Whose forest? A two-level collective action perspective on struggles to reach polycentric governance

Sara Lorenzini [a,*], Nadia von Jacobi [b]

[a] *Department of Italian and Supranational Public Law, University of Milan, Via Festa del Perdono 7, 20122 Milan, Italy*
[b] *Department of Economics and Management, University of Trento (Italy), Via Inama 5, 38122 Trento, Italy*

ARTICLE INFO

ABSTRACT

Natural resources management often entails accommodating competing cross-scale interests. Polycentricity literature offers a potential solution: value heterogeneity can reflect in an institutional architecture that allows the coexistence of multiple management priorities, appeasing conflicts. However, this literature has largely endorsed a static perspective focusing less on the function conflicts can play ex ante for reaching such a more participated governance. This paper addresses this gap by focusing on the micro-processes of conflict that precede the potential instalment of polycentric governance. We present a two-level collective action framework that emphasizes key moments of such processes and use it to read forest-related conflicts. In a comparative analysis of four illustrative case studies from Finland, Canada, Brazil and Indonesia, we focus on common dynamics of conflict reification and its eventual transformation into an agreement on common procedural rules, which can sustain polycentric governance. We work iteratively to enrich our two-level collective action framework with insights from other corollary theories, notably the Social Movements, Bargaining, and Deliberative theories. We find that conflict serves the purpose of marginalized parties to reshuffle power imbalances and force stronger parties to the negotiation table, corroborating other literature. Yet, conflict must be followed by negotiations and integrative bargaining on procedural rules for institutional innovation, that can lead to the accommodation of value heterogeneity. Our study can help practitioners in contextualizing current conflict scenarios within a longer-term perspective, and evaluating ongoing conflict episodes and the costs associated to certain strategies versus the prospect of longer-term consequences of these struggles.

1. Introduction

Global cross-scale sustainability issues like deforestation, water and air pollution, soil erosion and land disputes are more and more tangible and urgent, especially as uncertainty associated with the climate crisis grows. Inability to address these issues poses a double threat: natural resources degradation and increasing conflict potential due to competing demands and priorities over such resources (Andersson and Ostrom, 2008; Ebbin, 2004; Heikkila, 2019). In turn, conflicts are likely to impede the identification of sustainable solutions, because different parties advance opposing views regarding resource access, use and distribution (Colvin et al., 2015; Matiru, 2000; Xu, 2021; Yasmi, 2003; White et al., 2019). Moreover, such disputes frequently result in the exclusion of certain groups from access to and use of the resource, further increasing conflict potential.

In this context, forests have been recognized as "increasingly contested economic, cultural and political spaces" (Oldekop et al., 2020:1406). Forest governance depends largely on the outcomes of bargaining between different interested actors who claim their stake over the forest (Schlüter and von Detten, 2011), as well as on large scale political and economic processes that interact with local dynamics (Oldekop et al., 2020), often driving conflicts (Eckerberg and Sandström, 2013). Therefore, forest science has been encouraged to look into social science in addition to natural science (Hicks et al., 2016), to understand more about the interaction between global and local processes (Oldekop et al., 2020). Social science research has indeed addressed similar complexities over the last 60 years, advancing proposals for more promising institutional designs, specifically participatory and multi-level institutional arrangements that can be both feasible and more suitable than top-down and single actor solutions (Aligica, 2014; Baldwin, 2020; Frischmann, 2012; Ostrom, 2009; Ostrom, 2010). The Ostroms and subsequent authors' findings have demonstrated that,

Table 1
Comparative analysis of conflict reification.

		FINLAND				CANADA				BRAZIL (plantation)				INDONESIA (plantation)			
		GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM
	Forest use(r)s [2]	Municipality; Ministries of Justice/Agriculture/Forestry and the Environment	Metsähallitus: public enterprise	Greenpeace, Nature League and others	Sami reindeer herders	Provincial Government	Several BC timber companies	Environmental movements and NGOs (e.g Forest Ethics, Greenpeace, and Sierra Club BC)	First Nations	State of Espirito Santo, Federal Public Prosecutor's Office, National Foundation for Indigenous People (FUNAI)	Aracruz Celulose	Movimento dos Pequenos Agricultores, Movimento Sem Terra, Alliance against the Green Desert	Tupinikim and Guarani Indigenous communities	Head of Agency for Inventory and Forest, Jambi Province Government	PT Asiatic Persada	Various NGOs (e.g. Forest Peoples Programme, Sawit Watch, HuMa)	Suku Anak Dalam Bathin Sembilan (SAD) communities
institutional facts underpinning claims & management priorities	specific status and function (Y) for the forest (X)	diversified but mainly commercial forestry: export revenues and jobs	profitability of timber harvesting	global value for wildlife and biodiversity	traditional livelihood, mostly reindeer herding	diversified, but mainly employment and regional economy	profitability of timber harvesting	global value for wildlife and biodiversity	traditional livelihoods including hunting and selective logging	economic development	commercial eucalyptus monoculture plantations	land redistribution in favour of small producers	Tupinikim and Guarani traditional livelihoods	economic development	Profitability of commercial palm oil monoculture plantations	environmental claims, human rights claims	traditional livelihood and territory
	context (C)	state-owned land, national economy	public enterprise statute and mission	sustainability (mostly environmental)	usufructuary rights, customary land	legal ownership of the land	concession	sustainability (mostly environmental)	self-determination	state power	concession	equity: land redistribution (political narrative)	historical documents; customary land ownership	state power	concession	socio-environmental justice	customary ownership
getting organized (at level 1)	use being excluded				participation in decision-making; traditional livelihoods				self-determination over their land; traditional livelihoods			crop rotation and extensive farming; traditional livelihoods					traditional livelihoods
	degree of organization/ unity	high	high	international	advanced: Reindeer herding co-operatives (RHC)	high	high	international	medium because divided, initially	high	high	national/political	unity initially threatened, organization advanced because of FUNAI	medium	high	medium because reduced international reach	early stage organization, unity threatened

[a] GOV - Government; BUSI - Business Organization; NGO - NGO or movement; COMM - forest-reliant community. NB: only key actors are reported here, the comprehensive list is much larger.

under certain conditions, users can self-organize and solve collective action problems also across multiple and nested governing authorities, allowing for polycentric governance (Cole, 2015; Ostrom, 2005; Stephan et al., 2019).

As a result, much hope has been placed in polycentric governance to address pressing sustainability issues (Jordan et al., 2015; Milinski and Marotzske, 2022; Obura et al., 2021). While polycentricity itself may potentially also accommodate independent decision-making units, a polycentric 'system' implies interdependence between them (Ostrom et al., 1961). Polycentric governance can therefore be defined as an institutional arrangement with multiple, partially autonomous and partially overlapping decision-making centers, which interact and share governance responsibilities over a certain resource or policy under an overarching system of rules (Aligica and Tarko, 2013; Baldwin et al., 2018; Stephan et al., 2019).

Understood in this way, polycentric governance implies some sort of interdependence between its units. It is intended to alleviate conflicts that may arise from natural resources management, because multiple interests, claims and management priorities can co-exist and certain public goods can be co-produced. Within a well-designed polycentric system that translates value heterogeneity into institutional heterogeneity (Aligica and Tarko, 2013; Andersson and Ostrom, 2008), each unit can further use exit, voice, and self-organization as strategies to compete with other interdependent units; and larger units can serve as conflict resolution mechanisms for smaller units (Thiel and Moser, 2019) or be useful in addressing issues such as elite capture and discrimination. Finally, because of greater interaction and coordination between decision-making centers, mutual adjustment is more likely to occur (Baldwin et al., 2018). Given these features, polycentric governance is likely to attenuate or partially prevent resource conflicts, although it may not ultimately resolve their root causes.

Because of such high expectations placed on polycentric governance, it is noteworthy that the literature has mainly focused on its ability to accommodate potentially conflicting units but it has not dig into trajectories to reach it. We see this gap as tied to the prevalent view seeing polycentric governance as an institutional arrangement that guarantees a certain *ex post* capacity to avoid or deal with conflict, which implies that less attention is paid to *ex ante* conflicts and dynamic processes.

In this paper, we focus exactly on these micro-processes preceding potential polycentric governance. While we do not assess the quality of the outcome reached, our focus on the preceding dynamics aims to contribute to a deeper understanding of how and under which conditions a polycentric system can emerge. Our goal is to develop a comparative framework for understanding collective action dynamics towards eventual polycentric governance, in which there is a role for conflict. We investigate whether it is possible to identify common dynamics across different cases.

We concentrate on forests-related conflicts and the resulting stress on livelihoods and sustainability (Derkyi et al., 2014; Eckerberg and Sandström, 2013). We treat forests as collective goods subject to concurrent and at least partially competing claims advanced by various collectivities. To frame the micro-processes through which conflicts involving cross-scale interests unfold in time, we propose a two-level collective action problem framework that combines various elements of classical institutional theory with each other (Section 2).

Then, we present illustrative case study material from four forest-conflicts hotspots (Mola-Yudego and Gritten, 2010), namely Finland, Canada, Brazil and Indonesia (Section 3). We first use our framework as guidance in a comparative analysis that seeks to identify some common dynamics of conflict escalation and transformation. Second, we use corollary theories - the Social Movements, Bargaining and Deliberative Theories - to better interpret and reconstruct actor strategies within the dynamic process. We suggest that the resulting analytical grid (Tables 1–3) enriches the polycentricity literature in understanding key moments of *ex ante* conflict dynamics (Section 4). In our conclusions, we highlight that our stylized description of dynamic micro-processes may

have limitations but can be used to "read" other, multi- and cross-scale instances of forest governance. For practitioners, our analysis may serve as reference in evaluating ongoing conflict episodes and the costs associated to certain strategies versus the prospect of longer-term consequences of these struggles.

2. Conflicts over collective goods: a two-level collective action problem

Forests are essential resources for a wide range of users and uses, from the local to the global scale (Geores, 2003; Gong, 2002). They provide numerous ecosystem services, from supporting biodiversity to providing food, water, medicinal plants and raw materials, regulating climate, air and water and serving as cultural, spiritual or recreative spaces (Oldekop et al., 2020) but due to their multifunctionality, forests are particularly subject to several potentially competing claims advanced by multiple cross-scale stakeholders (Berkes, 2002; Gong, 2002). Such claims are often rooted in value heterogeneity, as the collectivities' sources of behaviour and knowledge, regulatory and policy systems and connected socio-economic and political settings can vary widely (Adams et al., 2003; Nousiainen and Mola-Yudego, 2022; Paavola, 2005; Young, 2006). For instance, certain communities regard forests as places of spirituality and constitutive of personal and community-identity, history and culture as well as sources of livelihoods (Abega, 1998; Pemunta, 2018; Simbaña, 2011; Tsing, 2004). Often, their demands for certain management priorities are rooted in claims of customary ownership or historical stewardship. Yet, to others, forests may simply be a source of a renewable commodity (Scott, 2020), a place of recreation and aesthetic pleasure, or a source of revenues.

We therefore envisage claims as reflecting institutional facts (Searle, 2005), which represent such value heterogeneity and are grounded in specific historical and political processes as well as geographical contexts (see Section 2.1). The framework we propose is meant to serve as tool to analyse the dynamics between "conflict episodes" (Pondy, 1967) of potentially longer-lasting - more or less latent - conflicts that result from economic, political, and institutional histories, as well as from ecological processes.

We synthesize quality and quantity of the advanced claims as *use(r)s* (Frischmann, 2012) and treat different stakeholders as *collectivities*. Notably, we consider a collectivity as a group of people who, despite likely internal heterogeneity (Agrawal and Gibson, 1999), distinguish themselves from other stakeholders by perceiving the forest differently, having specific claims and preferring a linked management priority. Thus, in the problem-setup we propose, a forest is a collective good (Olson, 1965) for various collectivities, opening up a two-level collective action scenario. At a first level, each collectivity faces the dilemma of getting internally organized (Olson, 1965; Ostrom, 1990, 2005) to push for its own preferred use of the forest; at a second level, different collectivities struggle around how to manage the contested forest and distribute the benefits it may produce. In case of no agreement at such second level, there would be a failure to deliver the 'public good', which consists in preserving the overall forest's health, productivity and sustainability.

At the second level, the collective action problem to find an agreement is often also a symbolic struggle for social and political reorganization and the recognition of new entitlement arrangements (Johnson, 2004; Johnson and Forsyth, 2002; Mosse, 1997). From this perspective, forest policy can be understood as a "social bargaining process" (Maryudi and Sahide, 2017:1) and forest governance as a "product of interaction between a number of interested participants" (Wagner, 2019:3).

2.1. Institutional facts. Getting organized around a claim

Before a collectivity can even enter a dispute with others about which management priority should be given to the forest, it must self-

Table 2

a: Comparative analysis of conflict transformation (part I).

