Community Forest Management in the Tropics: A QCA of its Performance

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Abstract

Community Forest Management (CFM) – ranging from community-based regimes to various forms of co-management – has become an influential approach around the world the last couple of decades. Responding to some of the adverse effects of state forestry and commercial timber production, CFM claims to improve local livelihoods and conserve forests. Many international organizations, donors, NGOs and governments therefore advocate CFM. However, a vast body of literature reveals that the overall results are mixed. This paper adds to this literature in two ways. Instead of the neo-institutional approach, so dominant in the CFM literature, it takes a practice-based approach as theoretical lens. This approach prioritizes 'social practices' over 'robust institutions' as the key unit of analysis for understanding outcomes. In addition, the paper applies a Qualitative Comparative Analysis (QCA) methodology to allow for a systematic cross-case comparison and modest generalization, without neglecting case complexity. By analysing a decade of CFM research at the Forest and Nature Conservation Policy (FNP) group of Wageningen University in the Netherlands, this paper compares and synthesizes ten CFM cases from Africa, Asia, and Latin America. It concludes that: 1. CFM indeed shows mixed results; 2. CFM performs rather equally on social and ecological parameters; 3. Community-based organizations are overall strongly engaged in CFM; 4. Such strong engagement, though, is not sufficient for CFM to perform; and 5. Particularly the presence of a 'Community of Practice' makes a positive difference in terms of livelihoods and forest conditions.

Key terms: Community forest management (CFM), practice based approach (PBA), qualitative comparative analysis (QCA), community of practice (CoP)

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1. Introduction

Community Forest Management (CFM) has become an influential approach in the management of Tropical forests around the world the last couple of decades (Agrawal, 2001; Arnold, 2001; Wiersum, 2009). About 16% of these forests fall under such a management regime today (IFRI, 2015). As a response to colonial state forestry and commercial tropical timber production, and building upon traditions of customary regulations for forest commons, this approach puts fulfilment of local livelihoods and forest conservation first. In general, it can be defined as the use, management and conservation of forests by communities. Such forests may, may not, or may be partially owned by communities, and their management is often practiced in various degrees of collaboration with state forest agencies, donor organizations, knowledge institutions and/or companies. On one end of the extreme, forest management is fully community-based and the forests concerned are 100% owned by the community. Whereas on the other extreme communities just participate in some of the state forest management practices in public lands. Because of this variation, several terminologies are used to refer to these practices (community forestry, community-based forest management, community-managed forests, collaborative forest management, participatory forest management, joint forest management and forest co-management). We prefer our term CFM, because the approach we are dealing with in this paper goes *beyond* forestry (it includes forest conservation as well), it is also used in a variety of countries (which is not the case for JFM, for example, because most associated with India) and is most referred to in the literature, compared to other alternative terminologies (based on a Google Scholar search in July 2015).

Over the years, a vast body of scholarly literature on CFM has emerged and one intriguing research question has been the performance of these initiatives. Does CFM deliver its promises on livelihoods delivery and forest conservation? And what factors might explain its successes and failures? Based on many publications, review papers and research programs, the current consensus is that - overall - the results of CFM are mixed (Baynes et al., 2015; Charnley and Poe, 2007). Many programs and projects are rather successful, but as many have simply failed. Moreover, forests have generally benefitted more from CFM than people, and for as far as the latter have benefitted, the relatively well-of gained more from these programs and projects than the poor.

These findings have been mainly produced by qualitative case studies (i.e. Mustalahti and Lund, 2010; Padgee et al, 2006), and by quantitative data analysis in some instances (i.e. Agrawal and Chattre, 2006; IFRI, 2015). Although both methodological approaches have been very helpful in understanding the performance of CFM, this paper takes a 'third way', using both qualitative data and quantitative logics. It is based on a research program of the Forest and Nature Conservation Policy (FNP) group of Wageningen University in the Netherlands. Over the last decade, this group has produced several PhD thesis and research papers on CFM cases from Tropical countries all over the world (Bolivia, Ecuador, Ethiopia, India, Indonesia, Tanzania and Vietnam). However, these findings have so far not been synthesized and generalized. In so doing, this paper applies the Qualitative Comparative Analysis (QCA) methodology to ten case studies in six countries. The aim of QCA is to apply (semi)quantitative techniques to qualitative data, thus enabling systematic cross-case comparison and modest generalization, without neglecting case complexity. While seeking to understand a group of cases in depth, QCA attempts to unravel the relationship between configurations of conditions on the one hand and outcomes over a range of cases on the other, thus assessing the degree to which specific configurations best explain the results. We will

apply a fuzzy-set QCA (fsQCA) in this paper, details of which will be explained in the methodological section.

This paper will also put another theoretical lens central stage than mainstream CFM literature generally does. Whereas most of this literature builds upon neo-institutionalism (Agrawal, 2001; Ostrom, 1999; Quinn et al., 2007; Wollenberg et al., 2007), this paper favours practice theory, following the current research program of the Forest and Nature Conservation Policy group (Arts et al., 2013). Whereas the former theory emphasizes the *presence* of robust institutional arrangements as precondition for CFM, the latter prioritizes to observe what people are actually *doing* and *saying* in relation to their forests and forest regulations. Or in other words: CFM is not primarily about following rules, but about performing certain practices. Three practice-based factors are considered crucial for CFM performance in this paper (to be justified in the theoretical section below): (1) active engagement – in terms of doings and sayings – of community-based organizations (CBOs); (2) the practicability of CFM rules and regulations for forest users; and (3) the emergence of a 'Community of Practice' through which information is shared, trust built and practices learnt (here, the term 'community' is used broadly, involving relevant stakeholders inside and outside the villages and forest lands concerned, including local people, state forest agencies, donors, NGOs, etc., jointly constituting a learning network; hence, not just a 'community *stricto sensu*').

By building upon practice theory, this paper automatically executes a *secondary* analysis of the case studies under investigation. It should be acknowledged that most of these studies (N=7) use neo-institutionalism as a starting point, except for three, which explicitly apply practice-based approaches. Yet all studies consist of in-depth case study research, so in principle all scholars have deep knowledge about 'their' local practices. Therefore, we recently contacted them again to assess the practice-based conditions – as elucidated in the above – in their areas.

The paper is structured as follows. First, we present a short history of CFM, showing its backgrounds of existence and its evolution over time. Second, the theoretical foundation of the paper is justified, particularly the shift from neo-institutionalism (so dominant in the CFM literature) to practice theory (the approach of this paper). Also, some crucial practice-based conditions for CFM to perform are deduced from the theory and further operationalized for the QCA. The latter, third, is elaborated upon in the next section. We explain why we chose this methodological approach and which version we apply (small-N fuzzy-set QCA). In the result section, next, we will present our findings and generalizations. All three practice-based conditions seem relevant, but one stands out: the presence of a Community of Practice. Such presence boosts positive outcomes in our sample (in terms of livelihoods and forest conditions). Finally, the findings and generalizations will be discussed in light of the broader literature.

