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Community loggers attempting to legalize traditional timber harvesting in the Brazilian Amazon: An endless path

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ABSTRACT

We conducted a case study to analyze the challenges experienced by small loggers in implementing a Community Forest Management (CFM) model demanded by external environmental agencies. The case study was undertaken within traditional communities located in Boa Vista do Ramos County, Amazonas State. With environmental issues surrounding tropical forest becoming increasingly disputed, traditional logging activities performed by locals came to be regarded as illegal. We believe that despite significant efforts to promote CFM initiatives, principally undertaken via public policy, small loggers have in fact had little success adapting to this new legal context. The results demonstrated that when small-scale loggers where supported by specific regulations and some external assistance they were able to collectivize their activities, forming the Community Association of Agricultural and Forest Products Harvesting (ACAF). After meeting challenges to strengthen their technical, social and managerial aspects, ACAF obtained environmental licenses and forest certification. However subsequent changes in forest policies lead to the termination of CFM-oriented regulations and ACAF weakened. Nevertheless, the social and human capital that had been developed in the collective ended up being successfully applied to other individual small-scale projects in the same region. We conclude that despite the community loggers' success in establishing a new and more sustainable way of working, they were not able to continue these activities within this new legal environment. The policies and laws that apply to CFM are more oriented to conservation goals than to meeting the demands of producers and contributing to their livelihoods.

1. Introduction

The use of forest resources is a widespread and historic phenomenon amongst smallholders and traditional communities in Latin America (de Jong et al., 2010, p. 303). According to the Brazilian Presidential Decree, traditional communities are regarded as culturally different groups, which have their own forms of social organization, and which occupy and use territories and natural resources for their cultural, social, religious, ancestral and economic practices (Brazil, 2007a). In the lower Amazon, residents of these communities are known as "caboclos". These communities have developed their value-systems after centuries of close contact with environment, from which they obtain both material resources that support their livelihood, and the sources of inspiration for their myths, legends and beliefs (Benchimol, 2009, p. 25). In certain communities small-scale logging is a historically important livelihood, being the only source of income in some seasons (Jovicich et al., 2007). However, unregulated small-scale timber extraction can lead to over-exploitation of the local environment (Ayres, 1995, p. 67).

We contend that there are two main drivers that cause communities to seek legality; internal forest policy in Brazil and the various national and international interests that seek to reduce deforestation, protect biological diversity and mitigate climate change (Fearnside, 2013). These drivers do not act independently however, as these national and international interests can have an influence on Brazilian forest policy.

In Brazil, modern forest legislation began with Law 4.771 in 1965, which provides the general framework for forest laws (Bauch et al., 2009). Nevertheless, only after 1989 did the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA[2]) officially request the submission of forest management plans from forest enterprises (Higuchi, 1994). Sustainable forest management and its principles and guidelines were officially defined in 1994 in Decree 1282. Following this Decree, various other directives were subsequently

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[2] IBAMA is linked to the Environment Ministry (MMA). Until 2006, when the decentralization process to sub-national levels of government began, it was responsible for licensing and supervising all the forest management plans.

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Table 1
List of the main CFM regulations that directly or indirectly affected ACAF project.

Year	Level	Regulations	References
1998	Fed.	Decree 2.788: allows simplified community management.	Brazil (1998)
1998	Fed.	IN 04 IBAMA: regulates CFM.	IBAMA (1998); Carvalheiro et al. (2008)
2001	Fed.	IN 15 IBAMA: regulates businesses, individuals and CFM.	IBAMA (2001)
2002	Fed.	Environment Ministry NI 04: limits the CFM area required to access simplified regulations.	MMA (2002)
2003	State	Administrative measure 40/03: sets guidance for small scale forest management projects.	Kibler and da Silva (2008)
2006	Fed.	Law 11.284 (Public Forest Management Law): leads to the decentralization of forest management.*	Bauch et al. (2009); Pinto et al. (2011)
2006	Fed.	Decree 5.975: excluded in principle the possibility of presenting a simplified collective forest management plan.	Brazil (2007b)
2006	Fed.	Environment Ministry NI 05: consolidated the decree above, establishing detail that maintained the impossibility	Brazil (2007b)
	Fed.	of simplified collective forest management.*	Carvalheiro et al. (2008)
2009	Fed.	CONAMA Resolution: establishes guidelines for the sustainable forest management which all state institutions must comply.*	MMA (2009)
2011	State	Resolution 07: consolidates the small scale forest management policy.*	Amazonas (2011)
2012	Fed.	Law 12.651 (New Forest Code): foresees the establishment of specific norms for CFM.*	Brazil (2012)

(Fed: Federal; IN: normative instruction; IBAMA: Brazilian Institute of the Environment and Renewable Resources; MMA: Environment Ministry; CONAMA: National Council for the Environment.)
The significance of asterisk is laws in force.

passed that affect forest management in the Brazilian Amazon (see Table 1).

Concurrently, in 1990 international efforts to reduce deforestation rates and conserve tropical forest biodiversity resulted in the Pilot Program to Conserve the Brazilian Rain Forest (PP-G7) (de Antoni, 2010; Fearnside, 2003). Within PP-G7 the project "Support for Sustainable Forest Management in the Amazon" (known as 'ProManejo') supported 46 projects relating to sustainable forest management, 14 of which were directly concerned with communities. ProManejo became the main program for developing community forest management in the Brazilian Amazon (IBAMA, 2007; Neto et al., 2011).

The United Nations Conference on Environment and Development (UNCED-92) was a key event for broadening the efforts to implement forest management (Mrosek et al., 2006). After UNCED numerous initiatives have invested in the promotion of CFM, with an approach that was strongly influenced by models for sustainable forest management that were conceived initially for commercial logging companies (Pacheco et al., 2008, p. 29; Pokorny and Johnson, 2008). Where traditional communities are concerned this approach can be considered an "introduced model", whereby forest management systems are developed outside of the community by governments, international agencies or local NGOs (Sunderlin, 2006).

