarchies enabled innovation (Sayer 2011) by large landholders – the ones more likely to have knowledge and resources to avoid monitoring – and reduced the instrumental functionality of INPE's monitoring techniques.

These findings help to understand the significantly higher levels of forest degradation in areas dominated by large properties (Godar et al. 2014), in which small patches of deforested land are being identified as 'degraded' by INPE's forest degradation mapping system (Portuguese acronym DEGRAD). Findings also suggest that the increase in the participation of small polygons in INPE's deforestation data may be related to new deforestation methods adopted by larger landholders. The confirmation of this hypothesis, however, requires a more detailed analysis based on a higher resolution of remote sensing data. Richards et al. (2016), for instance, suggest that the decision to use INPE's data to monitor forest loss in the Amazon as a policing tool may have incentivized landowners to deforest in ways and places that evade the monitoring and enforcement system. The authors argue that PRODES-monitored deforestation has become less representative of all deforestation in the Brazilian Amazon and therefore has become less accurate as a component of the system Brazil uses to estimate GHG mitigation from avoided deforestation.

The registration of just one part of the properties under CAR and the use of false CARs as a way of land grabbing are other types of alteration that reflects the institutional logic of SFX, in which land is perceived as locals' main source of income and therefore must be used with a productive end. Land users are not just 'powerless victims' of CAR but rather engaged actors who are able to use their institutional logic to rearrange the use of CAR to 'fit' the local social context, and by doing so subvert some of the original intention of the federal government and the NGOs that introduced CAR. Indeed, for more than half a century the Brazilian federal government has incentivized land users in the Amazon to occupy lands and make them productive under the so-called 'principle of social function of property'. This principle has been extensively incorporated into Brazil's legal system with regard to both rural and urban land, especially in the Amazon region (Ondetti 2016). To change such a mentality and institutional logic requires time, a better understanding of rural perceptions, priorities, social-cultural frameworks and economic needs (Wacquant 2005). From this perspective, rules and meanings are really only *ex post facto* attempts to recoup past usage (Schatzki 1996). In other words, it is what we do, how we go on, that determines the rule, not vice versa.

5.3. Articulation: culture of resistance

In other cases, land users developed a culture of resistance to the new institutional setting brought by CAR implementation, exemplifying what de Koning (2011) calls “articulation” (culture of resistance). This was the case of agriculture settlements, in which settlers opted to reject the instrument and even mobilized themselves against it. Instead of helping land users to better engage with environmental compliance, CAR promoted a culture of fear, in which smallholders feel constantly monitored, dependent on selling their cattle to medium and large producers and cannot trust the municipal government to provide their basic services and needs. This exemplifies the power relations in forest landscapes governance, as well as the restriction of the innovation and adaptation power of smallholders (Page 2005; de Koning 2014). The capacity of interaction between communities and government is a fundamental determinant for the results generated by bricolage processes, since they vary according to the specific political dynamics around common resources in a given place (Wardell and Lund 2006; Mwangi 2010).

The evidence of smallholders being forced to move to other areas due to invalid CARs and the overexploitation of labor in large properties also shows how institutions are transformed through a process of bricolage that underpins dominant views and reinforces existing inequalities (Gemenne et al. 2014). Moreover, it shows how local agency can reinforce the legitimacy of the dominant institutional logic. Finally, results suggest the great importance of considering the context in which local practices are embedded. This means working with existing institutions in a way that is sensitive to local realities, rather than attempting to import “ready-made” institutions that do not fit the local context (Landell-Mills et al. 2007; Booth 2012; Duncan and Williams 2012). This process is reflected in what Booth (2012) calls “practical hybridism”, in which cultural repertoires and local practices are considered in the formulation of institutions. According to the author, the process has the potential to reduce the cost of transitioning to more integrated governance or, as argued by Cleaver (2012, 48), “minimize cognitive energy”. It suggests that, instead of dictating the correct use of land, institutions should provide individuals with the capacity to cope with new situations and to employ different elements that constitute social practices in the face of endlessly varying events. Behavior, to quote Wittgenstein (1980a,b), is essentially “behavior-in-particular-circumstances” (RPP I, 314; RPP II, 148).