2. Community Forest Management: a short history

The central idea behind Community Forest Management (CFM) is that local management of forests, either by communities or jointly with forest departments, is more effective than management by central state institutions, because 'sense ownership', either legal or practical, and hence responsibility, is given back to the people. Already in the early 1970s, the idea of community participation, both for better forest management and for improving people's livelihoods, was practices in a few countries, advocated by NGOs and scientists and

intensively discussed in the FAO at global level (Arnold, 2001; FAO, 1978; Umans, 1993). Later, these ideas entered as norms into international law, both as hard and soft law, e.g. in Agenda 21, the Rio Forest Principles, the Convention on Biological Diversity and the Non-Legally Binding Instrument on All Types of Forests (Arts and Babili, 2013). Such ideas and norms have in turn travelled to national levels, where they became embedded in forest law and policy, or strengthened already existing local CFM practices in countries. For example, India, Nepal, Mexico, Bolivia, Kenya and Tanzania have pioneered different forms of CFM from the early 1990s onwards and many countries, from Ethiopia to Albania, followed later (Baynes et al., 2015; Charnley and Poe, 2007).

CFM finds its basis in critiques on 'state forestry' and 'coercive conservation' (Agrawal, 2001; Dressler et al., 2010). Traditionally, the political response to forest loss has been nationalization of forest areas and top-down, state-led forest management and conservation approaches, on the premise that local people are caught in a 'tragedy of the commons', which foster overuse of the resource through growing populations, increasing demands and lack of knowledge to rationally manage and conserve resources (Hardin, 1986; Scott, 1998). However, 'state forestry' did hardly deliver its promises, particularly in the Tropics, where state intervention was often weak, incompetent and/or corrupt (Agrawal, 2001). Moreover, 'coercive conservation', which was based on the classical Western *Yellowstone* model of national parks and protected areas, led to exclusion of people from their lands and violation of their forest rights in many Tropical countries, thus fuelling debates on 'doing conservation otherwise' (Dressler et al., 2010). Consequently, discourses on proper forest management and conservation drastically shifted over time (Umans, 1993; Wiersum, 2009).

Very influential has been the global debate on Community-Based Natural Resource Management (CBNRM). Various scholars argued that the 'tragedy of the commons' thesis is theoretically flawed and they also empirically falsified it by showing many examples of successful 'traditional' management systems of scarce resources from all over the world (Agrawal, 2001; Ostrom, 1990). This scholarly literature had an enormous impact on global debates on natural resource management, such as in the FAO, World Bank, UNEP, UNDP and more recently, the UNFF. Ever more, international policy makers, diplomats and NGOs started to advocate the CBNRM approach and, as said, references to it emerged in all kind of policy documents. At the same time, local communities and indigenous peoples became stronger in propagating their (forest) rights in international fora, thus fuelling the CBNRM debate from below and through their transnational networks (Dupuits, 2014). Subsequently, this 'glocal' discourse slowly but surely entered into national policies and local practices.

The history of CFM exhibits various phases in which different approaches were experimented with. Wiersum (2009) distinguishes the following: (1) a *conservation* phase, in which CFM mainly targeted the conservation and rehabilitation of community forests; (2) an *empowerment* phase, in which the democratic and forest rights of local communities were emphasized; (3) a *collaborative* phase, in which cooperation and joint decision-making of state agencies, donors and local communities were put central stage in order to alleviate poverty and sustainably manage forests; and (4) an *entrepreneurial* phase, in which CFM initiatives have been related to the establishment of local enterprises and to global value chains, including community certification (Wiersum et al., 2013). Of course, these phases did not neatly follow up in time; rather, they have been overlapping and many aspects of these do still exist in parallel today.

In understanding why CFM might work or not, scholars have found the following factors particularly relevant: (1) Biophysical factors: the literature often highlights human factors more than biophysical ones, like micro-climate and landscape morphology, yet these co-determine the effectiveness of CFM as much as social factors do (Agrawal and Chhatre, 2006; Baynes et al., 2015; IFRI, 2015); (2) Demographic factors: smaller- and medium-sized communities, which are moreover relatively well-off, are more likely to create and sustain successful CFM organizations, institutions and practices (Agrawal & Chhatre, 2006; Poteete & Ostrom, 2004); (3) Economic factors: benefit-sharing arrangements that are inclusive and fair generally enable CFM to become a success (Pagdee et. al., 2006; Agrawal and Chhatre, 2006); moreover, linking CFM initiatives to external markets and global value chains is generally improving income as well (Wiersum et al., 2012); (4) Institutional factors: clear rules and norms related to forest access, use, management, exclusion and alienation rights for local communities are paramount to successful outcomes; such rules, if locally designed and accepted, help manage conflict, hold users and officials accountable, prevent violations and lead to better forest conditions and improved livelihoods. (Agrawal & Chhatre, 2006; Baynes et al., 2015; Ostrom, 1990; Pagdee et al., 2006); (5) Socio-political factors: culturally homogenous, socially interdependent and politically stable groups are more likely to perform CFM successfully (IFRI, 2015; Poteete & Ostrom, 2004); (6) External recognition: support of CFM initiatives by governments, donors, universities, etc. makes effective CFM more likely (Baynes et al., 2015; Charnley and Poe, 2007; IFRI, 2015; Mustalahti and Lund, 2010; Padgee et al, 2006).

3. Theoretical framework: the practice-based approach (PBA)

Neo-institutionalism and practice theory

Much academic research and literature on CFM apply neo-institutional theories to analyse, understand and explain success and failure of such initiatives (Agrawal 2001, Ostrom 1999, Quinn *et al*. 2007, Wollenberg et al 2007). Pioneer in this field has been Nobel Prize laureate Elinor Ostrom (1990) who in her book *Governing the Commons* shows that local institutions to manage forest commons – and other common property resources, like water – can be very effective (something which had been denied or ignored by scholars of common property resources so far; see for example Hardin, 1968). Generally, success or effectiveness is assessed according to the extent to which livelihoods and income for communities on the one hand and the forest condition – both in qualitative and quantitative terms – on the other are improved (IFRI, 2015). However, whether local, communal institutions are able to produce such positive outcomes depends on a number of 'design principles', which Ostrom derives from a comparison of best practices (from grazing and forest institutions in the Swiss Alps to the institutions of Zanjera irrigation systems in the Philippines). Initially, eight design principles for 'robust' institutions were identified, relating to demarcating the resource, rules that fit local conditions, participatory decision making, monitoring compliance, sanctioning of non-compliance, conflict resolution, and external recognition and nesting of the local institution. Later, this list has been extended to cover more relevant variables that (potentially) play a role in the effectiveness of local institutions in managing natural resources sustainably (Agrawal, 2001; Ostrom, 2009).