With the ongoing implementation of various changes in forest policy, several small community loggers have found themselves increasingly marginalized and on course to be considered as illegal or clandestine loggers. As a consequence, these loggers are increasingly attempting to surmount the various barriers standing between them and legalization. This study aimed to analyze the challenges experienced by traditional communities in implementing the "introduced" CFM model demanded by environmental agencies. Is the introduced model feasible for small loggers that seek to carry out their work within the new legal context? We believe that despite significant efforts to enable CFM initiatives, undertaken through public policy, small loggers have achieved little success in adapting their work to this new legal context.

2. Methods

ACAF served as a case study which permitted an analysis of changes in a small-scale local timber industry during their search to legalize traditional logging activities. Choosing ACAF was due to an institutional relationship between our organization (the Federal Amazon Institute of Education, Science and Technology) and ACAF, we thus had the opportunity to closely monitor the development of the project. A contributory factor was that ACAF had been identified as a key pioneer project in Brazilian Amazon, and was one of the CFM projects to receive support from ProManejo (PP-G7).

ACAF is based in the "Menino Deus do Curuçá" community, situated on the banks of the Curuçá river, in Boa Vista do Ramos County, Amazonas State, Brazil. Between 2001 and 2007 we made 14 field trips to Boa Vista do Ramos. During those trips, the major data collection tool employed was Participant Observation (Bernard, 2006, p. 342). We were able to observe and record information about ACAF organization system and forest management practices in different stages: the definition and implementation of the forest management plan; the evaluation and adjustments required for forest certification; and the development of the project "Forest management through participative planning at the Curuçá river communities", which was funded by ProManejo.

During these field trips we conducted unstructured interviews with: (i) the three presidents of ACAF about their motivations, perspectives, concerns and strategies regarding differing aspects of CFM and of their earlier forestry practices; and (ii) the technical staff of the project regarding their perception of strengths, weaknesses, opportunities and threats to the project. We also employed a technique that we label "Forest Mediated Discourse" (FMD), whereby conversations, information exchanges, meetings and disputes between actors are conducted within the very same physical environment that they concern. In this study Forest Mediated Discourse occurred between both individuals and distinct groups, and took place during forest management activities or sometimes when simply walking in the forest. The technique brings a better comprehension of the natural environment as it currently exists, the knowledge of local actors, and the techniques involved in forest management. We employed this technique several times with ACAF members and technical staff during management practices, the certification process, and different training activities.

We also conducted a Documentary Research (Gil, 2008, p. 51) based on two sources of documents. The first was a review of laws, decrees and normative instructions that relate to sustainable forest management and CFM. The second was a review of documents shared with us by ACAF concerning their process of formalization, land-ownership regularization, environmental licensing and forest certification. Regarding ACAF we specifically analyzed: (i) social statute, internal regiment and meeting minutes; (ii) forest management plans; (iii) environmental licenses, transport authorization and timber product declarations of sale; (iv) forest certification reports and (v) reports of the projects established by the ProManejo.

2.1. Data analysis

In case studies we cannot always speak of a rigid scheme of analysis and interpretation of data (Gil, 2008, p. 175). As guiding principles and practices to qualitative analysis we used those presented by Tesch (1990, cited by Gil, 2008, p. 176). With regard to documentary research we rely on the concept of Interpretative Analysis (Bernard, 2006, p.

473). On laws and regulations related to forest management we identified all aspects of small-scale and community management and analyzed how these factors influenced the dynamics of labor. Regarding the technical and administrative documents, we used interpretive analysis to understand: how the extractors organized themselves to meet the new demands coming from the law; time and document flows; and administrative and managerial abilities. We divided our analyses into different categories relating to the project development: Establishment of ACAF structure; capacity-building; land registration; forest management plan; environmental licensing; forest certification; and capacity to influence and spread knowledge.

We also employed the concept of triangulation (Fielding and Schreier, 2001) to analyze data. We use triangulation with respect to data from different groups of individuals (forest managers, field technicians and community leaders/presidents) and data from different methods (Documentary Research, Participant Observation, Interviews and Forest Mediated Discourse).

3. Analysis of policies and regulatory framework regarding CFM

Forest policies established through the Brazilian Forestry Code from 1965 were implemented via presidential decrees and normative instructions (IN). Categories of forest management containing specific conditions for CFM in Brazil were formally established in 1998 (Table 1). A "Simplified Forest Management Plan" was made available for landowners of up to 500 ha. Where forest management was carried out collectively through associations or cooperatives only one management plan was necessary, provided that less than 500 ha was being exploited annually.

The availability of these new simplified regulations for CFM stimulated project development. According to Amaral and Neto (2005), at the end of the 1990s there were little more than a dozen projects; whilst by the end of the 2000 decade, there were more than 300 projects.

Nevertheless, such legal provisions were altered when the Environment Ministry established the NI 04, in 2002, reducing to 500 ha the upper limit of the property area that had could be exploited under the simplified regulations. Since the majority of CFM projects took place in communally-owned areas much bigger than 500 ha, these projects were consequently subject to the same regulations as large-scale entrepreneurial forest management projects (IBAMA, 2009), even though CFM projects exploit dramatically less land area within their properties than large-scale entrepreneurial projects. In 2006, all possibility of implementing Simplified Management Plans was erased, thus ignoring the unique characteristics and requirements of CFM.

A change of direction occurred in 2009 with the establishment of the Federal Program for Community Forest Management aimed to organize incentives for CFM, with a focus on sustainable development and on the use of multiple natural resources, including forest services and goods (Pinto et al., 2011). This new program did not interfere however with previously established forest management regulations. Only when Law 12,651 passed was the possibility of a different set of regulations pertaining to CFM considered again.