6. Conclusions: exploring the tributaries

This paper used the concept of institutional bricolage to examine how interventions intended at reducing deforestation were adapted in the municipality of SFX. Bricolage represents a creative process of using diverse materials and resources that are available in a differentiated way, independent of their final purpose. The overlapping of these arrangements over time, along with changes in political and social environments, ensure that institutional bricolage is created from a variety of sources.

Although de Koning's (2011) metaphor of the rock on the pond is useful to help us understand the different processes of bricolage, practices and social impacts institutions generate, results from the institutional bricolage in SFX suggest that the relations between institutions and practices are deeply categorized by reciprocity. This means that at the same time that the rock triggers different outcomes that can be categorized under types of practices, the water also shapes the rock, as through the process of erosion. Also, in the SFX context, the 'pond' is more like a flowing river with many tributaries, further complicating the metaphor. Indeed, in many cases the water shapes the rock more than the rock shapes the water. That is, at the same time that institutions are born from above they are eroded from below. Time also plays a key role in determining which shape the rock will assume, and behavior change occurs after a sequence of episodes and activities that result in new forms of practices. In sum, an institution almost never triggers a single outcome, but an arena of possibilities. Such possibilities are not merely multiple; they are abstract constructions that relate to human agencies' process of signifying. Since the arena of possibilities established by practices are indefinite, typically complex, and heterogeneously determined, they cannot be easily represented.

Results also suggest that CAR implementation is still too limited to adequately reflect the heterogeneity and complexity of reducing deforestation in the Eastern Amazon. The SFX case shows that land users responsible for pursuing environmental compliance normally draw on existing traditions – styles of thinking, sanctioned social relationships, the presumptions of particular social groups and places, lived law and social norms – to 'patch' or 'piece together' responses to changing situations. Neglecting such social processes and practices can decrease the long-term effectiveness of interventions such as CAR. This is usually a result of unforeseen interactions among activities practiced by the range of different actors in forest landscapes. Such findings show that unless we shift our approach from focusing on changing individuals' behavior to changing the interaction of elements that constitute social practices, we will remain blind to the conditions that actually drive behavior change.

The fundamental challenge for smallholders in SFX is that subsistence is still directly related to deforestation through the common practice of swidden agriculture ("slash-and-burn"), placing communities in the classic dilemma between subsistence and conservation. Agroforestry systems and alternative livelihoods that lead to sustainable land use are less common in SFX, since they require a certain level of technical knowledge for planting and cultivation and infrastructure to access markets. Finally, the transition to any alternative production system requires an initial investment and a medium- to long-term vision. Smallholders, who are constrained by immediate survival needs, often lack the financial means and capacities for this investment and cannot afford to focus on long-term goals. As one participant of the research put it: "The government gave the bait, taught us how to fish and now is drilling a hole in the canoe", drawing an analogy to the incentives promoted by the federal government for the occupation of the Amazon and the increase in monitoring land use practices.