		FINLAND				CANADA				BRAZIL (plantation)				INDONESIA (plantation)			
		GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM
Distributional Coalition formed	alliance	with 4	with 4	with 1–2 and 3	with 4	with 3	with 2 and 4	with 1 and 3	with 1 and with 4 (through FUNAI)	with the Federation of Industry of the State of São Paulo	with 4	with 1 through FUNAI and with 3	through mobile police brigade repressing illegal occupations also		with 4	with 3
	heterodox framing			legitimate users of the forest	legitimate government		Great Bear Rainforest (global value of ecosystem)	legitimate government			agribusiness harming social and environmental justice				monoculture development harming social and environmental justice	
	issue linkage		yes - against clear-cutting				yes - against clear-cutting				yes - against monoculture and agribusiness				Yes, against monoculture and agribusiness	
	scale jumping		yes - from local to global value of the forest				yes - from local to global value of the forest				yes - against national agribusiness model				yes - but with weaker international reach	
	market leverage		targeting international customers and investors				targeting international customers and investors									
Key strategies enacted	mobilization & boycott		yes	yes			yes	yes			yes	yes			yes	yes
	strategy diversification			file a civil lawsuit				bring causes to Courts			bring causes to the Federal Tribunal	file a series of lawsuits			complaints with the International Finance Corporation	complaint letters, reports to the government office, formal legal path

Table 2b
Comparative analysis of conflict transformation (part II)

		FINLAND				CANADA				BRAZIL (plantation)				INDONESIA (plantation)			
		GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM
Bargaining endowment (initial)	legitimacy of claim	strong	strong	geographically diffused	strong	strong	strong	Geographically diffused	partial	strong	partial	geographically diffused	strong	partial	partial	geographically diffused	low
	degree of organization	high	high	international	advanced: Reindeer herding co-operatives (RHC)	high	high	international	medium because divided, initially	high	high	national/political	unity initially threatened, organization advanced (FUNAI)	medium	high	medium because reduced international reach	early stage
Shift in bargaining positions	inflicting external costs to other parties (on whom)	logging - impact on spatial distribution of lichens (on 4)		reputational loss through market leverage, boycotts (on 2)	questioning credibility and lawsuits (on 1), boycotts (on 2)	violent repression (on 4)	logging in contested areas (on 3 and 4)	reputational loss through market campaigns, boycotts (on 2)	lawsuits (on 1 and 2) and mobilization and boycotts (on 2)	violent repression (on 4)	pollution, soil consumption, evictions (on 4)	reputational loss among the electorate (on 1), mobilization & boycotts (on 2)	lawsuits (on 1 & 2), mobilization, boycotts and self-demarcations (on 2)	violent repression (on 4)		reputational damage through campaigns, boycotts and lawsuits (on 1&2)	boycotts and occupations (on 2), reputational loss through complaint letters (on 1&2)
	paying predatory costs	no	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	paying defensive costs	yes	yes	no	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes

Table 3
Comparative analysis of potential polycentric governance.

		FINLAND				CANADA				BRAZIL (plantation)				INDONESIA (plantation)			
		GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM	GOV	BUSI	NGO	COMM
Change in strategy	negotiation	yes - through negotiation tables				Government to Government (with 4)	Joint Solution Project		Government to Government (with 1)		yes with (4)		yes (with 2)			Various NGOs, including the Roundtable for Sustainable Palm oil (RSPO)	
	mediation						Ecosystem-Based Management			FUNAI, Public Prosecutor's Office				Joint Mediation Team (JOMET)	IFC's Compliance Advisory Ombudsman		
	integrative bargaining/ deliberation	jointly developed operating model, goals harmonization, participatory and interactive planning, expertise pooling									no					no	
	Institutional innovation	New Natural Resource Plan				Coastal Information Team (science-based); New agreement based on Ecosystem-Based Management				New demarcation of Indigenous land				Failure - exit of business organization and new entry (negotiation reset)			

organize and agree on the 'exact nature' of the collective good for which it wishes to make a claim (Olson, 1982:24). This is the first step in ensuring that each collectivity's claim is heard by the others (Aligica, 2018; Olson, 1965).

We propose such exact nature can be interpreted as the institutional facts (Searle, 1995, 2005) underpinning a claim. An institutional fact is "*X counts as Y in C*" and assigns a specific status and function (Y) to an object (X) that must be agreed upon by the relevant collectivity and reflects a specific cultural-historical context (C) (Searle, 2005:9). The "status function" transforming X into Y is observer dependent, meaning it is a social construction that depends on the attitudes of the people involved, which share the specific context C.

Institutional facts have a wide reach, in as much as they can constitute 'money', 'government' or 'property' (ibidem, p.3). In our study, institutional facts frame the perceived legitimacy of who uses a specific resource and for which purposes (cf. 'cognitive conflict' in Adams et al., 2003 and 'institutional ethos' in Voronov and Weber, 2017). For instance, while some communities refer to traditional land and base their perception of the forest in experiential knowledge, informal rules, low social discount rates and historical disenfranchisement,[1] corporate actors or national governments often think in terms of commercial forestry, scientific evidence, high discount rates and formal, legally defined rules of ownership (Scott, 2020; Young, 2006).

In our analysis, we propose that X is a specific forest on which different collectivities concomitantly advance diverse claims, and Y is the 'exact nature at issue' (Olson, 1982:24) on which each collectivity internally agrees. The claim advanced is connected to a specific prioritized management arrangement that best resembles the preferred status and function attributed to the forest by the specific collectivity. We highlight that the legitimacy of each claim is to be traced back to "C", which is a system of emotional, logical and cultural elements unique to the collectivity and rooted in its specific historical, political and geographical context. For example, the legal system may not be part of "C" of an indigenous community if it marginalizes their customary land ownership since centuries. *X counts as Y in C* - different for each participating collectivity - incorporates the value heterogeneity (Aligica and Tarko, 2013) that must be accommodated in a polycentric governance architecture, also taking into account historical legacies and symbolic meanings (Johnson, 2004; Mosse, 1997).

Our model enacts an intentionally stylized representation that does not weight claims based on the importance of the "C" they rely on – so indigenous culture is *ab initio* an equally valid source of legitimacy for a claim on the forest as is a logging concession granted by the government (cf. Scott, 2020). Power asymmetries of course come along with different institutional facts, but our study is interested in the dynamics of such asymmetries, not in assessing exact power levels from the start.

Because organizing around a collective voice and intentionality (Searle, 2005) does not come easily even within a single collectivity, a first-level collective action problem arises. Any individual sacrifice for the common goal implies the equal sharing of the obtained gains (Olson, 1982:18). Yet, obtaining, maintaining or enlarging such gains is contingent, at least in part, on collective action taking place. Building a collective voice to advance a claim on the forest may thus be hampered by free-riding or hold-up, or by the absence of selective incentives that reward everyone who invests time and effort in the collective cause (Olson, 1965).

When members of a collectivity agree upon a common perception of their purpose and succeed in getting internally organized, they can advance their claim at a second level, where different collectivities advance separate claims (Y)s on the same forest (X) – Fig. 1, upper panel.

---

[1] We thank an anonymous reviewer for this point.

2.2. Distributional coalitions and the 'size of the pie'

The second level collective action problem envisages different collectivities, each with a separate claim (Y), struggling to reach an agreement on how to manage the forest. As their mutual interdependence varies, each collectivity can have different preferences over certain outcomes, which might be ranked in order (Bruns and Kimmich, 2021). Different types of interdependence in strategic situations lead to different challenges to cooperation. In our scenario, we simplify such complexity and collapse multiple levels into a two-level scenario that serves as exemplification of much more complex and networked situations. While pay-off structures of the rival collectivities may be diversified (Bruns and Kimmich, 2021), failure to agree on a solution that preserves the forest's health, productivity and sustainability can still broadly be envisaged as collective action problem. An unfavourable outcome results as long as each collectivity continues advancing its own claim over others', or until institutional change is just formal and not reflective of values heterogeneity and new forms of social and political organization (Mosse, 1997). Our "win-win" scenario is an agreement on forest governance that does not imply equal gains for all parties but is intended as outcome in t_2 not making any party worse-off than in t_1, although it may make some party worse-off than in t_0. Such outcome is a partial outcome of a "conflict episode" (Pondy, 1967) subject to further changes within a longer process.

Following Olson (1982), we frame collectivities as "distributional coalitions" that advance their own claim and demand a redistribution of benefits in their own favour, even if this means sacrificing cumulative output and/or failing to provide the public good. A collectivity may engage in such action by itself or enter alliances with others (Villamayor-Tomas and García-López, 2018) to increase its relevance and stance. In Fig. 1, middle panel, collectivities act in favour of their own slice of the pie and no symmetrical solution across groups - which could increase the size of the pie - is found (Olson, 1982). We interpret the 'size' of the pie as the cumulative output the forest may produce for current and future generations.

Still, under certain conditions, distributional coalitions may be interested in joining collective action, which at this level implies engaging in bargaining with other coalitions to agree upon a common strategy for forest management. First, the coalition must have some bargaining endowment to bring at the table (Buchanan, 1975; Gauthier, 1987), which may simply be its claim (Y) provided other collectivities have recognized its legitimacy. Crucially, a collectivity's organizational capacity at the first level is essential for what bargaining endowment it will bring into the second level (Yasmi et al., 2011). Second, all coalitions must regard the condition in which no collective action takes place as suboptimal. Suboptimality, and thus the wish to improve the current situation, may be determined by excessive predatory and defensive costs that one coalition inflicts upon the other(s) (Buchanan, 1975; Buchanan and Tullock, 1962; Gauthier, 1987). Further, if a coalition expects an agreement to be a more favorable outcome in t_2 with respect to t_1, this represents additional perceived gains from entering the bargaining (Buchanan and Tullock, 1962; Deutsch, 2006).

Once bargaining starts, a possible path to polycentric governance implies a shift in the collectivities' bargaining strategy from increasing one's slice of the pie to one of (jointly) enlarging the pie - Fig. 1, lower panel. Understanding in which circumstances such a shift can happen is key to our comparative analysis.

2.3. Reification of conflict

The described two-level collective action scenario bears a clear potential for conflict. Tensions may first accrue during internal organizational processes *within* each collectivity. Then, conflict *between* different collectivities and coalitions is likely to manifest when the claims advanced by one are perceived as illegitimate or as an impairment to the claims of another (Glasl, 1999). Furthermore, each distributional

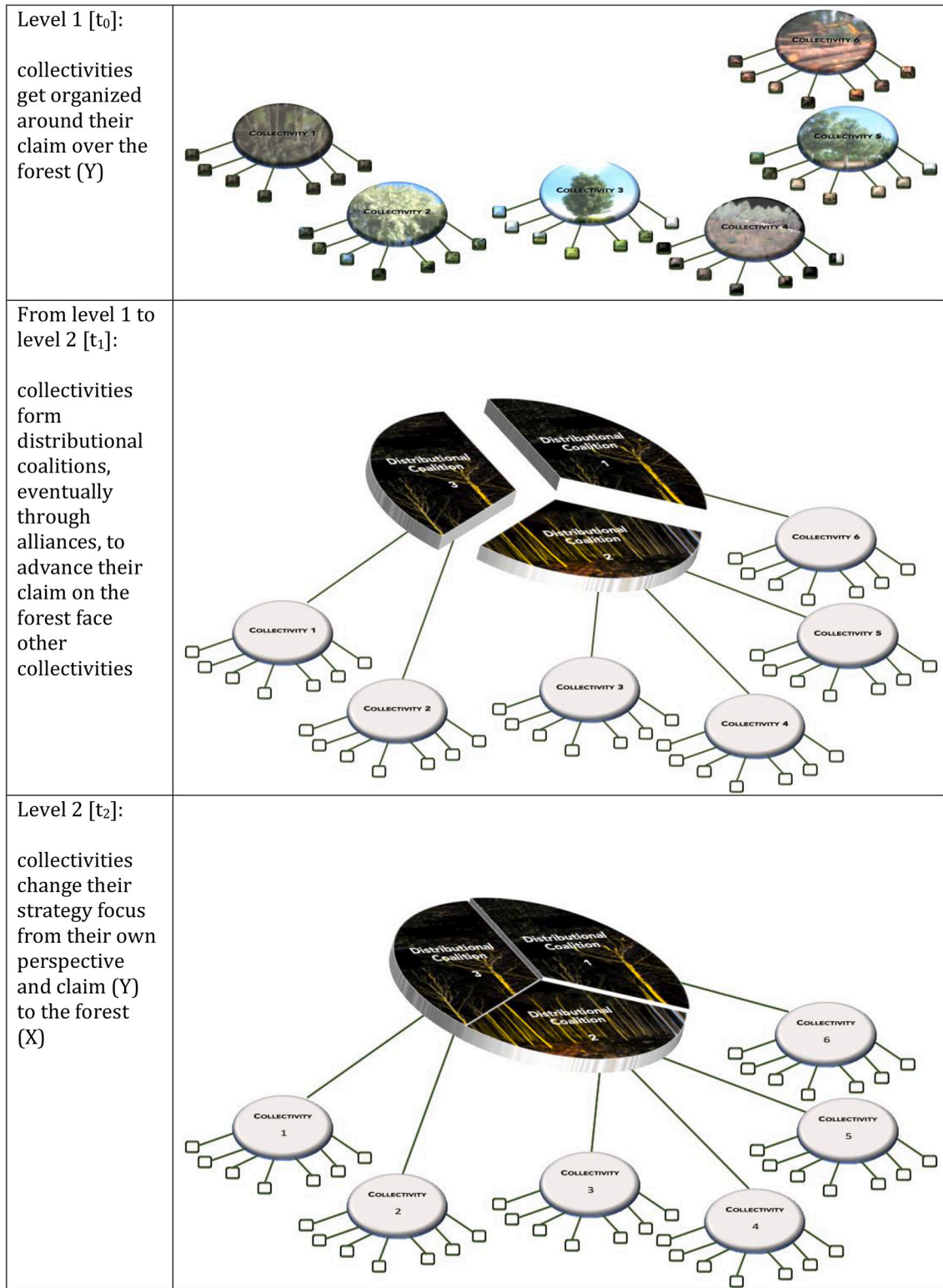| Level 1 [t_0]:

collectivities get organized around their claim over the forest (Y) | |
| From level 1 to level 2 [t_1]:

collectivities form distributional coalitions, eventually through alliances, to advance their claim on the forest face other collectivities | |
| Level 2 [t_2]:

collectivities change their strategy focus from their own perspective and claim (Y) to the forest (X) | |

Fig. 1. A two-level collective action scenario.

coalition risks pursuing group-interests that may clash with the broader societal interest. Such frictions are exacerbated by power asymmetries rooted in historical legacies, heterogeneous organizational capacities including different abilities to afford predatory and defensive costs, and in the type of information, knowledge and legitimacy of their claims (Foucault, 1975; Morrison et al., 2019; Weede, 1985).