3.1. Decentralization of forest management

In 2006, decentralization of forest management policies transferred the responsibility for licensing projects from IBAMA to the State Environmental Bodies (Bauch et al., 2009). Initially, such decentralization created a dispute between government institutions about their attributions, since Environmental State Bodies also started to produce forest management regulations (IBAMA, 2009). However, in Amazonas State the decentralization process began earlier in 2003, when the State took on management of Public State Forests via its own Environmental Bodies (Secretary of State for the Environment and Sustainable Development), promoting small-scale forest management projects. In order to develop this proposition, it established a partnership with IBAMA, making the Amazonas Environmental Protection Institute (IPAAM) the organization responsible for environmental licensing. The Administrative Measure 40/03 was established to guide these public policies, concerning the formal registration and conduct of small-scale forest management projects (Kibler and da Silva, 2008). Administrative Measure 40/03 underwent several reviews before the Amazonas State Environmental Council approved Resolution 07. This measure consolidated small-scale forest management policies and adopted special measures for the occupants of public lands that previously had held no formal land ownership.

4. Results concerning the CFM project developed by ACAF

The results are presented within the categories we use for our analysis and related to the different stages of legalization as experienced by the community. A chronological synthesis of the results is presented in Table 2.

4.1. The establishment of ACAF structure

Before the introduced model of CFM arrived in the Curuçá river region, timber harvesting techniques were highly rudimental, albeit adapted to local conditions and based on traditional knowledge of forest species and harvesting systems. Although these harvesting activities formed a key part of local community tradition, from the view of the State they were carried out informally and illegally. Extractors neither had environmental licenses nor provided receipts for sold timber.

Table 2
Chronological synthesis of results related to ACAF's project.

Period	Fact
1998	Initiated a participatory mapping project and the process of ACAF's formation
1999–02	Uncertainty period and low community uptake of the proposal
1999	First forest inventory taken of the Curuçá river region; training in Reduced-impact Logging techniques; ACAF is officially established.
2000	Boa Vista do Ramos city hall provides an area for the development ACAF's management plan; Management plan framework activities are initiated.
2001	The first environmental license requested and granted
2002–07	Implementation of management plan
2002	First sale of managed timber
2003–06	Interest grows from other communities and ACAF becomes a central reference-point in CFM.
2004–06	Delivery of several training courses, with support from the ProManejo
2004	Evaluation of certification; initiated registration of ACAF's area in Lands State Institute
2005	The ACAF area is divided in order to comply with the law.
2005–06	FSC certificate is obtained and the selling of certified wood starts.
2006	Final license provided for ACAF.
2007	Activities in the ACAF management area are halted.
after 2007	ACAF's expertise supports the realization of small scale individual projects.
2008	ACAF loses their certification

In 1998, a participatory mapping project of agro-forestry and silvicultural potential in Boa Vista do Ramos County was undertaken. The project was carried out by the Forest and Agriculture Management and Certification Institute (IMAFLORA). At that time, some small loggers of the Curuçá river had already shown interest in organizing themselves collectively and in shifting towards legal registration. In 1999 these harvesters assembled into a co-operative, creating ACAF. After the formation of the collective, partnerships were subsequently strengthened with the municipal government, IMAFLORA and the Federal Amazon Institute of Education, Science and Technology. These two organizations provided the technical and administrative support for the development of the forest management plan and the management capabilities of the association.

4.2. Capacity-building and experience exchange

The processes of structuring and implementing the forest management plan aimed at reconciling traditional and technical-scientific knowledge and abilities. Given that this was a 'pioneering' experience for all involved, the "learning-by-doing" practice was embraced. At the same time and place that the ACAF management plan was being structured, practical classes and apprenticeships were given to Federal Amazon Institute of Education, Science and Technology students, promoting experience-sharing amongst community, technicians, students and teachers.

In 2004, with support from ProManejo, courses were taught on the stages of legal registration necessary for forestry micro-businesses; administration and accounting for non-profit organizations; basic workplace safety concepts and accident prevention; and wood classification. ProManejo also promoted exchange programs with other CFM in the region and with Forest Stewardship Council (FSC) certified enterprises. Through these capacity-building courses and the experience exchanges, there was an intense strengthening of ACAF's human and social capital (Becker, 2002; Silva, 2008). Since 2006, this has lead to many of its associates being requested for assistance with other forest management projects in the region.

4.3. Land registration

It is important to highlight that most smallholders in this region do not officially own their land, and that there are no Protected Areas or Conservation Units in this area. This makes it more difficult to obtain title to their forest and lands (Hajjar et al., 2011). Small-scale timber harvesters in the region were accustomed to abiding solely by the local cultural norms and rules governing the access and use of forest resources. As they aimed for formal registration it was necessary to define the location where ACAF's forest management plan could be carried out. Despite the complexity and risks inherent in interfering with strongly-established social rules (Pacheco et al., 2008), an agreement was obtained during a CFM workshop delivered in Menino Deus do Curuçá community. The Boa Vista do Ramos municipal government committed to an agreement with the local community, and the authorities and provided a 2400 ha area in which that ACAF could formally start its forest management activities.

In 2004, it was revealed that the area conceded to ACAF was in fact under the jurisdiction of Amazonas State. Consequently the area had to be registered with the Amazonas State Land Institute. Several problems arose for ACAF from this new requirement. The first problem was that the state, in order to concede land over 1500 ha, would have had to approve the concession before the Amazon State Legislative Assembly. This requires a political and bureaucratic process that would have rendered the project unviable. The second problem is that, according to Amazonas State land law, land titling is not possible for collectively-owned lands.

ACAF tentatively got around the problem. The 2400 ha area was split into three lots. Through the usage of Agreement Letters, each lot was handed to an ACAF associate, which weakened ACAF's collective CFM activities. Agreement Letters are temporary documents and, after their expiration, three 'Definitive Titles' were requested. The division of collectively-owned lands into individual areas and the inevitable bureaucracy attached to this process (and others) lead to a decline in co-operation between the associates and strongly discouraged them from working within the ACAF area.