Literature cited

- Agrawal, A. 2002. Common Resources and Institutional Sustainability. In *The Drama of the Commons*, eds. E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Stonich, E. U. Weber, 41–86. Washington, DC, DC: National Academy Press.
- Agrawal, A. 2005. *Environmentality: Technologies of Government and the Making of Subjects*. Oxford: Oxford University Press.
- Agrawal, A. and G. Yadama. 1997. How do Local Institutions Mediate Market and Population Pressures on Resources? Forest Panchayats in Kumaon, India. *Development and Change, Oxford* 28(3):435–465.
- Arts, B., J. Behagel, E. Turnhout, J. de Koning, and S. Bommel. 2014. A Practice Based Approach to Forest Governance. *Forest Policy and Economics, Amsterdam* 49:4–11.
- Azevedo, A., L. R. Rajão, M. Costa, M. C. C. Stabile, A. Alencar, and P. Moutinho. 2014. Cadastro ambiental rural e sua influência na dinâmica do desmatamento na Amazônia Legal. *Boletim Amazônia em Pauta, Brasília* 3:3–16.
- Azevedo, A., R. Rajão, M. A. Costa, M. C. C. Stabile, M. N. Macedo, T. N. P. dos Reis, A. Alencar, B. S. Soares-Filho, and R. Pacheco. 2017. Limits of Brazil's Forest Code as a Means to End Illegal Deforestation. *Proceedings of the National Academy of Sciences of the United States* 114(29):7653–7658.
- Baker, T. and R. E. Nelson. 2005. Creating Something from Nothing: Resource Construction Through Entrepreneurial Bricolage. *Administrative Science Quarterly* 50:329–366.
- Balieiro, C. 2013. *Nota técnica: diagnóstico do desmatamento no município de SFX: anos 2012 até Agosto 2013*. Belém: The Nature Conservancy.
- Barbosa, L. 1992. *O jeitinho brasileiro*. Rio de Janeiro: Campus.
- Batterbury, S. 2001. Landscapes of Diversity: A Local Political Ecology of Livelihood Diversification in South-Western Niger. *Cultural Geographies, London* 8(4):437–464.
- Battilana, J., 2006. Agency and Institutions: The Enabling Role of Individuals' Social Position. *Organization* 13:653–676.
- Becker, G. 1976. *The Economic Approach to Human Behavior*. Chicago: University of Chicago Press.
- Berg, B. 2009. *Qualitative Research Methods for the Social Sciences. 7th ed.* Boston: Pearson.
- Booth, D. 2012. *Development as Collective Action Problem: Addressing the Real Challenges of African Governance: Synthesis Report of the Africa Power and Politics Programme*. London: Overseas Development Institute.
- Bourdieu, P. 1987. What Makes a Social Class? On the Theoretical and Practical Existence of Groups. *Berkeley Journal of Sociology, Berkeley* 32:1–17.
- Bourdieu, P. 1989. Social Space and Symbolic Power. *Sociological Theory* 7:14–25.
- Brandão, A., C. Souza, A. Pinto, P. Amaral, and A. Veríssimo. 2013. *Situação do desmatamento nos assentamentos de reforma agrária no Estado do Pará*. Belém: Instituto do Homem e Meio Ambiente da Amazônia.

- Campbell, J. L. 2004. *Institutional Change and Globalization*. Princeton: Princeton University Press.
- Cleaver, F. 2002. Reinventing Institutions: Bricolage and the Social Embeddedness of Natural Resource Management. *The European Journal of Development Research, London* 14(2):11–30.
- Cleaver, F. 2012. *Development Through Bricolage: Rethinking Institutions for Natural Resource Management*. Abingdon: Routledge-Earthscan.
- Cleaver, F. and T. Franks. 2005. *How Institutions Elude Design: River Basin Management and Sustainable Livelihoods*. Bradford: Bradford Centre for International Development. (BCID Research Paper, 12)
- Cleaver, F. D. and J. de Koning. 2015. Furthering Critical Institutionalism. *International Journal of the Commons, Utrecht* 9(1):1–18.
- Chan, K. M. A., P. Balvanera, K. Benessaiah, M. Chapman, and S. Díaz. 2016. Why Protect Nature? Rethinking Values and the Environment. *Proceedings of the National Academy of Sciences of the United States* 113(6):1462–1465. doi: 10.1073/pnas.1525002113. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4760809/>.
- Christiansen, L. H. and M. Lounsbury. 2013. Strange Brew: Bridging Logics via Institutional Bricolage and the Reconstitution of Organizational Identity: Institutional Logics in Action, part B. (WWW Document). *Research in the Sociology of Organizations* 39B:199–232.
- Darnton, A. 2011. Memorandum by Andrew Darnton, Submission to the House of Lords Inquiry. In *House of Lords, Science and Technology Committee*, 218–228. London: Behaviour Change Written Evidence.
- de Koning, J. 2011. *Reshaping Institutions: Bricolage Processes in Smallholder Forestry in the Amazon. (PhD thesis)*. Wageningen: Agricultural University Wageningen.
- de Koning, J. 2014. Unpredictable Outcomes in Forestry: Governance Institutions in Practice. *Society & Natural Resource, Madison* 27(4):358–371.
- Douglas, M. 1986. *How Institutions Think*. Syracuse University Press.
- Duncan, A. and G. Williams. 2012. Making Development Assistance More Effective through Using Political-Economy Analysis: What has been done and What have we Learned? *Development Policy Review, London* 30(2):133–148.
- Eggertsson, T. 1990. *Economic Behavior and Institutions*. Cambridge: Cambridge Survey of Economic Literature.
- Fabinyi, M., L. Evans, and S. J. Foale. 2014. Social-Ecological Systems, Social Diversity, and Power: Insights from Anthropology and Political Ecology. *Ecology and society* 19(4):28.
- Forsyth, T. 2009. Multilevel, Multiactor Governance in REDD+. In *Realising REDD+: National Strategy and Policy Options*, ed. A. Angelsen, 113–122. Bogor Barat: Center for International Forestry Research.
- Freeman, R. 2007. Epistemological Bricolage: How Practitioners Make Sense of Learning. *Administration & Society, Newbury Park* 39(4):476–496.
- Galvan, D. 1997. The Market Meets Scared Fire: Land Pawning as Institutional Syncretism in Inter-War Senegal. *African Economic History, Madison* 25:9–41.