Despite conflict potential is always lurking, its escalation becomes more probable when some use(r)s are excluded, possibly because the resource gets congested (Ostrom, 2005; Frischmann, 2012). Exclusion might be either physical from the forest, i.e. eviction following outsiders' occupation, or exclusion from the possibility to practice traditional activities, i.e., due to impairment caused by other activities within the same forest.

In forests, rivalry is always latent but increases in as much as the

diverse management priorities, their scale and contingencies, cross a certain threshold beyond which the resource loses its capacity to support additional use(*r*)s – see Fig. 2. Then, the potential for conflict reification increases as the problem of each collectivity shifts from how one's own wants should be satisfied while reducing external costs to others, to whose wants should be satisfied at all (Weede, 1985). It is worth mentioning that there is no clear single mechanics according to which a certain number of use(*r*)s will kick-off the threshold surpassing (Frischmann, 2012), much depending on both ecological dimensions and local cultural ecologies (Mosse, 1997), but external factors such as climate change can contribute to reaching the tipping point (Wohlleben, 2021).

3. Case studies

We next analyse four conflicts from "forest-conflicts hotspots" (Mola-Yudego and Gritten, 2010), specifically in Finland, Canada, Brazil and Indonesia. The last two cases concern plantations that replaced earlier forests (FAO, 2020; Wohlleben, 2021).

We selected cases on purpose, as they are of public prominence and have several common features that facilitate cross-case comparison in relation to our main research question (Bryman, 2012; Patton, 2002) . In each case, four main collectivities are involved in cross-scale interactions (Adger et al., 2005) and have competing claims over the same forest: the government at various levels, a business organization, one or more local, national or international NGO and/or social movement, and one or more forest-reliant communities. Cases differ significantly in the previous level of organization of parties (Yasmi et al., 2011) and the surrounding geographical, institutional and political context (Dubash et al., 2021), which also varies in the timespans we considered, i.e., more than 30 years.

Each of the local histories we described resembled a complex adaptive system we could not fully account for. Yet, our analytical endeavour consisted in comparing some dynamics of change within these four different, complex systems. This required a series of simplifications and stylizations: first, we only focused on four types of actors when many more players may be engaged. Second, we departed from our two-level collective action framework (Section 2) to reconstruct case dynamics, therefore reducing the potential multitude of levels to two.

We adopted a qualitative approach, combining two phases of research. First, we used available materials - secondary literature, official documents, reports, press releases and bulletins - to reconstruct conflict processes. Many sources are subject to previous interpretation of facts, but by triangulating different sources for the same case, we have excluded biased historical reconstructions as much as possible.

Second, to compare dynamic micro-processes, we elaborated a preliminary analytical grid based on the framework introduced in Section 2. However, our initial framework still lacked detail in breaking down the mechanics of change. Thus, we made use of corollary theories - Social Movements, Bargaining and Deliberative Theories - to better interpret actor strategies, which enrich our reconstruction of the micro-processes of change. Our resulting comparative analytical grid (Tables 1–3) has been iteratively enriched as we moved from the framework to the case studies and back.

3.1. Finland – reindeer herding v. the state timber company in Inari

The Inari case takes place in Finland that, shortly after independence of 1917, adopted parliamentary, representative democracy in its first and second constitution - agreed upon in 2000. The case of interest dates to the 1950s, when commercial timber harvesting began to negatively affect both the environment and the livelihoods of Sami reindeer herders, due to the direct and indirect impacts that intensive logging has on the spatial distribution and quantity of lichens, which are essential for the winter grazing of reindeer (Greenpeace, 2005; Roturier and Roué, 2009; Sandström et al., 2010).

On one side, reindeer herding is a traditional livelihood and a fundamental part of Sami culture and identity (Bostedt et al., 2003; Riseth, 2006), so much that the Reinder Herding Act (14.9.1990/848) established specific areas of State-owned lands as areas dedicated to this practice that "shall not be used in a manner that causes considerable damage to the reindeer herding" (Section 2.2). On the other side, commercial forestry is a significant Finnish export industry and a major employer in the region, such that the forestry industry perceived the possibility of halting commercial logging activities from some pasture forests as a threat to the economic viability and employment in the area. One of the most contentious issues was disputed ownership, because commercial forestry occurred on State-owned land that partially overlapped with Sami's customary land.

Beginning in the 1970s, public outrage grew and the Sami, already organized in reindeer herding co-operatives (RHCs), started resisting logging operations. As a response, Metsähallitus - the State state-owned enterprise in charge of most of the area - organized meetings and stakeholder working groups with representatives from the Sami and the Municipality to discuss reconciliation of the two livelihoods (Raitio, 2008). In the late 1990s, the company also began to develop new planning tools for commercial forests, but many RHCs saw these initiatives insufficient and claimed for some areas to be excluded from commercial forestry (Raitio, 2008).

The conflict peaked from the 2000s onwards, when the RHCs scaled the issue up to the national political agenda and attracted international media attention in alliance with environmental NGOs (ENGOs). While Greenpeace and Nature League especially helped the RHCs in organizing field visits with media representatives, documenting and disseminating information about loggings in sensitive areas, some of the RHCs themselves drafted a joint appeal to the Ministries of Justice, Agriculture and Forestry and the Environment. They expressed their concerns and urged that logging of old-growth forests in winter pastures areas be halted immediately, forest management practices as well as the planned annual cut be reconsidered to take herders' needs into account and the consultations be improved (Greenpeace, 2005; Raitio, 2008). Furthermore, ENGOs launched an international campaign targeting Metsähallitus, the Finnish Government and the Central European customers of the Finnish paper industry. Metsähallitus claimed it had started revising the Natural Resource Plan for Northern Lapland in response to rapid conflict escalation (Metsähallitus press release, 2008). Nonetheless, it continued refusing to set aside logging from some areas marked on maps by the RHCs and ENGOs.

Faced with a deadlock, some of the herders decided to file a civil lawsuit against Metsähallitus. Moreover, by the end of 2005, the Sami Council and the ENGOs had launched an independent but inter-linked campaign against Stora Enso, the largest buyer of Metsähallitus timber from Inari and had brought their case to the UN (Nyyssönen, 2022). This strategy was so effective that Stora Enso asked Metsähallitus not to deliver wood from the disputed sites in Northern Lapland (Sarkki and Heikkinen, 2010).

Only in 2010, after a protracted conflict and negotiation process, a temporary de-escalation was reached, with nearly 80% of important reindeer pastures set aside from cutting areas, as previously marked by herders and Greenpeace. Two years later, Metsähallitus adopted a new Natural Resource Plan that guided its activities in the Sami homeland for the period 2012–2021. The plan was drafted by a plan cooperation group comprised of key stakeholders in the area and it also regulated felling operations, decided together with RHCs. In 2022, a new plan was approved that will regulate Metsähallitus' operations until 2027 (Metsähallitus press release, 2020).

3.2. Canada – logging in the Great Bear Rainforest

The conflict over British Columbia's old-growth forests takes place in Canada, a constitutional monarchy, with a federal system rooted in parliamentary democracy. The conflict here described is also known as
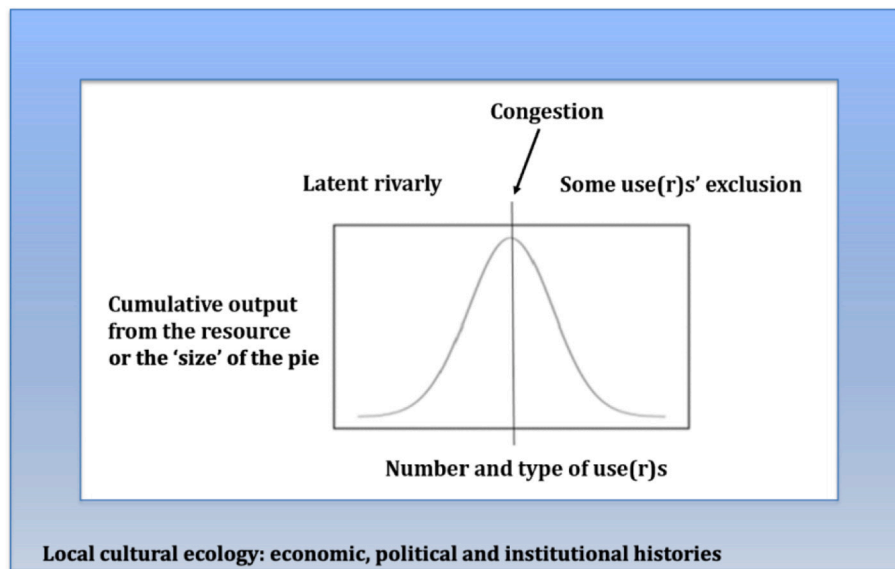
Fig. 2. The role of congestion and exclusion in increasing conflict potential.
The figure depicts a bell-shaped function where *n* collectivities concomitantly make multiple use (x-axis) of the forest to derive a cumulative output (y-axis), the set of all outputs stemming from downstream uses. Initially, the obtained output increases at higher levels of forest use. Yet, after the tipping point is reached, the forest gets congested and its overall capacity to sustain different use(*r*)s diminishes, at the detriment of some. Here is where the potential for conflict reification is most likely. The dynamics depends on ecological dynamics and on the local cultural ecology, which comprises economic, political, and institutional histories.

the "War in the Woods" (Cashore, 2001), and dates back to the 1980s when some of the First Nations (FNs) inhabiting the area together with some ENGOs started protesting against logging activities by timber industries (Affolderbach, 2011; Saakiroski et al., 2013; Sranko, 2011). At the time, ENGOs were mostly concerned with the global value of forest in terms of wildlife and biodiversity richness: they renamed it the "Great Bear Rainforest" (GBR) referring to the white-coated Kermode Bear endemic to the region and kept asking for the creation of class A Parks that exclude any human activity (Institute for Policy Analysis of Conflict. (IPAC), 2014; Saakiroski et al., 2013; Sranko, 2011). The FNs, instead, claimed the development of commercial forestry had occurred without their consent and was undermining their livelihoods. Moreover, they were concerned that conservationist arguments ignored their wellbeing and their right to hunt, harvest and take ceremonial logs from the forests. On the other hand, forestry companies were strongly hostile to any reduction of timber supply since this would further undermine the profitability of their operations and negatively affect employment and the regional economy (Armstrong, 2009; Cashore, 2001).

In the middle of this chaos, the Provincial Government (ProvGov) – the actual legal owner of the land - was first strongly adjuvant with the forestry industries because of the jobs and revenue they could generate, but it began to change its attitude in the 1990s due to the increasingly conflictual scenario. It attempted to introduce a collaborative planning system - the Land and Resource Management Planning (LRMP). Yet, neither part of the FNs nor the ENGOs accepted to participate in it, because they believed it would have jeopardized the possibility to have their land claims pleased and would be merely a cover-up for continuous logging (Howlett et al., 2009; IPCAs, 2018; Raitio and Saarikoski, 2012; Smith, 2010).

As a counterstrategy, the former chose to pursue a legal path by bringing cases to Courts, whereas the latter launched a big environmental campaign targeting the industries and their international customers (Raitio and Saarikoski, 2012). These strategies influenced the attitudes of ProvGov and logging business organizations respectively (Affolderbach, 2011; Sranko, 2011).