4.4. Forest management plan

ACAF's forest management system incorporates the 'polycyclic' system, which consists of 25-year cycles. This results in 25 Annual Production Units[3] (UPA) with the maximum area of 80 ha. ACAF applies Reduced Impact Logging techniques (Macpherson et al., 2010) but since lumber is transported via river networks there is no need to build forest or skid roads or wood storage yards.

The association works through attending to specific timber orders. Trees are felled and logs are processed into planks, boards or other smaller pieces, according to the dimensions specified by the buyer. All processing is carried out inside the forest. At the beginning of the process a chainsaw is used for sawing. Wood boards are moved manually from the forest interior to the riverside and are transported from there via shallow-draft local boats to the point of sale. A portable sawmill, small agricultural tractor and a 17-m wooden boat were acquired with support from ProManejo and the State Government in order to improve forest management.

ACAF organizes itself collectively to achieve its goals. There is no subdivision of the management area into lots for individuals or subgroups to work. Work teams are assembled to carry out tasks (pre-determined by the forest management) according to their specific individual abilities. Monitoring, work control, and wages are all administered by the associates themselves. Harvesting activities are only carried out once a commercial deal has been sealed. After all the wages and operational costs have been covered, the profit is invested back into the association.

4.5. Environmental licensing

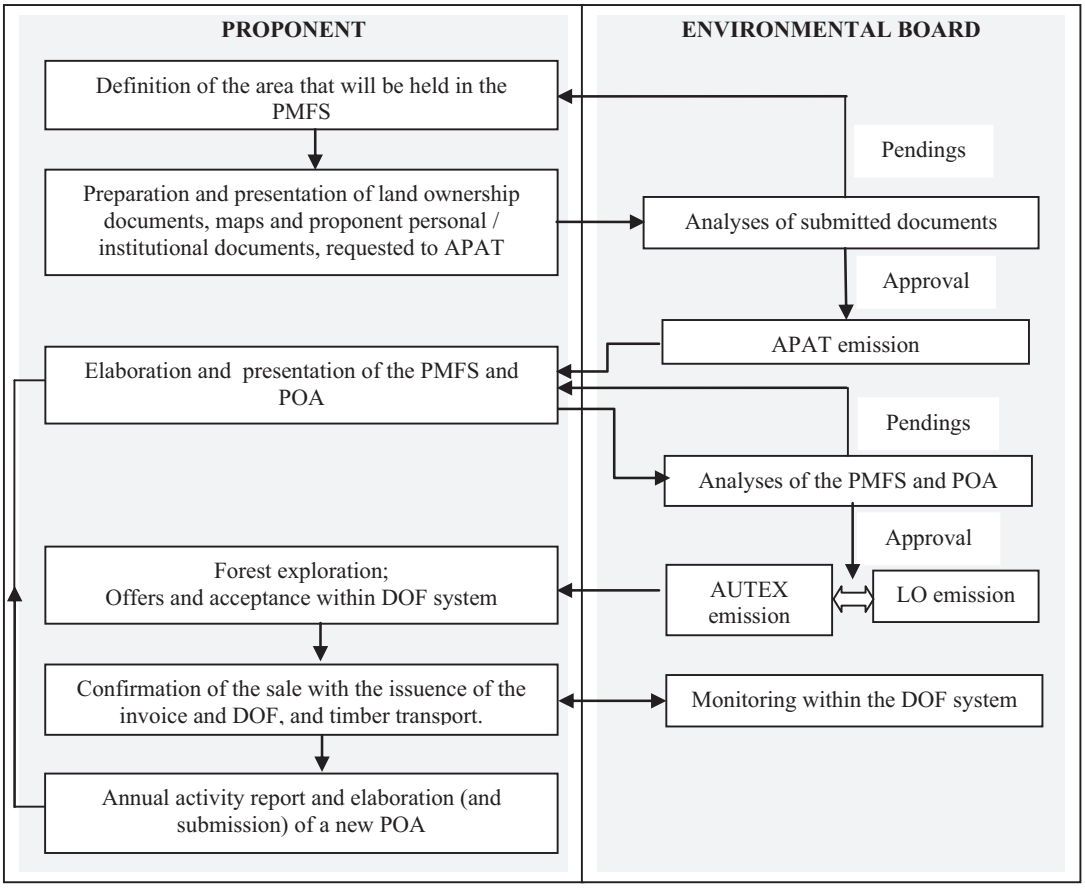
ACAF still needed to receive an official environmental license in order to work within the Brazilian regulatory system, and this licensing procedure is very complex (Fig. 1). Due to decentralization and constant changes to the rules, small differences can be found between the procedures and technical terms employed by the different states.

ACAF's Sustainable Forest Management Plan was registered in April 2001. Licenses were issued in July and August of the same year (Table 3). Once in possession of such licenses, ACAF was able to continue with its forest management and trading activities. Licenses expired after one year and were granted according to the Annual Operation Plan (POA). In order to continue its activities, ACAF requested licenses for UPA 2 in August 2002. But NI 4 from the Environment Ministry defined new regulations for community forest management, which resulted in conflicts and delays concerning the license granting. ACAF had to halt its timber trade, with harvesting only able to proceed until the end of 2004. Such a long waiting period created problems for those ACAF associates that had come to rely upon timber harvesting as an important source of income.

In 2005 ACAF requested licenses for UPA 3. Shortly after this request forest management in Brazil was decentralized and, once again, the association had to wait eight more months to obtain their license from the Amazonas Environmental Protection Institute. These recurrent changes in sustainable forest management regulations lead to rushed technical changes to the presentation of the project and created doubts regarding its approval.