- Gebara, M. F. 2015. *Governança de Paisagens Florestais: Impactos sociais da bricolagem institucional em São Félix do Xingu*. PhD thesis, Federal Rural University of Rio de Janeiro. Available online: https://sucupira.capes.gov.br/sucupira/public/consultas/coleta/trabalhoConclusao/viewTrabalhoConclusao.jsf?popup=true&id_trabalho=2834012.
- Gebara, M. F. and A. Agrawal. 2017. Beyond Rewards and Punishments in the Brazilian Amazon: Practical Implications of the REDD+ Discourse. *Forests* 8(3):66.
- Gemenne, F., J. Barnett, W. Adger, D. Neil, and D. Geoffrey. 2014. Climate and Security: Evidence, Emerging Risks, and a New Agenda. *Climate Change, New York* 123(1):1–9.
- Gibbs, H. K., J. Munger, J. L’Roe, P. Barreto, R. Pereira, M. Christie, T. Amaral, and N. F. Walker. 2016. Did Ranchers and Slaughterhouses Respond to Zero-Deforestation Agreements in the Brazilian Amazon? *Conserv Lett* 9:32–42.
- Giddens, A. 1991. *Modernity and Self-Identity*. Cambridge: Polity.
- Glaser, B. G. and A. L. Strauss. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine Pub. Co.
- Godar, J., T. A. Gardner, E. J. Tizado, and P. Pacheco. 2014. Actor-Specific Contributions to the Deforestation Slowdown in the Brazilian Amazon. *Proceedings of the National Academy of Sciences of the United States of America, Washington, DC* 111(43):15591–15596.
- Gould, K. 2006. Land Regularization on Agricultural Frontiers: The Case of Northwestern Petén, Guatemala. *Land Use Policy, Guildford* 23:395–407.
- Hardin, G. 1968. The Tragedy of the Commons. *Science: New Series, New York* 162(3859):1243–1248.
- Heidegger, M. 2008. *Being and Time*. New York: Harper Perennial, 62.
- IHU – Instituto Humanitas Unisinos. 2012. *Fazenda com escravos é controlada por família de Daniel Dantas*. Available at: <http://www.ihu.unisinos.br/noticias/508351-fazenda-com-escravos-e-controlada-por-familia-de-daniel-dantas->. Accessed: 12 January 2017.
- IHU – Instituto Humanitas Unisinos. 2013. *Trabalhador rural é assassinado em fazenda do grupo de Daniel Dantas*. Available at: <http://www.ihu.unisinos.br/noticias/522702-trabalhador-rural-e-assassinado-em-fazenda-do-grupo-de-daniel-dantas->.
- ISA – Instituto Socioambiental. 2016. *De olho no Xingu (parte I) – Histórico de desmatamento e tendências atuais*. Available at: <https://www.socioambiental.org/pt-br/blog/blog-do-xingu/de-olho-no-xingu-parte-i-historico-de-desmatamento-e-tendencias-atuais-parte-i>. Accessed: 21 November 2018.
- ISA – Instituto Socio-Ambiental. 2017. *Tentativa de regularizar terras com CAR causa polêmica*. Available at: <https://www.socioambiental.org/pt-br/noticias-socioambientais/tentativa-de-regularizar-terras-com-car-causa-polemica>. Accessed: 28 March 2019.
- Jentoft, S., B. J. Mccay, and D. C. Wilson. 1998. Social Theory and Fisheries Co-Management. *Marine Policy, Surrey* 22(4/5):423–436.