The critical turning point occurred in 1999, when a German delegation of papermakers and magazine publishers, guided by Greenpeace, visited active logging sites and met the FNs. Following the visit, they threatened cancellation of contracts with the timber companies unless an acceptable solution to the conflict was found (Armstrong, 2009; Saakiroski et al., 2013). Following this episode, the logging industries shifted from an "attack and defend" strategy to preserve the status quo (Raitio and Saarikoski, 2012), towards seeking mutually acceptable solutions. Some of them chose to engage in negotiations processes with ENGOs, which evolved into a longer-term alliance known as the Joint Solution Project (JSP). A significant achievement for ENGOs was a moratorium on logging activities in contested areas, agreed to by the industries in exchange for a halt to market campaigns (Saakiroski et al., 2013; Smith, 2010).

The JSP's development, however, engendered resentment in both the ProvGov and some FNs, who felt bypassed from agreements that concerned their territory (Union of British Columbia Municipalities (UBCM), 2000). As a response, the two parties began to sign protocols to strengthen their "Government to Government" (G2G) relation, pledging to work together on shared decision-making and agreement over land use planning and resource management. This was a strategic alliance for both actors to counterbalance the ENGOs-Industry power. Meanwhile, coastal FNs started to establish formal coalitions such as the Coastal First Nations Turning Point Initiative and, aware of need for international visibility, they strengthened their ties with the ENGOs (Raitio and Saarikoski, 2012). The passage of a logging moratorium on the one hand and the growth of G2G relations on the other, let FNs and the ENGOs feeling that ground rules were more inclusive of their own interests. This power re-shuffling, in turn, changed their incentives towards participating in the formal LRMP.

In the end, the ProvGov regained control over the entire process; with an interest in formalizing the agreement, all collectivities sat down at the formal planning table (Raitio and Saarikoski, 2012). The process culminated into BC Premier Gordon Campbell's announcement, in February 2006, of a historic agreement on the GBR. Importantly, the agreement sanctioned the establishment of a network of protected areas and conservancies, i.e. protected areas over which First Nations have management rights, and the creation of a Coast fund to finance indigenous-led conservation and new sustainable business development (Armstrong, 2009; Smith, 2010). In 2009, the land use plan was finally completed and a framework was put in place (Armstrong, 2009). The

parties announced the GBR would be managed using an Ecosystem-Based Management (EBM) approach based on both science and traditional local knowledge (Smith, 2010). To put the commitment into action, in 2016 the government passed the Great Bear Rainforest Land Use Order and the Great Bear Rainforest (Forest Management) Act (British Columbia Government News, 2016a, 2016b). Legislative reviews are planned to continue and improve collaboration for EBM.

3.3. Brazil – eucalyptus in Espirito Santo

Brazil is a federal, presidential representative democracy. Independent since 1822, and a republic since 1889, its history is marked by extractive economy and institutions in the North, and more participated and inclusive institutions in the South (Amendolagine and von Jacobi, 2023). Despite a new democratic era (and the new Constitution of 1988) followed populist democracy and military dictatorship, external debt and economic vulnerability have long constrained the political autonomy of governments.

We start describing the conflict from 1967, during the military dictatorship, when Aracruz Celulose S.A (AC), a major producer of cellulose made from bleached eucalyptus pulp, entered the land of Tupinikim and Guarani Indigenous communities in Espirito Santo, built three factories and planted eucalyptus monoculture (World Rainforest Movement, 2021). The State of Espirito Santo gave land to support the local economy and further sold some to AC through the Companhia de Ferro e Aço de Vitória (Andrade et al., 2001). However, the Tupinikim and Guarani perceived this as an illegal occupation of their traditional territories and saw the "green desert" (World Rainforest Movement, 2005) as a threat to their livelihoods, culture and identity.

Thus, in 1975 they started demanding the demarcation of their territories with the support of the National Foundation for the Indian (FUNAI), the body responsible for the protection of Indigenous peoples of Brazil. Since then, the FUNAI has negotiated with AC and instituted working groups to produce studies defining the area to be delimited as Indigenous territory. These studies were subject to revision and approval from the Ministry of Justice.

In 1980, AC donated 4.491 ha of land to the FUNAI for it to be used by the Tupinikim and Guarani communities; yet the latter deemed the territory insufficient. Additionally, the replacement of primary forest with eucalyptus monoculture and the industrial activities of AC had resulted in such level of pollution and soil consumption that the extensive farming and crop rotation methods traditionally used were no longer viable (Rocha, 2008). Thus, in 1994, the FUNAI working group published a new study (GT 783/94) demanding a demarcation of 18.070 ha and, in 1996, the Indigenous communities in alliance with the Conselho Indigenista Missionário (CIMI) launched an international campaign to request it (Andrade et al., 2001; Loureiro, 2006). However, the then Minister of Justice refused to accept it and, in 1998, he only extended the territory by 2.571 ha, for a total of 7.062 ha.

The Tupinikim and Guarani started protesting again. Under pressure from the potential damages to its image, AC agreed to enter a negotiation process with them, which culminated into an agreement ratified by the Federal Public Prosecutor's Office, who oversees collective interests, such as environmental protection or damage. Under the agreement, AC would have funded some economic sustainability and employability projects for communities and transferred 2571 ha of eucalyptus land to their management, but it would have continued its operations. These offers did not address the issue of land scarcity and posed a challenge to the communities' unity, as some leaders and other members were willing to accept the money while others considered territory more important (World Rainforest Movement, 2021).

In February 2005, about 1000 Tupinikim and Guarani families occupied the land, cut down eucalyptus trees and built two large communities' buildings in two of the villages they had previously inhabited. In May, they started self-demarcating 11,009 ha with the support of other movements, NGOs, networks and the Small Farmers Movement

(Movimento dos Pequenos Agricultores MPA). A network of resistance to the eucalyptus plantation was also born, the Alert against the Green Desert Network (Rede Alerta contra o Deserto Verde), composed of citizens, social movements, pastorals and churches, who saw in these communities' struggle the opportunity to fight against a business organization that created problems for agriculture, biodiversity and water, prevented agrarian reform and shortened rural labour market, therefore forcing migration towards urban areas (Rocha, 2008; Rede Alerta Contra o Deserto Verde, 2005). In October 2005, the Indigenous communities with the support of the Landless Rural Workers Movement (Movimento dos Trabalhadores Rurais Sem Terra, MST) occupied the Aracruz facilities for three days (Kenfield, 2008).

Meanwhile, AC started to bring causes to the Federal Tribunal to prove its possession of the disputed land; the Court agreed and ordered the removal of all occupants from the site. In January 2006 the federal police entered the village and evicted the people, destroying houses and properties (Conselho Indigenista Missionário, (CIM), 2006; Kenfield, 2008; World Rainforest Movement, 2006). Nonetheless, FUNAI published new conclusions confirming the need to readapt the 1998 decisions (GT 1299/05). AC again opposed to such conclusions.

Administrative delays in deciding over the demarcation contributed to the conflict's escalation. In December 2006, other occupations followed and the Federation of Industry of the State of São Paulo (Federação da Indústria do Estado de São Paulo) asked for the intervention of the federal police (Federação das Indústrias do Estado de São Paulo – FIESP, 2006). It took until February 2007 for the new Minister of Justice to order that the process be returned to the FUNAI, with instructions to conduct further studies and develop an adequate proposal to set the interests of the parties (Conselho Indigenista Missionário, (CIM), 2007). In July 2007, FUNAI confirmed its recommendation GT 783/94 to keep the 18.027 ha as land to be demarcated. Meanwhile, the MST organized a march through Brasilia to denounce President Lula's leadership and accuse the judiciary, executive and legislative branches of backing up agribusiness interests and impeding land redistribution (Kenfield, 2008).

The Ministry of Justice finally approved implementing the decrees for the demarcation of the territory in August 2007. This marked the beginning of new negotiations between AC and the Indigenous communities on a Conduct Adjustment Term (Termo de Ajustamento de Conduta) that had to resolve the compensation for Aracruz and the conditions of the territories returned to the communities. Following some stalemates, the parties reached an agreement in December 2007: the communities renounced on the eucalyptus already planted within their territories and granted Aracruz the permission to remove them and agreed to withdraw some lawsuits, while Aracruz committed to finance studies and projects to identify the needs and priorities for the communities' self-sustainability and FUNAI committed to conduct these studies. However, due to administrative delays, the demarcation ended only in April 2008.

3.4. Indonesia – palm oil in Jambi

Indonesia is a presidential, representative republic whose transition towards democracy has been assessed as incomplete, as free elections are not fully backed up by the protection of civil rights (Freedomhouse). Independent after the second world war, Indonesia experienced attempts for democratization and three decades of dictatorship until 1998.

We start reconstructing the conflict from 1987, when the Head of Agency for Inventory and Forest of Indonesia granted an oil palm plantation concession to PT Asiatic Persada (PT AP), one of Jambi's largest palm oil firms. The territory where the plantation expanded included 3.550 ha of Suku Anak Dalam Bathin Sembilan (SAD) communities' traditional land (Setyo Pratiwi, 2018; Institute for Policy Analysis of Conflict. (IPAC), 2014). Since the beginning, SAD communities considered this an illegal occupation of their customary territory (Steinebach, 2013), which prevented them from pursuing their

traditional livelihoods (Compliance Advisor Ombudsman (CAO), 2013; Parker, 2013). However, it was only in 1998, with the fall of Suharto's dictatorship, that they started organizing to claim back their ancestral lands. Demonstrations, occupations, roads' blockades and reports to the government office were combined with a formal legal path. As in the other cases, SAD communities got the support of several NGOs, especially in collecting proof of traditional land rights and developing maps.

The company's ownership changed several times over the years, and with it the responses to communities' demands communities. For instance, between 2004 and 2005, the company offered SAD communities 650 ha and 350 ha of smallholdings in the southern and northern parts of the concession respectively (Colchester et al., 2011). However, in 2008 Wilmar Group International bought the company and decided to pull back the offer, sparking reactions by the communities (Colchester et al., 2011). The conflict quickly escalated.

Only after several NGOs began to file complaints with the International Finance Corporation (IFC) - the World Bank's lending agency that provided funds to Wilmar - the latter agreed to submit the conflict to the mediation of the IFC's Compliance Advisory Ombudsman (CAO) (Compliance Advisor Ombudsman (CAO), 2013), which however did not run smoothly. Communities split between those who wanted to accept Wilmar's offers and those who kept asking for return of customary land. Moreover, Wilmar started accusing them of stealing palm fruits and selling them outside the concession and, in July 2011, it engaged the mobile police brigade (BRIMOB) to guard the plantation (Institute for Policy Analysis of Conflict. (IPAC), 2014; Steinebach, 2013). BRIMOB and PT AP personnel kicked out people from their settlements, destroyed houses and properties with excavators and fired gunshots. BRIMOB also barred NGOs, media and local people from entering the area (Colchester et al., 2011). This "conflict episode" (Pondy, 1967) resulted in the destruction of 83 families' homes and the death of one person.

After three affected communities and a coalition of local, national, and international NGOs filed a new complaint with the CAO in November 2011, the mediation process restarted in March 2012. A Joint Mediation Team (JOMET) formed by the CAO and the Jambi Province government facilitated the dialogue and assisted the parties in achieving some interim agreements (Compliance Advisor Ombudsman (CAO), 2013; Nilakrisna et al., 2016). However, when it appeared as if the parties were close to an agreement, the mediation halted. In April 2013, Wilmar International sold PT AP to Prima Fortune International Ltd. and PT Agro Mandiri Semesta, without previously sharing information with and seeking consent of the affected parties. This move deeply concerned both the communities and the NGOs, who sent a cover note to the Roundtable on Sustainable Palm Oil (RSPO) and a complaint letter to Wilmar International Group expressing their concerns. Indeed, they feared that the new owners would have refused to continue with the JOMET-mediated dialogues and neglected the results reached so far. Even more so because the new owners were neither members of the RSPO nor funded by IFC as Wilmar was, meaning they were not bound by their standards (Complaint to Wilmar on PT Asiatic Persada sale agreement, 2013).

While Wilmar had ensured the new buyers were aware of the progress made and encouraged them to continue with the mediation process (Response from Wilmar, 2013), in late September 2013, without prior consultation of the communities, the new owners communicated their withdrawal from the JOMET-led dialogue and their decision to continue with a new Integrated Team of Batang Hari district (Nilakrisna et al., 2016), comprised of government representatives, the military and the police. Failing the consent of one of the parties, the JOMET-led process came to an end, causing big frustration among the affected communities, who organized several protests. In October 2013, with the occasion of a press conference, the communities accused the Jambi Province governor of ignoring their demands and asked him to cancel the Business Use Permit of PT AP (Forest Peoples Programme Press Release, 2013). Moreover, they petitioned the RSPO to expel Wilmar International, suspend all its operations until the conflict was solved, and revise the

standard to clarify companies' obligations when selling concessions during a pending conflict resolution process (Joint petition of the Indigenous Suku Anak Dalam Batin Sembilan, 2013).

4. Discussion: understanding collective action for conflict transformation

Despite different contexts and outcomes, the four case studies display the main characteristics of a two-level collective action problem and some similarities in their pathways from conflict reification to potential polycentric governance. For the sake of exposition, we divide the analysis into three main phases – conflict reification (t_0), conflict transformation (t_1) and potential agreement (t_2). Such phases are largely compatible with the dynamic moments introduced in Fig. 1, although boundaries between them are not clear-cut.