Although this institutional approach and its design principles have been very inspiring, they also raised criticism (see for example Arts et al. 2013, Van der Arend and Behagel, 2011; Cleaver 2002, Li 2007, Mosse 2004, Nuijten 2005, De Koning 2011). Critics particularly

oppose to the idea that human behaviour of whatever kind can best be understood by institutional logics and that policy interventions should therefore focus on changing the rules of the game, or on introducing new ones. Institutional logics are based on the premise that people will follow incentives, norms, and rules when these appear effective and legitimate to them (March and Olson 1989). This premise assumes that people act upon expected positive consequences of incentives, norms, and rules (the rational claim) as well as upon their cultural appropriateness (the social claim). As an alternative, Bourdieu (1977, 1990), points to another logic that is at work on the ground, the 'logic of practice'. This logic is based on the daily flow of activities that have historically and culturally been patterned and routinized in the social fields in which people are involved. The key point here is that people just *act*, generally without conscious consideration of whether an individual act is rationally preferable and/or socially desirable. This is not to say that human behaviour is therefore necessarily non-rational or non-social; rather, it follows logics that have been shaped in specific social fields, that have become (rather) stable over time, and that take the shape of some basic socio-cultural generative principles, upon which individuals might improvise in concrete situations (Bourdieu, 1977, 1990). From that perspective, it is no surprise that externally introduced, so-called robust institutions, including CFM institutions, do not easily match practices on the ground, where another logic might be at work, so people might act upon the new institutional arrangement differently than expected (Cleaver, 2002; De Koning 2011; Mosse 2004).

This paper particularly builds upon the so-called practice-based approach (PBA) of Arts and colleagues (2013, 2014). Inspired by Bourdieu (1977, 1990), Cleaver (2002), Giddens (1984), Latour (2005), Reckwitz (2002), Schatzki (2001) and Shove et al. (2012), they designed a conceptual framework to analyse issues of forest and nature governance, including CFM (see for example Ayana et al., 2015). Arts et al (2013) define a 'practice' as: *An ensemble of doings, sayings and things in a specific field of activity* (be it a restaurant, a laboratory, a forestry department or a community-based organization). The 'doings' refer to social interactions, the practical skills that people employ, and the patterns and routines that they follow; 'sayings' refer to people, their discursive interactions, as well as explicit conventions and knowledge that they utter; and 'things' refer to materials, artefacts and society-nature interactions, like rocks, man-made technologies, and nature more in general. These elements together constitute a 'specific field of activity'. Accordingly, the definition emphasises the importance of the social and material settings in which these doings, sayings and things are situated and through which they are brought into being. Based on this definition, three 'sensitising concepts' are discerned as the core of the approach: (1) situated agency, (2) logic of practice and (3) performativity.

Sensitizing concepts

The *first* sensitising concept is 'situated agency' (Bevir, 2005). It critically examines the – often implicit – assumption of many neo-institutional scholars to consider humans or organizations in forest governance as (rather) autonomous and rational-strategic actors, who aim to serve their self-interest on the one hand and act rationally upon incentives, norms and rules on the other. In contrast, the concept of situated agency assumes that actors' ideas, identities and behaviours are shaped by the social practices in which they are embedded (Giddens, 1984; Hay, 2002; Bevir, 2005; Van der Arend and Behagel, 2011). Yet, they are capable of acting otherwise, particularly when confronted with social disruption, political dilemmas or shock events (Behagel, 2012). In other words, actors and practice are *entwined*, while agency – the capacity to do things otherwise – is located *in* this entwinement (Sandberg and Tsoukas, 2011).

The *second* sensitising concept is 'logic of practice' (Bourdieu, 1977, 1990). This concept critically examines the faith that many scholars of forest governance place in institutions to steer human behaviour (e.g. Gibson et al., 2000). Although the logic of practice acknowledges, like neo-institutionalism, that some sort of logic – or patterning – is always implied in any (social) action – e.g. in terms of knowledge, conventions or routines –such logic does not necessarily follow a pre-designed and general model, theory, rule or plan. As Bourdieu puts it: 'practice has a logic which is not that of the logician' (Bourdieu, 1977: 109). Hence, logic is *internal* to practice and not externally imposed. A logic of practice therefore does not readily conform to (new) institutional rules, spaces or scales, but is instead constituted in social fields that has formed historically in time and space.

The *third* sensitising concept is 'performativity'. It aims to critically examine the classical notion of universal, objective knowledge and scientific representations, that is, the idea that language, concepts and data can be seen as objective mirrors of nature's and society's realities (Brown, 2009). Although not valid for all of them, many neo-institutionalists follow such epistemologies. The concept of performativity originates from the philosophy of language that argues that language is not a neutral vehicle for the articulation of facts or interests but an active intervention into the world that it seeks to represent (Austin, 1962). In other words, language is performative. In a similar vein, knowledge is performative, science is performative and practices are performative, in that they impact not just on how we understand the world, but also on how we act upon it (Law and Urry, 2004). In other words, knowledge and reality co-produce each other, and one cannot be taken to pre-exist or cause the other.

From 'sensitizing concepts' to 'conditions in practice'

The above entails a (meta) theoretical positioning of the PBA vis-a-vis neo-institutionalism. However, to make the approach more useful for our CFM synthesis and QCA, the various concepts need to be further operationalized into actors, factors or conditions relevant for the topic at hand. As for the first concept ('situated agency'), we will focus on social organization, in this case community organizations, since they are considered crucial for CFM to work in much of the relevant literature (Poteete and Ostrom 2004, IFRI, 2015; Charnley and Poe, 2007). However, particularly large-N studies can only assess their existence, size or design, and not so much what they actually *do* in practice, or how they *change* practices. In line with the PBA, we therefore focus on the *active engagement* of community organizations in CFM in our comparison of case studies below. While doing so, we assume that the more such engagement is present, the more it is likely that positive results will be achieved (in terms of livelihoods/income and forest conditions; see above).

The second concept of logic of practice is operationalized as *practicability of rules* in this synthesis. Starting point of our argument is the simple observation that CFM rules have been introduced in all our case studies one way or the other. Subsequently, the question is: do they work? It follows from the PBA that such rules can only become effective once these (rather) easily align with the daily realities of local people (Arts and Babili, 2013; Ayana et al., 2015). Hence, CFM rules should be 'practical' for users, thus allowing them to work with these in their local routines and (partially) adopt them as a consequence. Of course, nothing will change if new rules do not 'add' to established practices, but if these are too distanced, nothing will happen either, given that – according to the PBA – people tend to follow established practices rather than newly introduced incentives, norms and rules.