- Lakatos, I. 1974. Popper on Demarcation and Induction. In *The philosophy of Karl Popper*, ed. P. A. Schilpp, 241–273. La Salle: Open Court. (The Library of Living Philosophers, v. 14).
- Landell-Mills, P., G. Williams, and A. Duncan. 2007. *Tackling the Political Barriers to Development: The New Political Economy Perspective*. Brighton: The Policy Practice. (Policy Practice Brief, n. 1)
- Lynch, T. R., A. L. Chapman, M. Z. Rosenthal, J. R. Kuo, and M. M. Linehan. 2006. Mechanisms of Change in Dialectical Behavior Therapy: Theoretical and Empirical Observations. *Journal of Clinical Psychology* 62:459–480.
- MacIntyre, A. C. 1981. *After Virtue: A Study in Moral Theory*. Chicago: University of Notre Dame Press.
- Mccay, B. J. 2002. *Emergence of Institutions for the Commons: Contexts, Situations, and Events*. The Drama of the Commons, 361–402.
- Mitchell, C. 2000. Case and Situation Analysis. In *Case Study Method*, eds. R. Romm and P. Foster, 234–258. London: Sage.
- Mosse, D. 1997. The Symbolic Making of a Common Property Resource: History, Ecology and Locality in a Tank-Irrigated Landscape in South India. *Development and Change, Oxford* 28(3):467–504.
- Mwangi, E. 2010. Bumbling Bureaucrats, Sluggish Courts and Forum-Shopping Elites. *The European Journal of Development Research, London* 22(5):715–732.
- Ogden, J., L. Karim, A. Choudry, and K. Brown. 2007. Understanding Successful Behaviour Change: The Role of Intentions, Attitudes to the Target and Motivations and the Example of Diet. *Health Education Research* 22(3):397–405.
- Ondetti, G. 2016. The Social Function of Property, Land Rights and Social Welfare in Brazil. *Land Use Policy* 50:29–37.
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.
- Pacheco, P. 2009. Agrarian Reform in the Brazilian Amazon: Its Implications for Land Distribution and Deforestation. *World Development, Oxford* 37:1337–1347.
- Page, B. 2005. Naked Power: Women and the Social Production of Water in Anglophone Cameroon. In *Gender, Water and Development*, eds. A. Coles and T. Wallace, 57–76. Oxford: Berg.
- Pierson, P. 2004. *Politics in Time: History, Institutions and Social Analysis*. Princeton: Princeton University Press.
- Pires, M. O. and V. G Ortega. 2013. *O Cadastro Ambiental Rural Na Amazônia. Brasília: Conservação Internacional*. Available at: <http://www.inovacar.org.br/wp-content/uploads/2016/11/documentos-base-1-1.pdf>.
- Poteete, A. 2012. Levels, Scales, Linkages, and Other ‘Multiples’ Affecting Natural Resources. *International Journal of the Commons* 6:134–150.
- Powell, W. W. and P. J. Dimaggio. 1991. *The New Institutionalism in Organizational Analysis*. Chicago: University of Chicago Press.
- Prigogine, I. and I. Stengers. 1984. *Order Out of Chaos: Man’s New Dialogue with Nature*. NY: Bantam Books.