Fig. 3 summarizes common actions and strategies that collectivities adopted within the cases analysed. These come from Social Movements (SMT), Bargaining (BT) and the Deliberative theories (DT) and help to better understand those *ex-ante* dynamics of cross-scale interactions that the polycentricity literature tends to leave unexplored. In the lower panel, we stylize the observed process from conflict reification to potential polycentric governance. We plot approximate level of conflict and power dynamics (vertical axis) against time (horizontal axis). Power is here intended as the (uneven) "capacity to influence the goals, process, and outcomes" of governance of a contested resource (adapted from Morrison et al., 2019). Our comparative analysis suggests that actors' strategies lead to some sort of reshuffling of power positions, which facilitates passing from (t_0) to (t_1) and (t_2). The trajectory we stylize is one of possible others, being based on four long-term cases only.

4.1. Phase 1: conflict reification

Our case reconstructions suggest a new conflict episode starts from a feeling of exclusion from policies, programs, negotiations or consultations, and a request for social change by marginalized parties (Almeida, 2019; Burawoy, 2017; Tarrow, 2011). In the GBR case, FNs claimed other parties made decisions over their territory without consulting them. In the Inari case, Sami felt the so-called negotiations were far from a real dialogue because they could not question fundamental issues (Raitio, 2008). In Jambi and Espirito Santo, the Indigenous communities asserted the business organizations had illegally occupied their territory, caused evictions and destroyed their livelihoods. In the four cases, traditional communities alleged commercial forestry was undermining their livelihoods, culture and identity. This suggests that feeling impairment was a critical cognitive element for conflict to spark (Glasl, 1999). However, marginalized collectivities could not engage in conflict unless they first achieved internal cohesiveness and unity (Hiller, 1975; Toch, 1965; Wilson, 1973), that is they self-organized around a common claim (Y) at level 1. The SMT provides further insights.

The socialization of exclusion is a critical component for a social movement to reify: enough participants must share a sense of vulnerability in the face of similar circumstances and find the movement's goal appropriate and attainable (Hiller, 1975). A certain sense of exclusion may already be latently socialized, e.g. because of historical neglect of traditional ownership or stewardship, but sentiments may cumulatively become more relevant and experience deeper socialization in specific moments. To this end, activists must frame grievances and threats as culturally relevant and in a way that challenges target institutions (King, 2008; Kroger, 2011; Snow and Benford, 1988). Through heterodox framing, target institutions like a law, a specific actor or decision, are addressed as an enemy. Moreover, marginalized collectivities need to have some favorable surrounding social, political and economic environment and the possibility to access mobilization structures (Jenkins, 1983; McAdam and Scott, 2002) to transform a shared and heterodox understanding of the situation into action and influence. The influence

of political opportunities for conflict (de)escalation and collective action assumes particular relevance in very oppressive systems. In the Jambi case, the fall of President Suharto in 1998 represented good news (McAdam et al., 2018; Meyer, 2002) for the proliferation of civil society organizations that were encouraging people to reaffirm their rights (Colchester et al., 2011; Setyo Pratiwi, 2018). Table 1 reports key elements of conflict reification in the four cases.

When similarly situated groups face good or bad news, the potential and scale of common interests expand if people are already organized (Yasmi et al., 2011), as this enhances trust and solidarity and facilitates communication. The case studies show significant differences in the forest-reliant communities' organizational capacity and unity at level 1: in Indonesia, the Indigenous communities started almost from scratch, whereas in Finland the Sami herders had already been organized in RHCs for years. NGOs, on the other hand, already had these organizational structures, making it easier for them to transform their framing into effective mobilization.

4.2. Phase 2: conflict transformation

Once organized at level 1, each collectivity could present itself as unitary and credible actor and advance its claim (Y) in the face of its opponent(s). At this point, the collectivities became distributional coalitions and the conflict was most likely to escalate – see Fig. 3, lower panel. On the one hand, marginalized collectivities had strengthened their stance towards the others and they had gained momentum by organizing around a shared grievance, so that the cognitive element of conflict was particularly strong (Adams et al., 2003). Conflict escalation could now raise attention to their perceived exclusion (Affolderbach, 2011). On the other hand, the most powerful actors still benefited excessively from the status quo and did not perceive it as a suboptimal condition, so they had no interest in de-escalating conflict.

A more relaxed attitude to risk is an important source of bargaining power: until a party has less to lose than the other (Buchanan and Tullock, 1962; Gauthier, 1987), it will be reluctant to make concessions
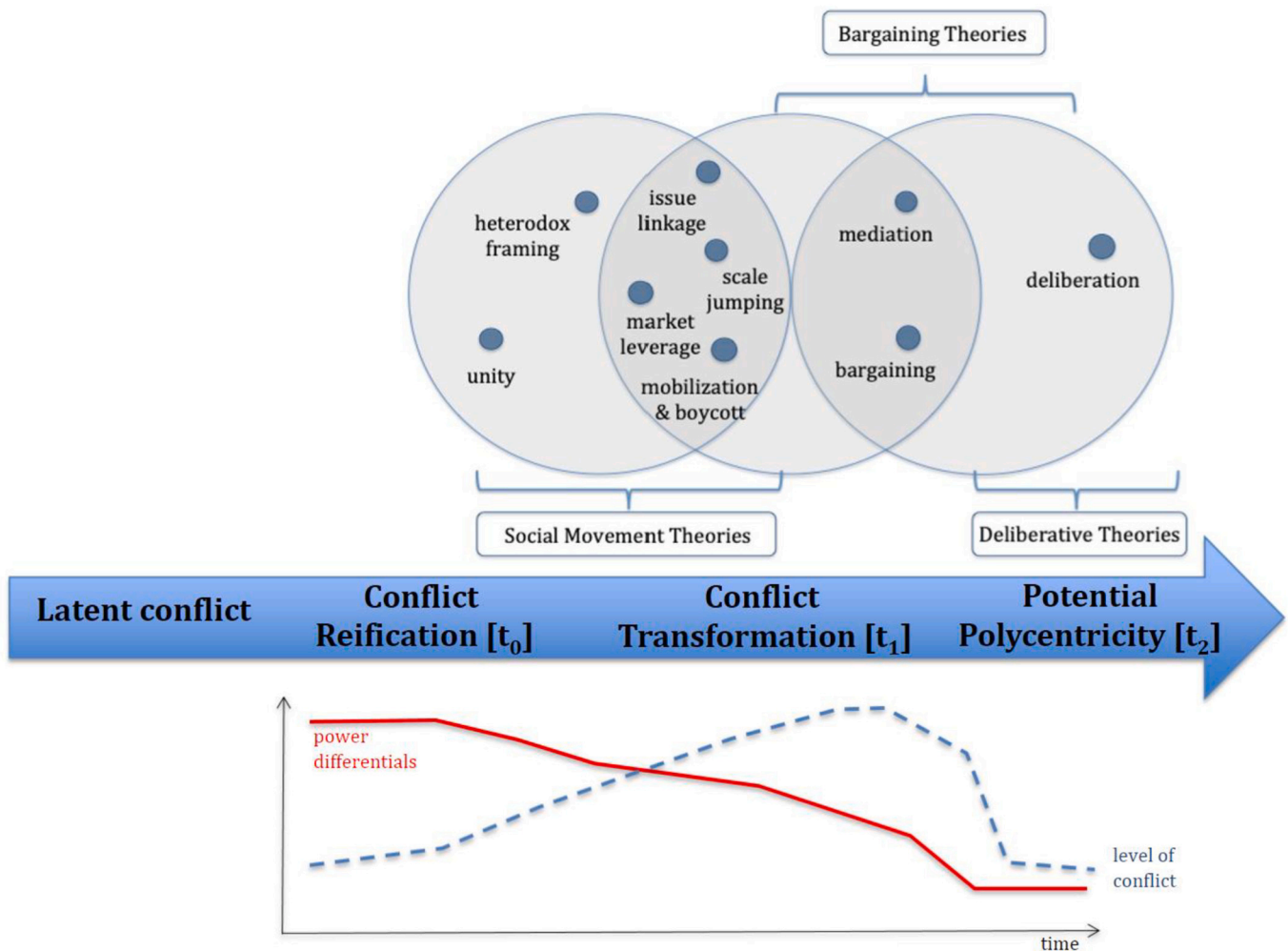

Fig. 3. Stylized conflict evolution and key actors' strategies highlighted by corollary theories.
Fig. 3 is organized as timeline that stylizes common patterns observed across cases. Phases of conflict are compatible with the dynamics presented in Fig. 1 (see Section 2).
The upper panel maps a conflict's pathway organized in three main phases (three big bubbles) whose boundaries are not sharp but overlapping. Dark points represent the collective action strategies that different collectivities adopted in the conflict. Corollary theories - SMT, BT and DT - contribute to the understanding of such strategies.
The lower panel outlines how power differentials between collectivities and level of conflict approximately unfold in our cases. Initially, power differentials are too high for parties to engage in direct conflict: marginalized parties are too afraid of substantial loss while stronger parties benefit too much to have any interest in change. Eventually, the former start collective action to escalate the conflict, reshuffling power imbalances. If defensive/predatory costs become too high for both parties, they perceive the *status quo* as suboptimal, develop an interest in de-escalating the conflict, and enter bargaining. Notably, power differentials do not disappear but seem to shrink. The trends depicted are not a quantitative computation of observable indicators but represent the qualitative and stylized trajectory emerging from our comparative analysis.

(Ratner et al., 2013; Zeuthen, 1930) or reach a fast agreement (Schelling, 1956). In other words, at level 2 there would be no collective action to transform conflict. Thus, marginalized parties had to find a way to change their opponent's reserve function by raising costs of non-deescalating the conflict (Weede, 1985). Informal and disruptive strategies may have been of crucial importance because they increased the defensive costs of the most powerful parties and made them perceive the status quo as suboptimal - see Table 2a-b. The four cases also confirm SMT's explanation of heterodox framing, mobilizations and boycotts as relevant instruments through which marginalized parties can level the playing field to get their demands considered (King, 2008; McAdam et al., 1996; Schurman, 2004).

In the four cases, the alliance between forest-reliant communities and NGOs having international reach played a key role in offsetting such conflict escalation. The formation of strategic alliances did not require the net fusion of interests but the construction of a shared (heterodox) frame: in Espirito Santo, the Tupinikim and Guarani people kept advancing claims for their customary land rights while other movements framed their allegations more as an issue of agribusiness advancement. Nonetheless, they believed the issues were linked (Zietsma and Winn, 2008) and addressed to a common enemy.

Similarly, in the Inari and GBR cases, native communities kept defending their livelihoods while ENGOs advocated primarily for biodiversity conservation, but they both opposed clear-cutting activities of logging companies. This issue-linkage enabled issues initially perceived as local to become of global concern, through scale-jumping (Haarstad and Floysand, 2007; Ukridi and Walter, 2011; Zietsma and Winn, 2008). By allying, the collectivities could also effectively pool their resources (Hargrave and Van de Ven, 2006; Ratner et al., 2013), i. e., legal entitlements, information, technical skills or cross-scale networks, and increase their stance.

However, as SMT emphasize, parties must also gain the support of strategic others to make mobilization fully effective (Cronkleton et al., 2008; Fligstein, 1997; Troast et al., 2002). This is even more crucial for stakeholders lacking traditional sources of bargaining power (King, 2008; Zietsma and Winn, 2008). In the GBR and Inari cases, market campaigns addressed at international customers put pressure on the companies, reversing their status quo utility. In Brazil, where market leverage was insufficient, activists strongly targeted the government through demonstrations and threat of withdrawing electoral support.

4.3. Phase 3: potential co-existence

Once a new power balance emerges the various collectivities may develop an incentive for collective action to de-escalate the conflict - see Fig. 3, lower panel. A significant shift implies some sort of process agreement, which also manifests in the abandonment of informal and illegal actions and the - now more equal - participation in a formal setting. In the GBR case, the JSP approval enabled the business organizations and ENGOs to initiate taking responsibility for resolving their controversies.

As DT explain, collective action at this point is about "agreeing to disagree" (Fligstein, 1997; Sen, 1998). Recalling Searle, this means each distributional coalition still assigns its own claim (Y) to the forest (X) and there is no mutual identification, but all share a commitment to approach conflict in a democratically acceptable way (Young, 2000). Thus, their focus shifts from Y to X as the forest becomes a space of mutual effect and positive interdependence wherein realizing their respective goals requires mutual adjustment (Deutsch, 2006). At this point, a window of opportunity for an agreement over how to manage value heterogeneity opens.

Then, once deliberation starts, parties need to move from distributive to integrative bargaining, to create "valued states of affairs from as many normative perspectives as possible" (Aligica and Tarko, 2013:13), that is exactly the point of polycentric governance. This is the potential shift from a zero-sum game with a fixed pie to a positive-sum game with a pie

that can be enlarged (Olson, 1982), even though each collectivity will simultaneously look for relative and public gains (Humphreys, 2001).

BT and DT highlight the factors most likely to contribute to this move. First, discussion should be problem- and not values-oriented (Fung and Wright, 2003). Secondly, parties should discuss interests rather than positions (Fisher et al., 2011) and frame one's argument as public and reasonable to the others (Young, 2000). Third, parties should have increased information about objective facts, which can support a reconsideration of values and interests (Fisher et al., 2011; Richardson, 2002; Sen, 2000).