In spite of this highly uncertain regulatory environment, ACAF managed to carry out timber harvesting in three UPAs to the extent of 50 ha in the first two and 80 ha in the third. Timber production was

[3] UPA: sub-division of the management area intended to be operated in a year, which requires an annual plan of operation (POA).



(Sustainable Forest Management Plan (PMFS); Prior License to Technical Analysis (APAT) of the PMFS; Annual Operation Plan (POA); Forest Exploration Permission (AUTEX); Operation License (LO); Forest Origin Document (DOF))

Fig. 1. Main steps of the Environmental Licensing process according to Brazilian laws until 2012. (Sustainable Forest Management Plan (PMFS); Prior License to Technical Analysis (APAT) of the PMFS; Annual Operation Plan (POA); Forest Exploration Permission (AUTEX); Operation License (LO); Forest Origin Document (DOF).)

consistently 20% less than the potential production level, meaning that the harvesting intensity was around 2 m^3/ha.

4.6. Forest certification

In 2004, ACAF started its forest certification process in concurrence with FSC guidelines. The audit for certification identified 17 pre-conditions and 10 conditions to be met by the association and, in February 2005, they acquired the FSC Forest Certification. The direct expenses for this first audit were covered by the World Wildlife Foundation — Brazil. FSC certification was of major importance in improving the association's internal processes, especially regarding social and environmental matters. Nevertheless, due to the long distance from consumers of certified wood and the low volumes of timber produced, the economic benefits of selling certified timber were scant. Due to certification costs and the legal impediments to continuing CFM (caused primarily through the lack of land-ownership documentation), ACAF lost its FSC certificate in 2008.

4.7. Capacity to influence and spread knowledge to other groups

In the beginning, ACAF did not have significant support from the community – especially from those who wished to continue to log illegally – even though it was conceived by the local residents. Besides, the

Table 3
Dates and time required for approval (in months) of the main regulatory actions taken by ACAF.
Adapted from: Koury, (2007).

No.	Action	Date	Time (between actions)
1	ACAF Foundation	Aug/06/1999	
2	OL and AUTEX for APU 1 requested	Apr/09/2001	20 months (1 and 2)
3	OL for APU 1 granted	Jul/23/2001	03 months (2 and 3)
4	AUTEX for APU 1 granted	Aug/10/2001	04 months (2 and 4)
5	OL and AUTEX for APU 2 requested	Aug/07/2002	
6	OL for APU 2 granted	Dec/05/2003	16 months (5 and 6)
7	AUTEX for APU 2 granted	Jan/04	17 months (5 and 7)
8	AUTEX for APU 3 granted	Oct/06/2005	
9	OL for APU 3 requested	Dec/15/2005	
10	Transference from IBAMA to Amazonas Environmental Protection Institute	Mar/20/2006	
11	OL for APU 3 granted	Aug/29/2006	08 months (9 and 11)

long time (three years) necessary to complete the first trade of legalized timber created expectations and doubts about ACAF's viability. When the first licenses were obtained, the project seemed to have overcome its major challenges. However the delay to grant the second licenses leads to another round of uncertainties. This scenario improved only in 2004, following a new order of timber. The selling of legalized wood freed the associates to work without worrying about the concerns of governmental environmental organizations, and to seek out better markets. In the same year, with support from ProManejo, technical and management courses were delivered, equipment was bought and specialized technical assistance was hired.

ACAF work was in this period undergoing its most successful phase and received, in 2005, the FSC certificate as a recognition for its technical, environmental and social quality. Such a high profile led many small loggers of the region to approach the project and ask for guidance. ACAF thus became consolidated as a role-model project for CFM in the region, attending events, receiving visits and lending its human and social capital to other projects.

The decentralization of Brazilian Forest Management, the weakening of public policies and the end of the NIs relating to CFM increased significantly the barriers to success for ACAF. The associates subsequently dispersed, seeking alternative incomes. Many associates ended up leading small-scale forest management projects, receiving support from the state government. These kinds of projects have their own regulations and receive technical assistance and support from specific programs for the trade of its products.

It must be stressed however, that the work of ACAF led to the creation of two other Associations that develop exclusively small-scale projects. ACAF contributed via the provision of technical knowledge and equipment. Some of the ACAF associates also joined the new association and started developing small-scale forest management plans. By 2013, 55 small-scale forest management plans had been prepared in Boa Vista do Ramos (Trindade, J.F. da, personal communication).

5. Discussion

In 1999, 250 people who had ties to logging were identified in Boa Vista do Ramos County (Koury, 2007). When a group of small loggers from Curuçá River Basin joined forces to create ACAF, they were seeking new opportunities within (for the first time) legal parameters. The core intention was to improve working conditions and environmental performance whilst maintaining the generation of income. To guide our discussion we return to our research question: Did the introduced model make it feasible for small loggers to carry out their work within the new legal paradigm?

Sunderlin (2006) expressed a desire to know if the introduced model was effective in improving the livelihood conditions of participants, since poverty alleviation was presented as a key goal of government forestry programs in Cambodia, Laos, and Vietnam. According to Sunderlin this is an important question for two reasons: it meets the expectations of certain donors and community forestry has generally under-performed in poverty alleviation. When analyzing forest policies that relate to the Brazilian Amazon we could not find any explicitly stated aims to alleviate poverty. Policies were established with the primary purpose of reducing deforestation and promoting environmental conservation (Fearnside, 2013; Bauch et al., 2009). Brazil has several specific policies and programs aimed at poverty alleviation (UNDP, 2014, p. 88). This may help explain the poor financial performance of both the ACAF project and CFM projects in Brazil more widely, as we discuss below.