The third concept of 'performativity' relates to the role of knowledge in the co-production of realities. In CFM too, knowledge is considered crucial for its performance (Agrawal and Chhatre, 2006; Fernandez-Gimenez, 2008). Often, though, scholars refer to external professional and scientific knowledge to be 'injected' in local communities to improve forest management, whereas the PBA highlights the already-present practical competencies of people to deal with forests in their daily practices (although not necessarily in compliance with Western ideals of sustainable forest management). However, in CFM projects, both forms of knowledge are very relevant, to innovate forest management *and* remain coupled to daily practices of people. Therefore, we decided to adopt Wenger's concept of *community of practice* in our synthesis. Emerged from practice theory, it presents an active form of knowing-while-doing and of social learning. Communities of practice (COPs) are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly (Wenger, 2000). For CFM too, building such a COP among all involved – local people, forest officials, donors and experts – is crucial for incrementally adopting new or revised forms of forest management and change established practices, while keeping local people on board. However, a COP is often difficult to realize, particularly so because forest officials generally have problems to work with locals on an equal basis and thus engage in 'true' social learning (Dang 2014). Yet our assumption is that the formation of such a COP is an important precondition for CFM to perform.

Condition	**Explanation**	**Sources**
Community Active Engagement (CAE)	The amount of 'doings' and 'sayings' with regard to CFM by community organizations	Arts et al., 2013; Bevir, 2005; Poteete and Ostrom 2004, IFRI, 2015; Charnley and Poe, 2007
Practicality of Rules (POR)	The extent to which CFM rules are 'practical' for users	Arts et al., 2013; Ayana et al., 2015; Cleaver, 2002 ; De Koning, 2011
Community of Practice (COP)	The emergence of an active form of knowing-while-doing, and of social learning, in a network	Wenger, 2000; Agrawal and Chhatre, 2006; Baynes et al., 2015; Charnley & Poe, 2007; Fernandez-Gimenez, 2008;Mustalahti & Lund, 2009

Table 1: Summary of practice-based conditions for CFM to perform

4. Methodology: Qualitative Comparative Analysis (QCA)

Main characteristics and variants

"Comparison is a key operation in any scientific effort" (Rihoux and Ragin 2009:xvii). Nevertheless, comparison in social science, especially in qualitative research, is challenging, as it deals with complexity in both the core and the context of cases, different components, and blurred boundaries (Rihoux and Ragin 2009). In spite of this, many social scientists opt for multiple case studies as a research strategy (Rihoux 2006). But such research is, to a certain extent, inherently contradictory. On one hand, the research aims to provide the necessary in-depth analysis of a certain object of study. On the other, the researcher wants to generalize from these results (Ragin 1987, Ragin and Becker 1992). To overcome this contradiction, Qualitative Comparative Analysis (QCA) (Ragin 1987) has been designed.

QCA is both a research strategy and a method to compare multiple cases. As a *strategy*, it is particularly useful to overcome the challenges of generalizing findings from multiple, qualitative case study research (particularly small-N and medium-N research). But QCA is also a specific collection of comparative *methods*, including qualitative and quantitative ones (Ragin and Rihoux 2004). QCA is qualitative in the sense that it: 1) considers each case as a complex entity that needs to be comprehended as a whole, and 2) leaves room for complexity in its conception of causality by including a combination of conditions with each having a different impact on the outcome (Ragin 1987, Rihoux 2006). QCA is also quantitative as it: 1) allows for the comparison of many cases, which is a rarity in case-oriented research, and 2) includes an analytical approach that allows for replication (Rihoux 2006). QCA is based on the logic of Boolean algebra. This is a branch of algebra that works with 'truth values' as variables. Truth values are usually denoted as 1 (true) or 0 (false). By using Boolean algebra, QCA is able to treat cases as configurations of numerous conditions and outcomes scoring one's and zero's.

QCA differs from mainstream statistical approaches in two ways. Unlike most statistical approaches, QCA does not require large-N sample sizes to demonstrate causal relations, since the basis of explanation is set theory, not correlational theory (Ragin 2000). Secondly, set theory re-conceptualizes 'independent variables' as conditions and configurations of conditions and 'dependent variables' as outcomes, which are – or which are not – members of the same set. In set theory, variables are not individually scored and correlated, like in mainstream statistics, but cases as a whole are assessed, whether they are members of the same set of conditions, configurations and outcomes, or not.

In QCA, 'sets' and 'memberships' are cornerstones for developing causal claims and for dealing with complex causality (Schneider and Wagemann 2006, Wagemann and Schneider 2010). Often, the terminology of 'multiple conjunctural causality' is used (Rihoux, 2006). This refers to the following: (1) more often than not, *combinations* of conditions, instead of individual factors, produce outcomes; (2) *similar* outcomes may be produced by *different* sets of conditions; and (3) *similar* sets of conditions may produce *different* outcomes, depending on the context. Hence, several causal pathways for producing an outcome should be considered, not just one, like a single causal model that fits the data best, as in mainstream statistics. In appointing causal pathways, the statements of necessity and sufficiency are important, as they differentiate among set relations. 'Whenever a causal condition is *necessary*, but not sufficient for an outcome, instances of the outcome will form a subset of instances of the causal condition' (Ragin 2000: 213). In other words, for outcome X to occur, condition A needs to be present, but A could also produce another outcome than X (Ragin 2008, Sehring et al 2013). For *sufficient* conditions, the opposite is valid, hence, instances of a cause are a subset of the outcome (Schneider and Wagemann 2006, Sehring et al 2013). Thus condition B will always lead to outcome X, but there might be other conditions or configurations leading to outcome X as well (Ragin 2008, Sehring et al 2013).

Over time, several variants of the QCA have developed (Rihoux 2006, De Meur et al 2009, Sehring et al 2013). Today, four types exist. These are: crisp set QCA (csQCA), fuzzy set QCA (fsQCA), multi-value QCA (mvQCA) and two-step QCA (Sehring et al 2013). csQCA, the original version, as developed by Ragin (1987), uses a *binary approach* that assesses the conditions and outcomes in terms of absent (0) or present (1). Following the critique that determining a strict boundary between present and absent is a rather arbitrary act, fsQCA allows for *partial membership* to address uncertainties in boundary work (Basurto 2013, Ragin 2000). mvQCA takes it even one step further by allowing *any number of values* as

possible to assess membership (Sehting et al 2013). Two-step fsQCA is a more recent development that differentiates between *remote* conditions (more stable conditions that are distant to the outcome) and *proximate* conditions (more flexible conditions that are close to the outcome) (Scheider en Wagemann 2006).

The analysis of QCA can be done by software programs or by hand. Regardless of both methods, it is important to realise that QCA is not an 'automatic' technique that simply renders a certain outcome. The researcher must know the cases very well in order to produce a high-quality 'truth table', which forms the basis of the QCA. Furthermore, it is up to the researcher to select and interpret the solutions offered, both by hand and software. The Boolean algebra permits minimization of configurations, also known as the most parsimonious solution. If two configurations leading to the same outcome show one different condition, this condition is regarded as irrelevant. This requires that the researcher constantly checks the findings from the QCA analysis with the empirics of the case studies and the theoretical foundations of the research (Rihoux 2006).