According to our case analysis, scientific and mediating bodies can be crucial in facilitating this shift, by producing common knowledge and highlighting interdependencies (Dubash et al., 2021; Humphreys, 2001). In the GBR, the Coastal Information Team (CIT), a "science-minded" body made of representatives of the different stakeholder collectivities together with independent scientists, practitioners and experts, played an important role. By offering a separate arena for joint fact-finding and discussion of detailed ecological questions using Ecosystem-Based Management (Slocombe, 1993), it helped the parties to focus on problem-solving and to explore interests and concerns more consciously.

In other cases, top-down solutions can also serve the purpose. The Finnish public enterprise resolved to include interactive planning through which Sami interests would be incorporated in the firm's operating model. In Brazil, judicial force settled the land demarcation debate. Our comparison shows that when no alliance between the government and the forest-reliant communities is built up at some point, results appear to be less satisfactory (Indonesia) - see Table 3.

5. Conclusions

In this paper, we investigated and compared dynamic micro-processes for the transformation of forests-related conflicts into polycentric governance. Such institutional design has been deemed promising for managing sustainability issues involving actor heterogeneity and cross-scale interactions (Milinski and Marotzske, 2022; Obura et al., 2021).

As a key characterizing matrix, our theoretical framework proposed to study the path towards polycentric governance as an (eventual) outcome of a two-level collective action scenario in which different collectivities advance concurring and potentially competing claims over the same forest. Our comparative analysis of four illustrative case studies from Finland, Canada, Brazil and Indonesia, identified some common, long-term micro-process dynamics through which collectivies' agency in forest conflicts can be "read" (Oberlack et al., 2018).

As it does not focus on a particular stage such as conflict escalation (Yasmi et al., 2006) or bargaining (Affolderbach, 2011), our framework enables to analyse conflict dynamics more in depth than other works do, combining various micro-processes of conflict and collective action within the action arena (Ratner et al., 2013). It is nevertheless subject to some limitations. Our framework seeks to provide a ground for comparison of different cases, so it simplifies the number of relevant actors and of interacting collective action levels. We further do not explain the deep roots of power asymmetries but limit ourselves to describing how change occurs between a series of conflict episodes and how bargaining positions change over the observed timeframe. The trajectory we describe is stylized and may be subject to the selective attention our framework enacts. However, when we run robustness checks in which we re-read the cases using alternative frameworks, we find fragmented but compatible evidence. Our study mainly serves to highlight possible micro-processes of long-term dynamics in which cross-scale conflict may transform into polycentric governance. Yet it is far from being a quantitative computation of changing power positions. We suggest further research should investigate possible measures to track reductions in power asymmetries and in bargaining strategies (e.g. Morrison et al., 2019; Sandström et al., 2010). Such approaches could also integrate the

backward-looking, historical reconstruction we enacted using mainly secondary resources.

For practitioners, our study can be helpful in contextualizing current conflict scenarios within a longer-term perspective. Present defensive or predatory costs may have to be counterbalanced against future expected bargaining positions. Our results indeed confirm that actors' strategies such as heterodox framing, issue linkage and scale-jumping, market leverage and the redistribution of bargaining endowments through conflict, can be key for introducing change into the forest governance status quo.

Conflict escalation may, indeed, be instrumental for a more participated governance, as marginalized parties often resort to it to reshuffle power imbalances (Affolderbach, 2011). We find that conflict escalation increases their bargaining endowments and inflicts costs to the status quo preferred by the stronger parties - which can lead to change. In this scenario, NGOs play a key role as allies in increasing the size and power of the marginalized parties' distributional coalition (Olson, 1982). Their legitimacy and mobilizing structures with international reach can be put "at service" of the marginalized parties' claims.

Yet conflict alone is not sufficient. While it can serve to reduce power asymmetries, its escalation must be followed by negotiations, for instance through top-down mediation or integrative bargaining on procedural rules, which can lead to the accommodation of value heterogeneity (Aligica and Tarko, 2013) within a new institutional architecture. We find that science can play a key role in negotiation and mediation, as it can provide information on the base of which publicly reasonable arguments can be advanced by the different parties. As the cases' reconstruction shows, different contexts will have different institutional resources on which to draw upon. i.e., civil society networks, the judicial system or NGOs, so that strategies diversification seems to be key for achieving change through collective action.

Finally, our dynamic analysis cautions against the quality and duration of any achieved solution: this will depend on the institutional quality provided by the specific context and on continuous efforts, while it could itself become a lock-in that prevents further solutions from emerging (Dubash et al., 2021). The Indonesian case, for instance, shows that if a major player has the option of "exiting" from bargaining, for example due to global capital mobility, satisfying solutions for participated governance are less likely.

Funding

CRediT authorship contribution statement

Sara Lorenzini: Conceptualization, Data curation, Formal analysis, Methodology, Investigation, Writing – original draft, Writing – review & editing. **Nadia von Jacobi:** Conceptualization, Methodology, Supervision, Investigation, Visualization, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Our data are derived from secondary literature which is publicly available

References

Abega, S.C., 1998. Les Pygmées baka, le droit à la différence. Université catholique d'Afrique centrale, Yaoundé, Inades-Formation-Presses.

Adams, W.M., Brockington, D., Dyson, J., Bhaskar, V., 2003. Managing tragedies: understanding conflict over common pool resources. Science 302 (5652), 1915–1916. https://doi.org/10.1126/science.1087771.

Adger, W.N., Brown, K., Tompkins, E.M., 2005. The political economy of cross-scale networks in resources co-management. Ecol. Soc. 10 (2), 9. http://www.ecologyan dsociety.org/vol10/iss2/art9/.

Affolderbach, J., 2011. Environmental bargains: power struggles and decision making over British Columbia's and Tasmania's old-growth forests. Econ. Geogr. 87 (2), 181–206. https://doi.org/10.1111/j.1944-8287.2011.01107.x.

Agrawal, A., Gibson, C.C., 1999. Enchantment and disenchantment: the role of community in natural resource conservation. World Dev. 27 (4), 629–649. https://doi.org/10.1016/S0305-750X(98)00161-2.

Aligica, P.D., 2014. Institutional Diversity and Political Economy: The Ostroms and Beyond. Oxford University Press, New York. ISBN: 9780199843909.

Aligica, P.D., 2018. Public Entrepreneurship, Citizenship and Self-Governance. Cambdrige University Press, Cambridge, UK. https://doi.org/10.1017/9781316888728 ISBN: 9781107186095.

Aligica, P.D., Tarko, V., 2013. Co-production, polycentricity, and value heterogeneity: the Ostroms' public choice institutionalism revisited. Am. Polit. Sci. Rev. 107 (4), 1–16. https://doi.org/10.1017/S0003055413000427.

Almeida, P., 2019. Social Movements: The Structure of Collective Mobilization. University of California Press, Oakland. https://doi.org/10.2307/j.ctvd1c7d7.

Amendolagine, V., von Jacobi, N., 2023. Symbiotic relationships among formal and informal institutions: comparing five Brazilian cultural ecosystems. Econ. Syst. 47 (3) https://doi.org/10.1016/j.ecosys.2023.101092.

Andersson, K., Ostrom, E., 2008. Analyzing decentralized natural resource governance from a polycentric perspective. Policy. Sci. 41 (1), 1–23. https://doi.org/10.1007/s11077-007-9055-6.

Andrade, J.C.S., Dias, C.C., Quintella, R.H., 2001. A dimensão político-institucional das estratégias sócio ambientais: o jogo Aracruz Celulose SA-índios Tupiniquim e Guarani. Ambiente & Sociedade (9), 75–92. https://doi.org/10.1590/S1414-753X2001000900005.

Armstrong, P., 2009. Conflict Resolution and the British Columbia's Great Bear Rainforest. Lessons Learned 1995–2009. Coast Forest Conservation Initiative. Available at: https://coastfunds.ca/wp-content/uploads/2016/07/GBR_PDF.pdf.

Baldwin, E., 2020. Why and how does participatory governance affect policy outcomes? Theory and evidence from the electric sector. J. Public Adm. Res. Theory 30 (3), 365–382. https://doi.org/10.1093/jopart/muz033.

Baldwin, E., McCord, P., Dell'Angelo, J., Evans, T., 2018. Collective action in a polycentric governance water systems. Environ. Policy Gov. 28 (4), 212–222. https://doi.org/10.1002/eet.1810.

Berkes, F., 2002. Cross-scale institutional linkages: perspectives from the bottom up. In: Ostrom, E., Dietz, T., Dolsak, N., Stern, P.C., Stonich, S., Weber, E.U. (Eds.), The Drama of the Commons. National Academy Press, Washington, DC, pp. 293–321.

Bostedt, G., Parks, P.J., Boman, M., 2003. Integrated natural resource management in Northern Sweden: an application to forestry and reindeer husbandry. Land Econ. 79 (2), 149–159. https://doi.org/10.2307/3146864.

British Columbia Government News, 2016a. Releases 1.3.2016. Available at. https://news.gov.bc.ca/releases/2016FLNR0021-000311.

British Columbia Government News, 2016b. 21.12.2016. Available at. https://terrasindigenas.org.br/pt-br/noticia/48995.

Bruns, B., Kimmich, C., 2021. Archetypal games generate diverse models of power, conflict and cooperation. Ecol. Soc. (4), 2. https://doi.org/10.5751/ES-12668-260402.

Bryman, A., 2012. Social Research Methods. Oxford University Press, New York, USA.

Buchanan, J.M., 1975. The Limits of Liberty. Between Anarchy and Leviathan. The University of Chicago Press. ISBN: 978-0865972261.

Buchanan, J.M., Tullock, G., 1962. The Calculus of Consent: Logical Foundations of Constitutional Democracy. The University of Michigan Press, Ann Arbor, USA. https://doi.org/10.3998/mpub.7687.

Burawoy, M., 2017. Social movements in the neoliberal age. In: Paret, M., Runciman, C., Sinwell, L. (Eds.), Southern Resistance in Critical Perspective. Routledge, New York, pp. 21–35. ISBN: 9781315585017.

Cashore, B., 2001. In: Howlett, M., Wilson, J., Hoberg, G., Rayner, J. (Eds.), In search of sustainability: British Columbia forest policy in the 1990. University of British Columbia Press, Vancouver, Canada. ISBN: 0774808306.

Colchester, M., Anderson, P., Firdaus, A.Y., Hasibuan, F., Chao, S., 2011. Human Rights Abuses and Land Conflicts in the PT Asiatic Persada Concession in Jambi. Report of

an Independent Investigation into Land Disputes and Forced Evictions in a Palm Oil Estate. Forest Peoples Programme, SawitWatch and HuMa. Available at: https://www.forestpeoples.org/sites/fpp/files/publication/2011/11/final-report-pt-ap-nov-2011-low-res-1.pdf. last access February 2023.

Cole, D., 2015. Advantages of a polycentric approach to climate change policy. Nat. Clim. Chang. 5, 114–118. https://doi.org/10.1038/nclimate2490.

Colvin, R.M., Bradd Witt, G., Lacey, J., 2015. The social identity approach to understanding socio-political conflict in environmental and natural resources management. Glob. Environ. Chang. 34, 237–246. https://doi.org/10.1016/j.gloenvcha.2015.07.011.

Complaint to Wilmar on PT Asiatic Persada sale agreement, 2013. Available at: http://www.forestpeoples.org/sites/fpp/files/publication/2013/05/complaint-pt-apsalewithoutcommfpicmay2013eng.pdf.

Compliance Advisor Ombudsman (CAO), 2013. Dispute Resolution Conclusion Report – Wilmar 3. Available at: https://www.cao-ombudsman.org/sites/default/files/downloads/Wilmar3ConclusionReportDec2013.pdf.

Conselho Indigenista Missionário, (CIM), 2006. ARACRUZ e Veracel usam aparato do Estado contra índios e trabalhadores rurais. Available at: bit.ly/3WMqiXO.

Conselho Indigenista Missionário, (CIM), 2007. DECISÃO DO MINISTÉRIO DA JUSTIÇA BRASILEIRO: mais uma desilusão para os Tupinikim e Guarani. Available at: https://cimi.org.br/2007/03/25786/.

Cronkleton, P., Taylor, P.L., Barry, D., Stone-Jovicich, S., Schmink, M., 2008. Environmental Governance and the Emergence of Forest-Based Social Movements. Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Derkyi, M., Ros-Tonen, M.A., Kyereh, B., Dietz, T., 2014. Fighting over forest: toward a shared analysis of livelihood conflicts and conflict management in Ghana. Soc. Nat. Resour. 27, 281–298. https://doi.org/10.1080/08941920.2013.861550.

Deutsch, M., 2006. Cooperation and competition. In: Deutsch, M., Coleman, P.T., Marcus, E.C. (Eds.), The Handbook of Conflict Resolution. Wiley publishing, pp. 23–42. ISBN: 0787980587.