Hajjar et al. (2011), who studied the challenges faced by communities in the Brazilian Amazon in initiating or maintaining formal CFM, divided the projects into two phases: developmental and operational. ACAF managed to pass through the development phase and successfully entered the operational phase. Amongst the various difficulties faced by ACAF during the operational phase, the negative economic return (Humphries et al., 2012; Medina and Pokorny, 2011) received the greatest research attention. The main driver for ACAF's lack of economic viability was the low volume of commercialized wood combined with high production costs due to the substantial impact of equipment depreciation (Koury, 2007). For CFM projects to be economically viable a minimum harvesting intensity of 9.8 m^3/ha has been suggested (Carvalho and Oliveira, 2010), much greater than the 2 m^3 harvested by ACAF.

The expectation that the CFM projects supported by ProManejo could become economically viable in a few years (Humphries et al. 2012) was not met. These CFM projects presented limited opportunities for timber producers to generate financial returns (Medina and Pokorny, 2011). This mirrors community forestry in Nepal which was found to be more successful at forest conservation than improving livelihoods (Thoms, 2008). Within the three countries studied by Sunderlin (2006), only Vietnam has a strong record in poverty alleviation that can be linked to an emerging community forestry program. Financial problems are part of the reality of community projects in Brazil and around the world.

That said, we must also recognize that ACAF was able to overcome many of the typical challenges faced by communities, implementing the introduced model and reaching an operational phase of a legal forest management. The question that arises then is this: why did the ACAF project fail after having successfully overcome so many obstacles?

We believe that changes in public policies and the regulatory environment specific to CFM were decisive in both initially promoting the project and then also causing its subsequent decline. In 1998, there was a helpful framework provided by the laws and public environmental agencies for CFM, plus financial support available for structuring the projects (provided by ProManejo and other programs). ACAF was quickly able to take advantage of this favorable political environment, which even then was perceived by some as just a temporary opportunity (Fearnside, 2013). Project activities subsequently peaked between 2004 and 2006. After this period ACAF's work began to decline, coinciding with substantial changes to Brazilian forest policies (Bauch et al., 2009) that promoted the decentralization of forest management and excluded any special regulatory needs required for successful CFM. Coincidentally, concurrent changes in the approach of external agencies to CFM projects in Brazil saw a termination of support that had been previously available. The Pilot Program for Brazilian Tropical Forest Protection terminated its activities without having developed complete autonomy in its forest management projects. To do so, it would be necessary to build a common ground amongst many stakeholders from both public institutions and civil society (de Antoni, 2010).

A further important issue to be considered is the limitations imposed by bureaucratic and legal requirements onto the CFM structure itself (Pokorny and Johnson 2008), which ended up making projects unviable. Vianna et al. (2013) exposed the slowness surrounding the licensing of forest activities in Amazonas State, establishing that the average times to license a forest management plan and to renew a license were 32 and 26 months respectively. Slowness and bureaucracy-related costs are factors that strongly promote illegality and that also reduce the economic viability of enterprises (Adeodato et al. 2013). Responding to this scenario, Fialho et al. (2009) considers the need for simplification of the bureaucratic process in order to expand the productive base of the forest sector.

In 2009 illegal logging represented 33% of timber production in the Amazon (Pereira et al., 2010). Obidzinski et al. (2014) also found a high level of illegality in logging and small-scale timber processing in Indonesia. This suggests that the difficulties in achieving legality faced by small loggers in the Curuçá river region are a worldwide problem, albeit a global issue that can be addressed with local solutions, as demonstrated in the work presented by Obidzinski et al. (2014). The processes surrounding the regulation of forest based activities are inadequate when addressing the reality of community production (Benatti et al. 2003). Thus understanding the informal context becomes

extremely important in influencing State efforts concerning the formalization of forest resource use (Pacheco et al., 2008, p. 67). Nevertheless, there appears to be a clear crossroad. On the one hand, illegal logging is one of the main challenges to be overcome by sustainable forest management projects (Hajjar et al., 2011) as it causes unfair market competition. On the other hand, the complexity and costs of bureaucracy discourage the search for legality.

Regarding our research question we consider that there is not a single answer. When public policy was favorable to CFM, the small loggers, in our case study, had considerable external support which enabled them to organize and create ACAF, legalizing their activities and gaining forest certification. From this point of view the introduced model was feasible. However, against a backdrop of constant political change and a discontinuation of external support, the small loggers within ACAF were unable to maintain production, abandoned their search for legality and consequently lost their certification. Clearly the introduced model became in this period unfeasible for the small loggers. What would likely have happened if there had been no changes in public policy, we cannot know.

de Antoni (2010) considered that more time would have been necessary for the CFM projects (supported by ProManejo/PP-G7) to fully develop complete autonomy. On a global review of rural community enterprises Donovan et al. (2008) (cited by de Jong et al., 2010, p. 304) suggested that the start-up phase necessary to establish a viable business structure takes at least 10–20 years, followed by a consolidation phase of similar duration.

Fearnside (2013), when discussing the environmental policies in Amazonia, considered the importance of making the best of instability by being prepared for opportunities, and pointed out the importance in this process of understanding the complex nature of Brazilian bureaucracy. Viewed from this perspective, the small loggers at Curuçá basin took into account the changes established by environmental policy in the 90s, and were able to adapt their way of production to the introduced CFM model and licensing activity. When new changes in public policy impacted negatively upon CFM in 2006, the work of ACAF declined, and by necessity the small loggers had to seek the individualized small-scale forest management plans that were recognized by Amazonas State.

These small-scale management plans promoted by Amazonas State were originally conceived as a way to address two common problems related to CFM more widely. Firstly, the land ownership documents that are typically not held by most smallholders in the Brazilian Amazon are required for environmental licensing (Haggar et al., 2011). Secondly, the persistent ambiguities that surround the concept of community management; CFM generally invokes collective arrangements related to forest activities that are in contrast with the existing social organization of most Amerindian peoples (we include Caboclos here), which are based primarily on reciprocal family networks (de Jong et al., 2010, p. 302). Moreover, the results achieved by these small-scale projects are questionable (Kibler and da Silva, 2008).