Fuzzy-set QCA

This article analyses the configurational nature of causal relationships between the performance of community forest management, the engagement of community organizations, the practicality of rules and the presence of a community of practice. As these conditions are hard to explain by a binary approach of zero's and one's, fsQCA was chosen to investigate these relationships, as it allows for some differentiation, more precise description of the cases, and combinations of the many linkages. The following steps are taken in fsQCA. First, the researcher decides on the amount of values used to assess the conditions and their respective thresholds. These values need to range between 0 and 1, with 0 representing a non-membership of the respective condition and 1 representing a full membership. This creates a data matrix in which conditions and outcomes are assessed in terms of the values chosen. Second, these values are analysed by means of a software program[2] or done by hand[3]. Overall, the decisions on membership, the analysis of relationships, and the final conclusions are based on theoretical knowledge, expert judgment and empirical evidence. Important in fsQCA is that the chosen conditions and their respective thresholds can be linked to the empirical data and that the data lend themselves to be categorized according to the chosen conditions. It is vital that the researcher continuously re-assesses and also re-questions these so-called boundaries (Sehring et al 2013, Basurto 2013, Rihoux 2006). The analysis of the data provides the researcher with the possibility to compare and contrast all of the possible configurations of outcomes and conditions. fsQCA allows to identify the many potential ways a certain outcome can be reached (Ragin, 1987).

Case selection

For this article, we used data of ten different case studies on CFM, all located in tropical countries. This selection of cases was based on CFM research performed at the Forest and Nature Conservation Policy Group (FNP), Wageningen University, the Netherlands, on a 10 year time-scale – from 2005 until 2015. Some of these case studies have been published as full PhD theses, others as individual chapters within such theses, or within books, and again others as journal papers. We assessed the suitability of each case study for this synthesis in that they indeed addressed the achievement of CFM objectives in-depth, namely: 1) the

[2] There are a few software programs for QCA, such as fs/QCA, Kirq, Tosmana and more.
[3] See Sehring et al 2013 for a detailed description of a fsQCA analysis

improvement of local livelihoods, and 2) the improvement of forest conditions. Table 2 gives an overview of the selected case studies and shows their similarity (different forms of CFM) as well as their variance (from one village being the study object to several in three regions of a country).

Scholars	**Country**	**Case studies**
Ayana et al, 2015 (Journal paper)	Ethiopia, Gimbo	The performance of CFM in one village
Arts & Babili, 2013 (Book chapter)	Tanzania, Babati	The performance of CFM in four villages
Benneker, 2008 (Thesis)	Bolivia, C-Lowland	The performance of Community Forest Enterprises (CFEs)
Bose, 2012 (Thesis)	India, Rajasthan	The micro-politics of CFM in five villages
Dang, 2014 (Thesis)	Vietnam, three regions	The governance capacity of Forest Land Allocation (FLA) policy
De Koning, 2011 (Thesis chapter)	Bolivia	CFM practices in one village
Katani, 2010 (Thesis)	Tanzania, Ukerewe	Community management of micro-spring forests in four villages
Nandigama, 2013 (Book chapter)	India, Andhra Pr.	CFM practices in one village
Woldeamman. 2011 (Thesis chapter)	Ethiopia, Borana	Community management of gum/resin trees
Yasmi, 2009 (journal paper)	Indonesia East-Kalimantan	Decentralized forest management and logging practices

Table 2: Overview of cases

Generally, the selection of cases in QCA should allow for comparison and generalization. As such, the variety in cases should not be too high: cases should share a sufficient amount of features to allow for comparison and generalization (Rihoux 2006). For this purpose, we selected from FNP's research program those case studies that entailed information on the three key conditions for CFM. In this way we were able to summarise our data and to test our theoretical assumptions on good performance of CFM (Schneider and Wagemann 2010). Although ten case studies are generally considered a low amount for a QCA, it does not make the analysis impossible, particularly so since we are working with a limited number of conditions (this is also referred to as *small-N* research; see for example Ryan and Smith 2012, Basurto 2013). Moreover, the use of fuzzy-sets in small-N research is also critiqued, as fsQCA includes more variation among the cases than csQCA, and therefore requires more cases to establish significant findings (Sehring et al 2013, Rihoux 2007, Scheider and Wagemann 2007). However, after critically re-assessing membership boundaries, thresholds and conditions in relation to the ten cases, we still decided to choose for a fsQCA. For example, the presence of a community organization in a village would score 1 in a crisp set. Such would however not show the variation that exists in community organizations' *engagement*. This variation is important for this paper, as it directly relates to the theoretical assumptions of the practice based approach.

In a next step, we chose for a *four*-value fuzzy-set (0 = no membership of the case regarding the condition concerned; 0.33 = membership more absent than present; 0.67 = membership more present than absent; 1= full membership). A four-value set provides us with some variation, as required by our theoretical assumptions, while at the same time preventing too much.[4] As such, we tried to overcome the challenge of conducting a fsQCA analysis for a small-N research. In addition, a four-value fuzzy set forces the researcher to choose between (more) absent or (more) present of a condition in a specific case and does not allow him or her to 'hide' behind a 50-50 category, which would be the case if either a three-value or five-value fuzzy-set is chosen.

Dataset and calibration

To create the full dataset, the following steps were taken. Firstly, we re-read the ten case studies at length and wrote summarizing reports of each of them, while explicitly structuring the empirical data according to the three conditions of CFM (CAE, POR, COP). These summaries mostly served as sources for background information to be consulted during the data analysis phase of the QCA. We then, secondly, scored the outcomes and conditions for each of the cases, leading to the first truth table and to temporary results. Thirdly, this step was followed by individually contacting the researchers of the ten CFM cases, to validate with them those first results and to present to them a survey through which they could provide additional input. This survey included open-ended and qualitative as well as closed and quantitative questions about the performance and practice-based conditions of CFM in the respective communities and villages. Once the surveys were all completed, a second table was constructed, now with the validated data. In the meantime, ambiguities and questions which remained were dealt with via email with the individual researchers. Finally, the scores in the table were calibrated individually by both authors of this paper and jointly at a later stage. This resulted in the final QCA tables on outcomes and conditions that were used to create the truth table in the final stage (see below). However, we need to acknowledge here, though, that direct contact with two of the ten researchers failed, but that one of the authors knows their field situations well. He therefore filled in the two respective questionnaires.

5. Results

Outcomes, conditions, examples

Table 2 summarizes the performance of the different CFM initiatives on improving livelihoods (LLH), enhancing forest conditions (FC) and in terms of one overall performance indicator (PERF), using the calibrated, four-value, fuzzy-set scale. Results are definitely *mixed*. The best performers are in the top of the table, the least in the bottom. Four studies show relatively high performance, five some and one none. In addition, the scores on livelihoods and forest conditions also vary with the cases. In six case studies, LLH and FC score equally (win-win and lose-lose) and in four as trade-offs (win-lose and lose-win). When the ten cases are taken together, CFM performs rather similarly on livelihoods and forest conditions (which goes against the general literature in which it is claimed that – overall – CFM benefits forests more than people; see the discussion section below).