Dubash, N., Pillai, A.V., Flachsland, C., Harrison, K., Hochstetler, K., Tyler, E., 2021. National climate institutions complement targets and policies. Science 374 (6568), 690–693. https://doi.org/10.1126/science.abm1157.

Ebbin, S.A., 2004. The anatomy of conflict and the politics of identity in two cooperative salmon management regimes. Policy. Sci. 37 (1), 71–87. https://doi.org/10.1023/B:OLIC.0000035464.24471.89.

Eckerberg, K., Sandström, C., 2013. Forest conflicts: a growing research field. Forest Policy Econ. 33, 3–7. https://doi.org/10.1016/j.forpol.2013.05.001.

FAO, 2020. Global Forests Resource Assessment. Terms and Definitions. Rome, Italy.

Federação das Indústrias do Estado de São Paulo – FIESP, 2006. Nota oficial da Fiesp – Invasão do Portocel. Available at: www.fiesp.org.br.

Fisher, R., Ury, W., Patton, B. (Eds.), 2011. Getting to Yes: Negotiating Agreement without Giving In. Penguin Books, New York.

Fligstein, N., 1997. Social skill and institutional theory. Am. Behav. Sci. 40, 397–405. https://doi.org/10.1177/0002764297040004003. Freedomhouse. Indonesia country report.

Forest Peoples Programme Press Release, 2013. Indonesia: The Governor of Jambi Province must Take Action to Tackle Unscrupulous Conduct of Palm Oil Plantation PT Asiatic Persada. 7th October 2013. Available at: https://www.forestpeoples.org/en/topics/palm-oil-rspo/news/2013/10/press-release-indonesia-governor-jambi-province-must-take-action-t.

Foucault, M., 1975. Surveiller et punir: Naissance de la prison. Gallimard, Paris.

Frischmann, B.M., 2012. Infrastructure - the Social Value of Shared Resources. Oxford University Press, Oxford/New York. https://ssrn.com/abstract=2000962.

Fung, A., Wright, E.O., 2003. Deepening Democracy: Institutional Innovations in Empowered Participatory Governance. Verso Press, London. https://doi.org/10.1177/0032329201029001002.

Gauthier, D., 1987. Morals by Agreement. Oxford University Press. https://doi.org/10.1093/0198249926.001.0001. ISBN: 9780198249924.

Geores, M.E., Dolsak, N., Ostrom, E., McKay, B.J., 2003. The relationship between resource definition and scale: considering the forest (2003). In: The Commons in the New Millennium: Changes and Adaptation. MIT Press, Cambridge, Massachusetts, pp. 77–97. https://doi.org/10.7551/mitpress/1945.003.0012.

Glasl, F., 1999. Confronting Conflict. A First Aid Kit for Handling Conflict. Bristol, Hawthorne Press. ISBN: 9781869890711.

Gong, P., 2002. Editorial - multiple-use forestry. J. For. Econ. 8 (1), 1–4. https://doi.org/10.1078/1104-6899-00001.

Greenpeace, 2005. Lapland: State of Conflict. Forest Rescue Station Briefing.

Haarstad, H., Floysand, A., 2007. Globalization and the power of rescaled narratives: a case of opposition to mining in Tambogrande, Peru. Polit. Geogr. 26 (3), 289–308. https://doi.org/10.1016/j.polgeo.2006.10.014.

Hargrave, T.J., Van de Ven, A.H., 2006. A collective action model of institutional innovation. Acad. Manag. Rev. 31 (4), 864–888. https://doi.org/10.5465/amr.2006.22527458.

Heikkila, T., Thiel, A., Blomquist, W., Garrick, D., 2019. Conflict and conflict resolution in polycentric governance systems (2019). In: Governing Complexity. Analyzing and Applying Polycentricity. Cambridge University Press, New York, pp. 133–151.

Hicks, C.C., et al., 2016. Engage key social concepts for sustainability. Science 352, 38–40. https://doi.org/10.1126/science.aad4977.

Hiller, H.H., 1975. A reconceptualization of the dynamics of social movement development. Pac. Sociol. Rev. 18 (3), 342–360. https://doi.org/10.2307/1388434.

Howlett, M., Rayner, J., Tollefson, C., 2009. From government to governance in forest planning? Lessons from the case of British Columbia great bear rainforest initiative. Forest Policy Econ. 11, 383–391. https://doi.org/10.1016/j.forpol.2009.01.003.

Humphreys, D., 2001. Forest negotiations at the United Nations: explaining cooperation and discord. Forest Policy Econ. 3, 125–135. https://doi.org/10.1016/S1389-9341(01)00039-9.

Institute for Policy Analysis of Conflict. (IPAC), 2014. Indigenous rights vs agrarian reform in Indonesia: a case study from Jambi. In: Indigenous Rights vs Agrarian Reform in Indonesia: A Case Study from Jambi, pp. 1–29. Available at: https://www.jstor.org/stable/resrep07791.1?seq=2.

Jenkins, J.C., 1983. Resource mobilization theory and the study of social movements. Annu. Rev. Sociol. 9 (1), 527–553. https://doi.org/10.1146/annurev.so.09.080183.002523.

Johnson, C., 2004. Uncommon ground: the 'poverty of history' in common property discourse. Dev. Chang. 35 (3), 407–434. https://doi.org/10.1111/j.1467-7660.2004.00359.x.

Johnson, C., Forsyth, T., 2002. In the eyes of the state: negotiating a "rights-based" approach" to forest conservation in Thailand. World Dev. 30 (9), 1591–1605. https://doi.org/10.1016/S0305-750X(02)00057-8.

Joint petition of the Indigenous Suku Anak Dalam Batin Sembilan, 2013. RSPO, Please Stop Protecting Wilmar!. Available at: https://www.forestpeoples.org/sites/default/files/publication/2013/11/sad-petition-english.pdf.

Jordan, A., Huitema, D., Hildén, M., Van Asselt, H., Rayner, T.J., Schoenefeld, J.J., Tosun, J., Forster, J., Boasson, E.L., 2015. Emergence of polycentric climate governance and its future prospects. Nat. Clim. Chang. 5, 977–982. https://doi.org/10.1038/nclimate2725.

Kenfield, I., 2008. Taking on Big Cellulose: Brazilian Indigenous Communities Reclaim their Land. NACLA. Reporting on the Americas. Available at: https://nacla.org/news/taking-big-cellulose-brazilian-indigenous-communities-reclaim-their-land.

King, B., 2008. A social movement perspective of stakeholder collective action and influence. Bus. Soc. 47 (1), 21–49. https://doi.org/10.1177/0007650307306636.

Kroger, M., 2011. Promotion of contentious agency as a rewarding movement strategy: evidence from the MST-paper industry conflicts in Brazil. J. Peasant Stud. 38 (2), 435–458. https://doi.org/10.1080/03066150.2011.559016.

Loureiro, K., 2006. A instalação da empresa Aracruz Celulose S/A e a "moderna" ocupação das terras indígenas Tupiniquim e Guarani Mbya. Revista Ágora 3, 1–32.

Maryudi, A., Sahide, M.A.K., 2017. Research trend: power analyses in polycentric and multi-level forest governance. Forest Policy Econ. 81, 65–68. https://doi.org/10.1016/j.forpol.2017.05.003.

Matiru, V., 2000. Conflict and natural resource management. In: Hart, N., Castro, P. (Eds.), Sustainable Forest Management (SFM) Toolbox. FAO, Rome, Italy. https://www.fao.org/forestry/21572-0d9d4b43a56ac49880557f4ebaa3534e3.pdf.

McAdam, D., Scott, W., 2002. Organizations and movements. In: Davis, G., McAdam, D., Scott, W., Zald, M. (Eds.), Social Movements and Organization Theory. Cambdrige University Press, pp. 4–40. https://doi.org/10.1017/CBO9780511791000.003.

McAdam, D., Scott, W., McCarthy, J.D., Zald, M.N., 1996. Introduction: opportunities, mobilizing structures, and framing processes—toward a synthetic, comparative perspective on social movements. In: McAdam, D., McCarthy, J.D., Zald, M.N. (Eds.), Comparative Perspectives on Social Movements. Cambridge University Press, New York, pp. 1–20. https://doi.org/10.1017/CBO9780511803987.002.

McAdam, D., Scott, W., Tarrow, S., 2018. The political context of social movements. In: Snow, D.A., Soule, S.A., Kriesi, H., McCammon, H.J. (Eds.), The Wiley Blackwell Companion to Social Movements, pp. 17–42. https://doi.org/10.1002/9781119168577.

Metsähallitus press release, 2008. 24.11.2005 in Raitio, K. In: You can't Please Everyone. Conflict Management Practices, Frames and Institutions in Finnish State Forests. Joensuun yliopiston yhteiskuntatieteellisiä julkaisuja nro 86.

Metsähallitus press release, 2020. 28.9.2020. Available at: https://www.metsa.fi/en/press-releases/metsahallitus-drafting-a-new-natural-resources-plan-for-the-sami-homeland/.

Meyer, D.S., 2002. Opportunities and identities: bridge-building in the study of social movements. In: Meyer, D.S., Whittier, N., Robnett, Belinda (Eds.), Social Movements: Identity, Culture and the State. Oxford University Press, New York, USA, pp. 3–21.

Milinski, M., Marotzske, J., 2022. Economic experiments support Ostrom'spolycentric approach to mitigating climate change. Humanit. Soc. Sci. Commun. 9 (442) https://doi.org/10.1057/s41599-022-01436-6.

Mola-Yudego, B., Gritten, D., 2010. Determining forest conflict hotspots according to academic and environmental groups. Forest Policy Econ. 12, 575–580. https://doi.org/10.1016/j.forpol.2010.07.004.

Morrison, T.H., Adger, W.N., Brown, K., Hughes, T.P., 2019. The black box of power in polycentric environmental governance. Glob. Environ. Chang. 57, 101934 https://doi.org/10.1016/j.gloenvcha.2019.101934.

Mosse, D., 1997. The symbolic making of a common property resource: history, ecology and locality in a tank-irrigated landscape in South India. Dev. Chang. 28 (3), 467–504. https://doi.org/10.1111/1467-7660.00051.

Nilakrisna, D., et al., 2016. Social conflicts between oil-palm plantation company and indigenous people in Jambi Province. J. Trop. Life Sci. 6 (2), 113–117. https://doi.org/10.11594/jtls.06.02.09.

Nousiainen, D., Mola-Yudego, B., 2022. Characteristics and emerging patterns of forests conflicts in Europe – what can they tell us? Forest Policy Econ. 136 https://doi.org/10.1016/j.forpol.2021.102671.

Nyyssönen, J., 2022. Frame alignment between environmentalists and the Sámi in the forest dispute in Inari, Finland until the 2000s—competing conservation needs and obstacles for co-living with the non-human. Front. Conserv. Sci. 3, 925713 https://doi.org/10.3389/fcosc.2022.925713.

Oberlack, C., Boillat, S., Brönnimann, S., Gerber, J., Heinimann, A., Speranza, C.I., Messerli, P., Rist, S., Wiesmann, U., 2018. Polycentric governance in telecoupled resource systems. Ecol. Soc. 23 (1) https://doi.org/10.5751/ES-09902-230116.

Obura, D.D., Katerere, Y., Mayet, M., Kaelo, D., Msweli, S., Mather, K., Harris, J., Louis, M., Kramer, R., Teferi, T., Samoilys, M., Lewis, L., Bennie, A., Kumah, F., Isaacs, M., Nantongo, P., 2021. Integrate biodiversity targets from local to global level. A shared earth approach links biodiversity and people. Nature 373 (6556), 746–748. https://doi.org/10.1126/science.abh2234.

Oldekop, J.A., Rasmussen, L.V., Agrawal, A., et al., 2020. Forest-linked livelihoods in a globalized world. Nat. Plants 6, 1400–1407. https://doi.org/10.1038/s41477-020-00814-9.

Olson, M., 1965. The Logic of Collective Action. Harvard University Press, Cambridge.

Olson, M., 1982. The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities. Yale University Press, New Haven, Connecticut.

Ostrom, E., 1990. Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press, New York.

Ostrom, E., 2005. Understanding Institutional Diversity. Princeton University Press, New Jersey.

Ostrom, E., 2009. A Polycentric Approach for Coping with Climate Change. World Bank Working Paper, 5095. https://openknowledge.worldbank.org/handle/10986/4287.

Ostrom, E., 2010. Polycentric systems for coping with collective action and global environmental change. Glob. Environ. Chang. 20, 550–557. https://doi.org/10.1016/j.gloenvcha.2010.07.004.

Ostrom, V., Tiebout, C.M., Warren, R., 1961. The organization of government in metropolitan areas: a theoretical inquiry. Am. Polit. Sci. Rev. 55 (4), 831–842. https://doi.org/10.2307/1952530.

Paavola, J., 2005. Interdependence, pluralism and globalisation: implications for environmental. In: Paavola, J., Lowe, I. (Eds.), Environmental Values in a Globalising World: Nature, Justice and Governance. Routledge, London, pp. 143–158. https://doi.org/10.4324/9780203319628.