6. Conclusions

In evaluating this case study, we see that the efforts undertaken through public policy to promote CFM initiatives have achieved little success. This finding is in accordance with our original hypothesis. The introduced CFM model required by environmental agencies to legalize small loggers' activities has not proven feasible within the context of the traditional communities studied. The financial fragility of the project, its lack of autonomy and the difficulties imposed by excessive bureaucracy were the principal barriers to success.

Even when considering the constant legal and institutional changes surrounding CFM, the small loggers overcame many obstacles facing the legalization of their activities. ACAF's pioneering attitude, along with its partner institutions and the financial support received, made possible the development of significant human and social capital related to environmentally sensitive collectively-organized logging. This expertise helped to establish it as an important institutional base for spreading CFM in the region. The development of ACAF also provided a positive influence on the parallel development of other small-scale forest management projects. Such family-scale projects could consequently draw upon the community expertise developed through ACAF in order to take advantage of any relevant new policies and regulations established by the state government.

Communities that wish to carry out sustainable and legal management of their traditional timber harvesting practices must walk a long and tortuous path. The lack of public policies and regulations tailored to their activities, and the frequent alterations to those policies that do exist impose harsh obstacles for those seeking legalization in Brazil. Only the persistent will reach it.

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References

Adeodato, S., Villela, M., Betiol, L.S., Monzoni, M., 2013. Madeira de ponta a ponta: o caminho desde a floresta até o consumo. FGV RAE, São Paulo, Brazil (128 pp.).
Amaral, P., Neto, M.A., 2005. Manejo florestal comunitário: processo de aprendizagem na Amazônia brasileira e na América Latina. IEB/IMAZON, Belém, Brasil.
Amazonas, 2011. Resolução CEMAAM 07, estabelece normas e procedimentos para Plano de Manejo Florestal Sustentável de Pequena Escala.
Ayres, J.M., 1995. As matas de várzea do Mamirauá: Médio Rio Solimões, Sociedade Civil Mamirauá, Tefé: CNPq, Brasília2ª. ed. , (123 pp.).
Bauch, S., Sills, E., Rodriguez, L.C.E., McGinley, K., Cubbage, F., 2009. Forest policy reform in Brazil. Int. Forestry. ,pp. 132–138, (April/May).
Becker, G.S., 2002. La inversion em talento como valor de futuro. Rev. para La integración y dessarrollo de lós recursos Humano 153, pp. 26–29.
Benatti, J.H., McGrath, D.G., de Oliveira, A.C.M., 2003. Políticas Públicas e Manejo Comunitário de Recursos Naturais na Amazônia. Amb. Soc. 7 (2), 137–154.
Benchimol, S., 2009. Amazônia – Formação social e cultural, 3ª. ed. Valer, Manaus, Brazil (546 pp.).
Bernard, H.R., 2006. Research Methods in Anthropology (4th Ed.): Qualitative and Quantitative Approaches. Altamira Press. Rowman & Littlefield Publishers, Inc., (Available: http://www.antropocaos.com.ar/Russel-Research-Method-in-Anthropology.pdf).
Brazil, 1998. Decreto 2.788, altera dispositivos do Decreto 1.282.
Brazil, 2007a. Decreto No. 6.040, institui a Política Nacional de Desenvolvimento Sustentável dos Povos e Comunidades Tradicionais.
Brazil, 2007b. Normas Florestais Federais para a Amazônia – Brasília: IBAMA/Diretoria de Uso Sustentável da Biodiversidade e Florestas.
Brazil, 2012. Lei 12.651, dispõe sobre a proteção da vegetação nativa; ...; e dá outras providências.
Carvalheiro, K., Sabogal, C., Amaral, P., 2008. Análise da legislação para o manejo florestal por produtores de pequena escala na Amazônia brasileira. CIFOR / Projeto ForLive / IMAZON / UFRA, Belém, Brasil.
Carvalho, R. da S., Oliveira, A.D., 2010. Economic feasibility of timber management in extractive settlement projects of southwestern Amazonia. Cerne 16 (4), 505–516.
de Antoni, G., 2010. O Programa Piloto para Proteção das Florestas Tropicais do Brasil (PPG-7) e a globalização da Amazônia. Amb. Soc. 13 (2), 299–313.
de Jong, W., Cornejo, C., Pacheco, P., Pokorny, B., Stoian, D., Sabogal, C., Louman, B., 2010. 16 opportunities and challenges for community forestry: lessons from tropical America. In: Mery, G., Katila, P., Galloway, G., Alfaro, R.I., Kanninen, M., Lobovikov, M., Varjo, J. (Eds.), Forest and Society — Responding Global Drivers of Change. IUFRO Word Series 25, pp. 299–314 (Vienna).
Fearnside, P.M., 2003. Conservation policy in Brazilian Amazonia: understanding the dilemmas. World Dev. 31 (5), 757–779.
Fearnside, P.M., 2013. The evolving context of Brazil's environmental policies in Amazonia. Novos Cad. NAEA 16 (2), 9–25.
Fialho, J.T., Higa, A.R., dos Santos, A.J., Malinoviski, J.R., 2009. A influência do ambientalismo na política florestal produtiva: uma percepção dos atores sociais da cadeia produtiva da madeira do Paraná. Floresta 39, 577–595.
Fielding, N., Schreier, M., 2001. Introduction: on the compatibility between qualitative and quantitative research methods. Forum: Qualitative Social Research. , (Disponível em http://qualitative-research.net/fqs/fqs-eng.htm).