[4] We also experimented with a *five*-value fuzzy-set, but this scale indeed produced too much variety in our small sample.

Cases	LLH	FC	PERF
Benneker (BOL)	0.67	0.67	0.67
Dang (VIETN)	1	0.33	0.67
De Koning (BOL)	0.67	0.67	0.67
Nandigama (INDIA)	0.67	0.67	0.67
Ayana (ETH)	0.33	0.33	0.33
Arts & Babili (TANZ)	0	0.67	0.33
Bose (INDIA)	0	0.33	0.33
Katani (TANZ)	0.33	0.33	0.33
Yasmi (INDON)	0.67	0	0.33
Woldeammanuel (ETH)	0	0	0

Table 3: Performance of cases

To validate Table 3, we now present an example of a case with high, some and no performance, respectively. To start with the first, the study of De Koning (2011) covers CFM in a Bolivian community in the Amazon region. It looked at how a community collectively – and rather successfully – managed their forest resources. As the communal forest area was already substantial in size and rich in biodiversity, the new CFM regime did not lead to an increase in forest size, or an improvement of forest conditions. But it particularly led to avoided deforestation, as it offered the community a way to make much more income from the forests (in particular the collection of Brazil nut and the production of timber). Moreover, land titles of the communal forest areas were formalized through CFM, providing the community the necessary stability in access to the forest, income and even to medical services. A communal organization was also established that organized the sustainable management of the forests and guaranteed income distribution. Finally, the direct involvement of a local NGO guaranteed facilitation in terms of knowledge and money. This combination of factors made CFM successful in this particular community and, as a result, the community played an exemplary role in the whole region.

An example of a case study with 'some' performance is the one of Arts and Babili (2013). In this study, the forest area under CFM of four North-Tanzanian neighbouring villages was assessed through satellite images, focus groups and field observations, which indicated that the forest area expanded over time in the 2000s (with about 0,3% each year, due to replanting and natural regeneration). Also, the forest conditions, particularly tree density and species diversity, improved over time. Yet, according to a household survey and respondents' individual perceptions, neither livelihoods nor income did gain from CFM over the years. While for example the availability of some NTFPs increased, the limitations on cattle grazing in the forests that paralleled CFM reduced other livelihood options.

A last example from Table 3, now showing 'no' performance, is the one of Woldeammanuel (2011). This study analysed the use and management of gum and resin trees in the Borana region of Southern Ethiopia. Although community-based organizations – both the 'traditional' *Gada* system and some 'modern' cooperatives – did address the forests concerned, this did not lead to an improvement of forest conditions and livelihoods. On the contrary, whereas the *Gada* rules aim at *clearing* these bushes, for maintaining open pastoralist rangelands, the few cooperatives are only interested in better gum and resin prices for their own members. All this implies that most communities just tap the products, without any active management of the gum/resin trees, while selling the products to individual traders for very low prices, without a cooperative interfering. Hence, some form of CFM is definitely present in the region, but most of it works *against* the current gum/resin forest/livelihood system so far.

Case	CAE	POR	COP	PERF
Benneker (BOL)	0.67	0.33	0.67	0.67
Dang (VIETN)	0.33	0.33	0.67	0.67
De Koning (BOL)	1	0.67	0.67	0.67
Nandigama (INDIA)	1	0.33	0.67	0.67
Ayana (ETH)	0.67	0.33	0.33	0.33
Arts & Babili (TANZ)	0.67	0.33	0.67	0.33
Bose (INDIA)	0.67	0.33	0.33	0.33
Katani (TANZ)	0.67	0.33	0.67	0.33
Yasmi (INDON)	0.67	0.33	0	0.33
Woldeammanuel (ETH)	0.33	0	0	0

Table 4: Raw dataset of conditions and outcomes

Table 4 presents the raw dataset of conditions (CAE, POR, COP) and outcomes (PERF) for all ten case studies. A first observation at face value shows that, overall, CAE scores relatively high, POR relatively low and COP somewhere in the middle. Therefore, taking the mixed performance of the cases as a starting point (PERF), the active engagement of community-based organizations seems an *enabling* condition for CFM to work (CAE, high scores), whereas a lack of practical of rules seems a *constraining* one (POR, low scores). Of course, these implicit causal statements should be verified in the QCA below, but before doing so, we first articulate them by recalling our three examples from the above. In the Bolivian case study of De Koning, the CAE scores very high: a well-functioning and active community organization managed the collective forest areas effectively and without many problems. POR also scored high, as national legislation provided the community with formalized land titles, which enhanced one of its most important forest practices: Brazil nut collection. In other words, the CFM legislation matched the practical needs of the community very well. However, POR did not receive the highest score as the legislation was complex, the process for applying for land titles was cumbersome and free access to timber became restricted through the CFM regime. Finally, COP scored high in this particular community because of the presence of a local NGO. This NGO facilitated in the implementation of CFM, raised awareness and actually created a 'community of practice' for forest management with high levels of trust, exchange of knowledge and mutual relationships.

The case study of Arts and Babili, next, shows relatively high scores on CAE and COP, and a relatively low one on POR. Indeed, all four Tanzanian villages under investigation had strong village forest committees and leaders, who were also supported by an extensive external network of professionals (NGOs, donors, forest officials and university scientists). Although mutual trust and learning was quite limited initially, particularly at the beginning of the CFM initiative in the 1990s, these phenomena dramatically improved over time. Yet the villagers mainly complained about some of the CFM rules, particularly the ban on grazing the forests. These rules do not match their practices well.

Finally, the case of Woldeammanuel shows low scores on all three conditions. Whereas at least some engagement of the *Gada* institutions and cooperatives existed with regard to the gum/resin forest/livelihood system, the rules mainly worked against people's practices, or did

not facilitate them. Moreover, a shared community of practice to reverse this situation has so far not been emerging either.

Truth tables and results

The truth table is a core element of the QCA (Ragin 1987). A truth table contains the values of all possible configurations and results per case. Truth tables can be constructed by hand (see for example Sehring et al 2013), or with the help of software (see for example Pahl-Wostl and Kneiper 2014). For this synthesis, we used both approaches for reasons of getting acquainted with QCA techniques, for method triangulation and thus for validation. The manual analysis provides us with more insights in the QCA methods as such, and in the relationships between the configuration and results; the software analysis provides us with the calculation of coverage and consistency of the results ('coverage' refers to the extent to which the configurations are able to explain the outcome and 'consistency' to the extent to which the causal pathways are found among the cases in the analysis).