Parker, D., 2013. Palm Oil Deal Undermines Efforts to Resolve 25-Year Conflict in Sumatra. Mongabay. https://news.mongabay.com/2013/10/palm-oil-deal-undermines-efforts-to-resolve-25-year-conflict-in-sumatra/.

Patton, M.Q., 2002. Qualitative research & evaluation methods, 3rd ed. Sage Publications, London, p. 688. 0761919716.

Pemunta, N.V., 2018. Fortress conservation, wildlife legislation and the Baka Pygmeys of Southeast Cameroon. GeoJournal 84, 1035–1055. https://doi.org/10.1007/s10708-018-9906-z.

Pondy, L.R., 1967. Organizational conflict: concepts and models. Adm. Sci. Q. 12 (2), 296–320. https://doi.org/10.2307/2391553.

Raitio, K., 2008. You can't Please Everyone. Conflict Management Practices, Frames and Institutions in Finnish State Forests. Joensuun yliopiston yhteiskuntatieteellisiä julkaisuja nro 86. Available at: https://erepo.uef.fi/bitstream/handle/123456789/8791/urn_isbn_978-952-219-117-5.pdf?sequence=1.

Raitio, K., Saarikoski, H., 2012. Governing old-growth forests: the interdependence of actors in great bear rainforest in British Columbia. Soc. Nat. Resour. 25 (9), 900–914. https://doi.org/10.1080/08941920.2011.642462.

Ratner, B.D., Meinzen-Dick, R., May, C., Haglund, E., 2013. Resource conflict, collective action, and resilience: an analytical framework. Int. J. Commons 7 (1), 183–208. https://doi.org/10.18352/ijc.276.

Rede Alerta Contra o Deserto Verde, 2005. Tupinikim e Guarani celebram a conclusão da autodemarcação. Terra é direito dos povos indígenas!. Available at: https://cimi.org.br/2005/05/23516/.

Response from Wilmar, 2013. To Complaint on PT Asiatic Persada Sale Agreement, 20th May 2013. Available at: http://www.forestpeoples.org/sites/fpp/files/publication/2013/05/wilmarreplycomplaintsaleptapmay2013.pdf.

Richardson, H. (Ed.), 2002. Democratic Autonomy: Public Reasoning about the Ends of Policy. Oxford University Press, Oxford. ISBN: 0195150902.

Riseth, J-Å., 2006. Sámi Reindeer Herd Managers: Why Do They Stay in Low-Profit Business? British Food J. 108 (7), 541–559. https://doi.org/10.1108/00070700610676361.

Rocha, D., 2008. O papel do Estado nos conflitos socioambientais no Brasil: um estudo sobre o conflito entre as comunidades indígenas Tupiniquins e Guaranis e a Aracruz Celulose S.A. no norte do Espírito Santo. Instituto de Ciências Humanas e Filosofia, Universidade Federal Fluminense, Niterói, 2008.

Roturier, S., Roué, M., 2009. Of forest, snow and lichen: Sámi reindeer herders' knowledge of winter pastures in northern Sweden. For. Ecol. Manag. 258 (9), 1960–1967. https://doi.org/10.1016/j.foreco.2009.07.045.

Saakiroski, H., Raitio, K., Barry, J., 2013. Understanding 'successful' conflict resolution: policy regime changes and new interactive arenas in the great bear rainforest. Land Use Policy 32, 271–280. https://doi.org/10.1016/j.landusepol.2012.10.019.

Sandström, C., Moen, J., Widmark, C., Danell, Ö., 2010. Progressing toward co-management through collaborative learning: forestry and reindeer husbandry in dialogue. Int. J. Biodivers. Sci. Manag. 2 (4), 326–333. https://doi.org/10.1080/17451590609618153.

Sarkki, S., Heikkinen, H.I., 2010. Social movements' pressure strategies during forest disputes in Finland. J. Nat. Resour. Policy Res. 2 (3), 281–296. https://doi.org/10.1080/19390459.2010.487991.

Schelling, T.C., 1956. An essay on bargaining. Am. Econ. Rev. 46 (3), 281–306. http://www.jstor.org/stable/1805498 (Accessed 1 Mar. 2023).

Schlüter, A., von Detten, R., 2011. Socio-economics in forestry. Eur. J. For. Res. 130, 325–328. https://doi.org/10.1007/s10342-010-0466-0.

Schurman, R., 2004. Fighting "frankenfoods": industry opportunity structures and the efficacy of the anti-biotech movement in western Europe. Soc. Probl. 51, 243–268. https://doi.org/10.1525/sp.2004.51.2.243.

Scott, J.C., 2020. Seeing like a State: How Certain Schemes to Improve the Human Condition have Failed. Yale University Press.

Searle, J.R., 1995. The Construction of Social Reality. Allen Lane, London. ISBN 9780140235906.

Searle, J.R., 2005. What is an institution? J. Inst. Econ. 1 (1), 1–22. https://doi.org/10.1017/S1744137405000020.

Sen, A., 1998. Reason Before Identity. Romanes Lecture. Oxford University. ISBN 0199513899.

Setyo Pratiwi, T., 2018. Understanding the movement of Suku Anak Dalam Bathin Sembilan against land conflict with PT. Asiatic Persada in Jambi through social movement theory. Jurnal Transborders 2 (1), 1–12. https://doi.org/10.23969/transborders.v2i1.859.

Simbaña, F., 2011. El sumak Kawsay como proyecto politico (2011). In: Lang, M., Dunia, M. (Eds.), Más allá del desarrollo. Rosa Luxemburg Foundation, Permanent Working Group on Alternatives to Development. Editorial El Conejo, Quito, Ecuador, pp. 219–226.

Slocombe, D.S., 1993. Implementing ecosystem-based management. BioScience 43 (9), 612–622. https://doi.org/10.2307/1312148.

Smith, M., 2010. Place of Power: Lessons from the Great Bear Rainforest. Tides Canada Foundation. ISBN 978-0-9867825-0-3. Available at: https://greatbearrainforesttrust.org/wp-content/uploads/2020/11/GBR-Activism.pdf.

Snow, D.A., Benford, R.D., 1988. Ideology, frame resonance, and movement participation. Int. Soc. Mov. Res. 1, 197–218 (ISBN: 0892329556).

Sranko, G.R., 2011. Collaborative governance and a strategic approach to facilitating change: lessons learned from forest agreements in south East Queensland and the great bear rainforest. J. Soc. Mov. 3 (1), 210–239. Available at: https://www.interfacejournal.net/wordpress/wp-content/uploads/2011/05/Interface-3-1-Sranko.pdf.

Steinebach, S., 2013. "Today we occupy the plantation – Tomorrow Jakarta": indigeneity, land and oil palm plantations in Jambi. In: Adat and Indigeneity in Indonesia: Culture and Entitlements between Heteronomy and Self-Ascription [Online]. Göttingen University Press, Göttingen. Available at: http://books.openedition.org/gup/170>. ISBN:9782821875487.

Stephan, M., Marshall, G., McGinnis, M., 2019. An introduction to polycentricity and governance (2019). In: Thiel, A., Blomquist, W., Garrick, D. (Eds.), Governing Complexity. Analyzing and Applying Polycentricity. Cambridge University Press, New York, USA, pp. 21–44. https://doi.org/10.1017/9781108325721.002.

Tarrow, S., 2011. Power in Movement: Social Movements and Contentious Politics, 3rd ed. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511813245.

The Indigenous Circle of Experts and participants of the Northern Regional Gathering on Indigenous Protected and Conserved Areas (IPCAs), 2018. We Rise Together. Achieving Pathway to Canada Target 1 Through the Creation of Indigenous Protected and Conserved Areas in the Spirit and Practice of Reconciliation. ISBN 978-0-660-25571-2. Available at: https://publications.gc.ca/collections/collection_2018/pc/R62-548-2018-eng.pdf.

Thiel, A., Moser, C., 2019. Foundational aspects of polycentric governance. Overarching rules, social-problem characteristics and heterogeneity (2019). In: Thiel, A., Blomquist, W., Garrick, D. (Eds.), Governing Complexity, Analyzing and Applying Polycentricity. Cambridge University Press, New York, pp. 65–90. https://doi.org/10.1017/9781108325721.004.

Toch, H., 1965. The Social Psychology of Social Movements. Bobbs-Merril Co, New York, USA. https://doi.org/10.4324/9781315869704.

Troast, J.G., Hoffman, A.J., Riley, H.C., Bazerman, M.H., 2002. Institutions as barriers and enablers to negotiated agreements: institutional entrepreneurship and the Plum Creek habitat conservation plan. In: Hoffman, A.J., Ventresca, M.J. (Eds.), Organizations, Policy and the Natural Environment: Institutional and Strategic Perspectives. Stanford University Press, Palo Alto, CA, pp. 235–261 (ISBN: 0804741956).

Tsing, A.L., 2004. Friction: An Ethnography of Global Connection. Princeton University Press, New Jersey.

Ukridi, L., Walter, M., 2011. Dimensions of environmental justice in anti-gold mining movements in Latin America. Geoforum 42, 683–695.

Union of British Columbia Municipalities (UBCM), 2000. Task Force Report on the Coast Forest Conservation Initiative (CFCI). Policy Paper #5. Available at: https://www.ubcm.ca/sites/default/files/2021-07/Policy%2520Paper%25205-Task%2520Force%2520Report%2520on%2520the%2520Coast%2520Forest%2520Conservation%2520Initiative%2520%28CFCI%29-2000.pdf.

Villamayor-Tomas, S., García-López, G., 2018. Social movements as key actors in governing the commons: evidence from community-based resource management cases across the world. Glob. Environ. Chang. 53, 114–126. https://doi.org/10.1016/j.gloenvcha.2018.09.005.

Voronov, M., Weber, K., 2017. Emotional Competence, Institutional Ethos and the Heart of Institutions. Academy of Management Review. https://doi.org/10.5465/amr.2016.0522.

Wagner, R.E., 2019. Governance within a system of entangled political economy. Forest Policy Econ. 107 https://doi.org/10.1016/j.forpol.2019.05.00.

Weede, E., 1985. Dilemmas of social order: collective and positional goods, leadership and political conflicts. Sociol. Theory 3 (2), 46–57. https://doi.org/10.2307/202224.

White, R.M., Fischer, A., Marshall, K., Travis, J.M., Webb, T.J., Di Falco, S., Redpath, S. M., Van der Wal, R., 2019. Developing an integrated conceptual framework to understand biodiversity conflicts. Land Use Policy 26 (2), 242–253. https://doi.org/10.1016/j.landusepol.2008.03.005.

Wilson, J., 1973. Introduction to Social Movements. Basic Books, New York, USA. https://doi.org/10.1093/sf/53.1.146.

Wohlleben, P., 2021. Der lange Atem der Bäume. LUDWIG Verlag (ISBN 978-3-453-28094-6.).

World Rainforest Movement, 2005. Brazil: Tupinikim and Guarani peoples restart their struggle against Aracruz. Bulletin 94. Available at: https://www.wrm.org.uy/bullet

in-articles/brazil-tupinikim-and-guarani-peoples-restart-their-struggle-against-arac
ruz.

World Rainforest Movement, 2006. Brazil: the federal police invade Tupiniquim and Guarani villages on land recovered from Aracruz celulose plantations. Bulletin 102. Available at: https://www.wrm.org.uy/bulletin-articles/brazil-the-federal-police-invade-tupiniquim-and-guarani-villages-on-land-recovered-from-aracruz-cel ulose-plantations.

World Rainforest Movement, 2021. A struggle lasting more than 40 years. Bulletin 258. Available at: https://www.wrm.org.uy/bulletin-articles/a-struggle-lasting-more-th an-40-years.

Xu, J., 2021. Conflicts in multi-level governance: an analysis of international climate policy implementation at the sub-national level. In: Global Public Policy and Governance, 1, pp. 401–420. https://doi.org/10.1007/s43508-021-00029-4.

Yasmi, Y., 2003. Understanding conflict in the co-management of forests: the case of Bulungan research forest. Int. For. Rev. 5 (1), 38–44. https://doi.org/10.1505/IFOR.5.1.38.17424.

Yasmi, Y., Schanz, H., Salim, A., 2006. Manifestation of conflict escalation in natural resource management. Environ. Sci. Pol. 9 (6), 538–546. https://doi.org/10.1016/j.envsci.2006.04.003.

Yasmi, Y., Kelly, L., Enters, T., 2011. Forest conflict in Asia and the role of collective action in its management. In: CAPRi Working Paper No. 102. International Food Policy Research Institute, Washington, D.C.. https://doi.org/10.2499/CAPRiWP102

Young, I.M., 2000. Inclusion and Democracy. Oxford University Press, New York. https://doi.org/10.1093/0198297556.001.0001.

Young, O., 2006. Vertical interplay among scale-dependent environmental and resource regimes. Ecol. Soc. 11, 1. https://doi.org/10.5751/ES-01519-110127.

Zeuthen, F., 1930. Problems of Monopoly and Economic Warfare. Routledge and Kegan Paul. ISBN 9780815371588.

Zietsma, C., Winn, M., 2008. Building chains and directing flows. Strategies and tactics of mutual influence in stakeholder conflicts. Bus. Soc. 47 (1), 68–101.