- PRODES. 2017. *Satellite Monitoring Project for the Brazilian Amazon Forest*. Annual Rates of Deforestation. Available at: <http://www.dpi.inpe.br/prodesdigital/prodesmunicipal.php>. Accessed 21 November 2018.
- PUBLICA. 2016. Crime e grilagem com o uso do CAR. Available at: <http://apublica.org/2016/08/crime-e-grilagem-com-uso-do-car/>.
- Reay, T. and C. R. Hinings. 2005. The Recomposition of an Organizational Field: Health Care in Alberta. *Organization Studies* 26:351–384.
- Reed, J., L. Deakin, and T. Sunderland. 2014. What are Integrated Landscape Approaches and how Effectively have they been Implemented in the Tropics: A Systematic Map Protocol. *Environmental Evidence, London* 4(2):2–7.
- Reimberg, M. 2009. *MPF cobra Santa Bárbara por 51 mil hectares de área desmatada*. Repórter Brasil, São Paulo, 26 set. Available at: <http://reporterbrasil.org.br/2009/06/mpf-cobra-santa-barbara-por-51-mil-hectares-de-area-desmatada/>. Accessed 12 January 2015.
- Ribot, J. C., A. Agrawal, and A. M. Larson. 2006. Recentralizing while Decentralizing: How National Governments Reappropriate Forest Resources. *World Development, Oxford* 34(11):1864–1886.
- Richards, P., E. Arima, L. Vanwey, A. Cohn, and N. Bhattarai. 2016. Are Brazil's Deforesters Avoiding Detection? *Conservation Letters* 10:470–476.
- Robinson, B. E., M. B. Holland, and L. Naughton-Treves. 2011. *Does Secure Land Tenure Save Forests? A Review of the Relationship between Land Tenure and Tropical Deforestation*. Copenhagen: CGIAR Research Program on Climate Change, Agriculture and Food Security. (Working Paper, 7)
- Ryan, G. W. and H. R. Bernard. 2003. Techniques to Identify Themes. *Field Methods, New York* 15(1):85–109.
- Sayer, A. 2011. *Why Things Matter to People: Social Science, Values and Ethical Life*. Cambridge: Cambridge University Press.
- Schmink, M. and C. H. Wood. 1992. *Contested Frontiers in Amazonia*. New York: Columbia University Press.
- Schnegg, M. and T. Linke. 2015. Living Institutions: Sharing and Sanctioning Among Pastoralists in Namibia. *World Development, Oxford* 68:205–2014.
- Scott, W. R. 1995. *Institutions and Organizations*. Thousand Oaks: Sage.
- Shove, E., M. Pantzar, and M. Watson. 2012. *The Dynamics of Social Practice: Everyday Life and how it Changes*. London: Sage.
- Schatzki, T.R. 1996. *Social Practices: A Wittgensteinian Approach to Human Activity and the Social*. Cambridge: Cambridge University Press. <https://www.cambridge.org/core/books/social-practices/D744F200232444F4FC0D3C6E014205A1>.
- Sewell, W. H. J. 1992. A Theory of Structure: Duality, Agency, and Transformation. *American Journal of Sociology* 98:1–29.
- Uzzell, D. and N. Räthzel. 2009. Transforming Environmental Psychology. *Journal of Environmental Psychology* 29(3):340–350. <https://www.sciencedirect.com/science/article/abs/pii/S0272494408001035>.
- Valle R. and F. Camargo. 2014. *Aliar a política agrícola com a ambiental: uma oportunidade perdida?* Brasília, Brazil: Instituto Socio-Ambiental. Accessed

- 5 October 2016. <https://www.socioambiental.org/pt-br/blog/blog-do-ppds/aliar-a-politica-agricola-com-a-ambiental-uma-oportunidade-perdida>.
- Vatn, A. 2005. *Institutions and the Environment*. Cheltenham: Edward Elgar.
- Wacquant, L. 2005. Carnal Connections: On Embodiment, Membership and Apprenticeship. *Qualitative Sociology, New York* 28(4):445–471.
- Walker, N., S. Patel, F. Davis, S. Milledge, and J. Hulse. 2013. *Demand-Side Interventions to Reduce Deforestation and Forest Degradation*. London: International Institute for Environment and Development (IIED). <https://pubs.iied.org/pdfs/13567IIED.pdf?>
- Wardell, D. A. and C. Lund. 2006. Governing Access to Forests in Northern Ghana: Micro-Politics and the Rents of Non-Enforcement. *World Development, Oxford* 34(11):1887–1906.
- Wittgenstein L. RPP. 1980a. Remarks on the Philosophy of Psychology/ Bemerkungen über die Philosophie der Psychologie Vol. 1. In eds. G. E. M. Anscombe and G. H. von Wright, translated by G. E. M. Anscombe. Oxford: Basil Blackwell. [With an index by Heikki Nyman. German text with English translation].
- Wittgenstein L. RPP. 1980b. Remarks on the Philosophy of Psychology/ Bemerkungen über die Philosophie der Psychologie Vol. 2. eds. G.H. von Wright and Heikki Nyman, translated by C. G. Luckhardt and Maximilian A. E. Aue. Oxford: Basil Blackwell. [With an index and a list of correspondences between TS 232 and Z, TS 232 and PI, TS 232 and VB. German text with English translation].