Cases	**Configurations**								**PERF**
	CAE* POR* COP	CAE* POR* cop	CAE* por* cop	CAE* por* COP	cae* por* COP	cae* POR* COP	cae* POR* cop	cae* por* cop	
Ayana	0.33	0.33	0.**67**	0.33	0.33	0.33	0.33	0.33	**0.33**
Babili	0.33	0.33	0.33	0.**67**	0.33	0.33	0.33	0.33	**0.33**
Benne	0.33	0.33	0.33	0.**67**	0.33	0.33	0.33	0.33	**0.67**
Bose	0.33	0.33	0.**67**	0.33	0.33	0.33	0.33	0.33	**0.33**
Dang	0.33	0.33	0.33	0.33	0.**67**	0.33	0.33	0.33	**0.67**
De Kon	0.**67**	0.33	0.33	0.33	0	0	0	0	**0.67**
Katani	0.33	0.33	0.33	0.**67**	0.33	0.33	0.33	0.33	**0.33**
Nandig	0.33	0.33	0.33	0.**67**	0	0	0	0	**0.67**
Wolde	0	0	0.33	0	0	0	0	0.**67**	**0**
Yasmi	0	0.33	0.**67**	0	0	0	0.33	0.33	**0.33**

'No fit' configurations (all scores in the column below 0.5)

'Not relevant' configurations (scores in the column are both higher <u>and</u> lower than those of the outcome)

'Sufficient' configurations (scores in the column are similar to or lower than those of the outcome)

Table 5: Truth table CFM (manual analysis)

For the manual analysis, we followed the steps as suggested by Sehring et al 2013. This provided us with Table 5 (now the case studies are ordered alphabetically). Three conditions, first of all, imply eight possible configurations (2^3). We then assessed the extent to which the three conditions of each case are represented in the respective configurations. Present conditions (CAPITALS) score the value as set in Table 4, absent conditions (lowercase) score the reverse (1-value). In a next step, we scored each case with *one* value for each configuration, taking the lowest value of the three conditions in the configuration concerned (like 'the slowest ship determining the speed of the convoy' or like 'the weakest link in the chain'). By assessing all different configurations in Table 5 in this way, we thus concluded that 3 of the 8 configurations have no *best fit* with any of the cases. *Best fit* configurations need to have at least one score higher than 0,5 in the column, otherwise no one case is 'more present than absent' in the respective configuration. The 'no fit' configurations were

subsequently left out of the second part of the analysis (see the red columns in Table 5). The remaining 'best fit' configurations were, in a next step, tested for being necessary, sufficient or not relevant (in case of neither necessary nor sufficient). For a necessary configuration, all scores in its column must be equal or higher than the ones of the outcome. As a result, table 5 lacks a necessary configuration for CFM performance (see the brown columns in Table 5). For a sufficient configuration to occur, all its scores must be equal to or lower than the ones of the outcome. Consequently, two configurations in Table 5 are sufficient (see the green columns in Table 5):

CAE*POR*COP
cae*por*COP

From this, we can conclude that the performance of CFM benefits from the simultaneous presence of CAE, POR and COP, or that it is enabled by a presence of COP and an absence of CAE and POR. Using Boolean minimization, one might subsequently conclude that the presence of COP is *the* condition that makes the difference for CFM to perform in our sample of cases. However, although a presence of a 'community of practice' may thus be sufficient, other (unknown) configurations may produce similar results.

In addition to the manual analysis, we also used software fsQCA 2.0 (Ragin et al 2006) to create a second truth table. This is done in two steps. As a first step, we created the dataset as *csv. format*, based on Table 4, imported it in the software program and created the provisional fuzzy-set truth table (see Table 6 below). To run the analysis, we first needed to edit the truth table by removing empty rows and by coding the column 'Outcome' (OUT). The coding of OUT is based on the consistency cut-off, the consistency level at which the configurations are still accepted to be included in the analysis by the researcher. We set the cut-off at 0.83 to ensure a relatively high level of consistency, but at the same time include the most cases possible. Since there generally exists a trade-off between the consistency level set by the analyst and the number of cases included in the analysis – the higher the consistency level, the lesser the number of cases involved, because cases *always* differ, even though they might express similar configurations – one should try to balance both the best possible. Configurations with a consistency of 0.83 or higher score an one (1) under OUT in Table 5, and those below 0.83 a zero (0). The latter are subsequently deleted from the analysis, in our case N=4. Table 5 furthermore shows the three conditions (CAE, POR and COP). The rows beneath these represent the possible configurations (with 1 indicating a presence of the respective conditions and 0 an absence). Finally, the final column represents the consistency[5] for each configuration.

CAE	**POR**	**COP**	**# cases**	**OUT (>0.83)**	**Consistency**
1	0	1	4	1	0.830000
1	0	0	3	0	0.687500
1	1	1	1	1	1.000000
0	0	1	1	1	1.000000
0	0	0	1	0	0.775168

Table 6: Truth table CFM (fsQCA 2.0 software analysis)

[5] The degree to which specific membership of the configuration is a consistent subset of the membership of the outcome (Ragin 2008).

As a second step, we ran the (standard) analysis with the assumption that all conditions should contribute to the outcome, irrespective whether they are present or absent. This assumption is called *intermediate assumption* in QCA. We chose for an intermediate assumption as we do not hypothesize that certain conditions must be present OR absent to affect CFM performance. Both are possible, in our view. This analysis rendered the results, as presented in Table 7.

Solution	**Coverage**[6]	**Consistency**
COP*por	0.845266	0.843318
COP*CAE	0.845266	0.843318
Solution coverage (both combined)	0.923788	
Solution consistency (both combined)	0.854701	

Table 7: Results of the fsQCA 2.0 software analysis[7]

From this analysis, the following two solutions are proposed:

COP*por
COP*CAE[8]

Consequently, CFM performs best, according to the software analysis, when COP is present and POR absent, or when COP and CAE are both present. This result partially underpins our earlier findings, namely that: (1) COP is crucial in explaining CFM performance (similarly as it emerged from the manual analysis), and (2) CAE seems an enabling factor too (as the first interpretation of the raw data and the manual analysis pointed at). However, the relevance of POR (as could be deduced both from the raw data and manual analysis), is not confirmed by the software analysis. *Therefore, we conclude that for CFM to produce positive results, both for people and forests, particularly the existence of a 'community of practice' is essential.* Hence, crucial for CFM is a network of local inhabitants and professionals, like NGOs, forest officers or scientists, who share trust, knowledge and learning experiences. *Besides, an engaged community organization seems to enable positive results too*, whereas the practicality of rules – as theoretically assumed by the PBA – does not play a decisive role in our sample. Of course, other factors that have fallen outside the scope of this paper may still do so in the performance of CFM (see section 2 above and the discussion section below).