Gil, A.C., 2008. Métodos e técnicas de pesquisa social, 6ª ed. Editora Atlas S.A., São Paulo, Brazil, p. 1985 (Available from: https://ayanrafael.files.wordpress.com/2011/08/gil-a-c-mc3a9todos-e-tc3a9cnicas-de-pesquisa-social.pdf).
Hajjar, R., McGrath, D.G., Kozak, R.A., Innes, J.L., 2011. Framing community forestry challenges with a broader lens: case studies from Brazilian Amazon. J. Environ. Manage. 92, 2159–2169.
Higuchi, N., 1994. Utilização e manejo dos recursos madeireiros das florestas tropicais úmidas. Act. Amaz. 24, 275–288.
Humphries, S., Holmes, T.P., Kainer, K., Koury, C.G.G., Cruz, E., Rocha, R.M., 2012. Are community-based forest enterprises in the tropics financially viable? Case studies from the Brazilian Amazon. Ecol. Econ. 77, 62–73.
IBAMA (Brazilian Institute of the Environment and Renewable Natural Resources), 1998. Instrução Normativa 04, dispõe sobre a exploração de recursos florestais na bacia amazônica de forma comunitária.
IBAMA (Brazilian Institute of the Environment and Renewable Natural Resources), 2001. Instrução Normativa 15, dispõe sobre a exploração de recursos florestais na bacia amazônica de forma empresarial, individual ou comunitária.
IBAMA (Brazilian Institute of the Environment and Renewable Natural Resources), 2007. Projeto de Apoio ao Manejo Florestal Sustentável na Amazônia - Relatório de Atividades, (Manaus, Brasil).
IBAMA (Brazilian Institute of the Environment and Renewable Natural Resources), 2009. Projeto Floresta em Pé. Análise e elaboração de propostas de diretrizes técnicas para elaboração e execução de planos de manejo florestal por produtores na forma individual, familiar ou comunitária, integrando produtos madeireiros e não madeireiros, (Brasília, Brasil).
Jovicich, S.S., Amaral, P., Cronkleton, P., Fonseca, H., Pires, A., 2007. Acompanhamento para manejo florestal comunitário na Reserva de Desenvolvimento Sustentável Mamirauá, Amazonas, Brasil, CIFOR, Bogor, Indonésia.
Kibler, J.F., da Silva, L.N., 2008. Articulação nacional e internacional no Projeto Floresta Viva. T C Amazônia 15, 35–43.
Koury, C.G.G., 2007. Manejo florestal comunitário no baixo Amazonas: custos e entraves da produção madeireira(Dissertação de mestrado) INPA, Manaus, Brasil.
Macpherson, A.J., Schulze, M.D., Carter, D.R., Vidal, E., 2010. A model for comparing reduced impact logging with conventional logging for an Eastern Amazonian Forest. For. Ecol. Manag. 260, 2002–2011.
Medina, G., Pokorny, B., 2011. Avaliação financeira do manejo florestal comunitário. Novos Cad. NAEA 14 (2), 25–36.
MMA (Environment Ministry), 2002. Instrução Normativa 4, ajusta os procedimentos relativos às atividades de Manejo Florestal Sustentável de Uso Múltiplo na Amazônia Legal.
MMA (Environment Ministry), 2009. Resolução CONAMA 406, estabelece parâmetros técnicos a serem adotados na elaboração, apresentação, avaliação técnica e execução de PMFS.
Mrosek, T., Balsillie, D., Schleifenbaum, P., 2006. Field testing of a criteria and indicators system for sustainable forest management at the local level. Case study results concerning the sustainability of the private forest Haliburton Forest and Wild Life Reserve in Ontario, Canada. For. Policy Econ. 8 (6), 593–609.
Neto, M.A., Cruz, H., Carneiro, M., Miranda, K., 2011. A construção de políticas públicas para o manejo florestal comunitário e familiar na Amazônia brasileira, in: Cruz, H., Sablayrolles, P., Kanashiro, M., Amaral, M., Sist, P. (Org.), Relação empresa/comunidade no contexto do manejo florestal comunitário e familiar: uma contribuição do projeto Floresta em Pé. Ibama/DBFLO, Belém, pp. 242–255.
Obidzinski, K., Dermawan, A., Andrianto, A., Komarudin, H., Hernawan, D., 2014. Timber legality verification and small-scale forestry enterprises in Indonesia: lessons learned and policy options. Cifor, Infobriefs (76). , (Available from: http://www.cifor.org/publications/pdf_files/infobrief/4862-infobrief.pdf).
Pacheco, P., Barry, D., Cronkleton, P., Larson, A.M., 2008. The role of informal institutions in the use of the forest resources in Latin America. Forest and Gov. Programme (15). CIFOR, Bogor, Indonesia, p. 78.
Pereira, D., Santos, D., Vedoveto, M., Guimarães, J., Veríssimo, A., 2010. Fatos Florestais da Amazônia 2010. Imazon, Belém (126 pp.).
Pinto, A., Amaral, P., Amaral, M., 2011. Iniciativas de manejo florestal comunitário e familiar na Amazônia brasileira 2009/2010. Imazon, IEB, GIZ, SFB, Belém, Brasília, Brasil.
Pokorny, B., Johnson, J., 2008. Community forestry in the Amazon: the unsolved challenge of forests and the poor. Nat. Resour. Perspect. 112 (4 pp.).
Silva, S.S.B. da, 2008. Capital humano e capital social: construir capacidade para o desenvolvimento dos territórios(Dissertação de mestrado) Universidade de Lisboa, Lisboa, Portugal.
Sunderlin, W.D., 2006. Poverty alleviation through community forestry in Cambodia, Laos, and Vietnam: an assessment of the potential. For. Policy Econ. 8 (4), 386–396.
Thoms, C.A., 2008. Community control of resources and the challenge of improving local livelihoods: a critical examination of community forestry in Nepal. Geoforum 39, 1452–1465.
UNDP, 2014. Human Development Report 2014. United Nations Development Programme, New York, USA (Available from: http://www.pnud.org.br/arquivos/RDH2014.pdf).
Vianna, A.L.M., Koury, C.G., Arruda, A.N., Ferreira, D., Barros, H., Nogueira, O., 2013. Diagnóstico florestal do Estado do Amazonas. IDESAM, Manaus, Brasil.