[6] In table 6, only the so-called *raw* coverage is shown. It measures the proportion of memberships in the outcome explained by each term of the solution. Besides, *unique* coverage exists, measuring the proportion of memberships in the outcome explained solely by each individual solution term (Ragin 2008).

[7] All consistency and coverage indicators in this table score sufficiently high enough for drawing conclusions (Ragin 2008).

[8] We are still looking for clarifications why our manual and software analyses did not render exactly similar results. As a first response, we consulted QCA experts and understood from them that software analyses use more complicated algorithms to retrieve causal paths and are thus less error-prone than manual analyses (although the latter give more insights in what you are actually doing). Secondly, on advice, we conducted additional software analyses, since the various QCA programs also use different algorithms themselves. Just now, at the time of finishing the paper, we are running another model. The good news is that - again - COP is identified as the main 'causal path', the bad news is that we now lack time to integrate this new analysis in the paper, given the FLARE submission deadline of Nov 15, 2015. To be added at a later stage, when the paper will be revised for a journal publication.

6. Discussion and conclusion

Many review papers on CFM, or related initiatives, show that field results are generally mixed: both successes and failures in improving local livelihoods and forest conditions are to be observed in this domain (Agrawal, 2006; Baynes et al., 2015; Charnley and Poe, 2007; IFRI, 2015; Mustalahti and Lund, 2010; Padgee et al., 2006). Our findings support this conclusion: half of the studies show medium to high performances, the other half some or none. However, the general notion that CFM appears to have more ecological benefits than socio-economic ones is not confirmed by our study. Besides this win-lose trade-off, the reversal is found in our sample, as well as win-win and lose-lose combinations. Overall, though, both objectives score rather equally. Of course, we are working with a rather limited sample of case studies, so we should be very careful in making generalizing statements. We will come back to this issue of generalization at the end of this discussion section. But first, we will discuss explanatory conditions and configurations for CFM performance in light of our findings and the literature.

Local community-based organizations (CBOs) have been identified in the literature as instrumental in the successful management of common pool resources (see for example Poteete and Ostrom 2004, IFRI, 2015; Charnley and Poe, 2007). However, different roles have been assigned to these community organizations, varying from a more passive gatekeeper role (Mustalahti and Lund, 2010) to more active roles for rule making and the monitoring of rule compliance, for example (IFRI, 2015; Charnley and Poe, 2007; Padgee et al., 2006; Poteete and Ostrom, 2004). Regarding the latter, current debates and research on community biodiversity monitoring, e.g. under REDD+, also allocates an important, active role to communities (see for example Pratihast et al 2013). Consequently, the establishment of community organisations has become a common practice in participatory forest management and conservation (including all ten case studies in this paper). Our findings indeed underline the important role allocated to community-based organizations in CFM, and their active engagement in particular. However, these findings also show that CAE – 'community active engagement', as we called it – is not sufficient for CFM to perform well. At best, we identified it as a potential enabling condition, given our raw data and the manual QCA.

As already referred to in the theoretical section, much academic research and literature emphasize the relevance of robust institutions, i.e. well-embedded local rules of the game, to enhance local livelihoods and forest conditions (Agrawal 2001, Agrawal & Chatre 2006, Baynes et al 2015, Ostrom 1999, Quinn et al. 2007, Poteete & Ostrom 2004, Wollenberg et al 2007). Theoretically and empirically, while being inspired by critical institutionalism (Cleaver, 2002; De Koning, 2015), practice theory (Schatzki, 2001; Shove et al., 2012) and practice based field research (Ayana et al., 2015; De Koning 2011), we challenged this position by emphasizing the relevance of the *practicability* of local institutions, instead of their robustness, and developed the condition of POR ('practicability of rules') for the QCA. However, although our raw data seems to point at this condition being important for CFM to perform, since its overall low scores seems to mimic a constraining factor, such was not confirmed by our analysis (against our expectations, to be honest). At the same time, neo-institutionalists also recognize that the actual performance and effectiveness of institutions in common property resources regimes remain complex and uncertain (Ostrom and van Laerhoven 2007). Hence, for the time being, practicability seems not a crucial explanatory factor for CFM performance, but more research is needed to underpin and carefully generalize this – or the opposite – position.

Much more clearly than POR, COP ('community of practice') does emerge from our QCA analysis as a crucial precondition for CFM performance. Although the concept of COP is hardly addressed in the CFM literature, its constitutive elements (networks, knowledge, learning, trust) are regularly covered. For example, several scholars address the relevance of knowledge, both professional and local ones, for CFM (Agrawal and Chhatre, 2006; Fernandez-Gimenez, 2008), others conceive of social learning as a necessary part of CFM (Berkes, 2009), again others cover the importance of cooperative networks, stretching beyond the local level, particularly forest agencies, NGOs, donors, universities and companies (Baynes et al., 2015; Charnley & Poe, 2007; Mustalahti & Lund, 2009; Wiersum et al., 2012) and a last group emphasizes the relevance of mutual trust among those involved (Baynes et al., 2015; Berkes, 2009). Particularly the latter is difficult to establish, root and maintain, given the different interests, positions, cultures and discourses of all those agencies (Mustalahti & Lund, 2009). Governments easily pay lip-services to CFM, without doing much, financial support by NGOs is often only temporarily and forest professionals generally find it hard to work with locals on an equal basis (Dang, 2014). Such events easily undermine trust. Our findings thus find some confirmation in the literature, although research on COP is scarce in this field.

Of course, we should put our findings into perspective. First, we only addressed a small fraction of all factors that possibly contribute to CFM performance. Section 2 in the above referred to biophysical, demographic, economic, institutional, socio-political and external factors derived from an extensive body of literature. We particularly addressed conditions related to the last three – institutional, socio-political, external – and added to the literature, we believe, the relevance of 'communities of practice' for CFM, including active engagement of local organizations. Yet so many other factors than those two are crucial for understanding CFM. Secondly, our sample of case studies is indeed limited (N=10). Moreover, the QCA solutions are even based on *less* (N=6). This should make us very modest in generalizing our findings. On the other hand, like in N=1 or small-N case study research, one is always allowed to generalize in a *theoretical* sense and thus formulate a research agenda (Yin, 1994). So we conclude that particularly COP is crucial for CFM performance, whereas CAE plays a an important role as well, although more research is needed to expand our knowledge on these issues. Even POR cannot be excluded from such a research agenda yet, since the sample is small, variance in POR scores is absent among the studies in this paper and all POR scores are low, potentially referring to a constraining factor.[9]

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[9] QCA is – as any methodology – contested. It deviates from mainstream algebra and statistics and from both interpretive and quantitative research methods and techniques. From all these corners, QCA can be challenged and critiqued. Since we have been mainly busy in engaging with QCA the last couple of months, we have so far neglected the critical literature. Currently, we are filling this gap, but it is too early for us to write a complete and concise paragraph on QCA criticisms in the discussion section. This will of course be added at a later stage, when developing this conference paper into a journal publication.

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